GLOBAL ASSOCIATION
Master's in Development Practice Programs

Sustainable Development Practice: Advancing Evidence-Based Solutions for the Post-2015 Agenda

Proceedings of the 2013 International Conference on Sustainable Development Practice

Edited by
Rodrigo Medeiros
Larry Swatuk

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Global Association of Master's in Development Practice Programs
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Global Association of the Master's in Development Practice Programs

The Global Association of Master's in Development Practice (MDP) programs arises from a shared commitment to forge a new profession of sustainable development practice that integrates the social sciences, natural sciences, health sciences and management. lntellectual foundational support was provided in the 2008 report of the *Intemational Commission on Education for Sustainable Development Practice*, supported by the MacArthur Foundation.

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2013 ICSDP is the first annual Conference on Sustainable Development Practice organized by the Global Association of the MDP programs in partnership with the United Nations Sustainable Development Solutions Network (UN-SDSN)

PREFACE

More than a year ago, an ocean away from New York, in the beautiful African city of Dakar, Senegal, the seeds for the First International Conference on Sustainable Development Practice (ICSDP) were planted. At a February 2013 meeting of about 70 faculty members from 24 academic institutions from around the world the idea was discussed. Why not? was the collective and supportive response. All of the attendees at the meeting were in Dakar for one reason— to find solutions to the complex challenges of sustainable development. If a conference could bring others into the dialogue, then a conference would be organized. Thus in an auditorium at Université Cheikh Anta Diop, Dakar, it was decided that the Global Association of Master's in Development Practice programs (www.globalmdp.org) would partner with the Sustainable Development Solutions Network (http://unsdsn.org/) to launch the first ICSDP.

Once back in New York City a small handful of people in an office at Columbia University began the task of organizing the conference. And, almost as immediately, students, scholars and practitioners from all over the world responded positively to the call for abstracts and proposals. Even more exciting was the fact that within a few weeks many knowledgeable, skilled and talented people volunteered to assist the organizers; and, it is because of their belief in the need for such a conference that on September 6 & 7, 2013 ICSDP opened its doors to many interested and engaged attendees who participated in the conference.

On behalf of the Global Association of the Master's in Development Practice Programs, we would like to thank everyone who worked on making the First International Conference on Sustainable Development Practice such a success. From the President of the Global Association to the Support Team, everyone played a crucial role in bringing this conference to fruition. Without everyone's time, energy and ideas ICSDP 2013 would not have been possible.

Thank you!

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Global MDP Secretaria, Columbia University, USA

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Introduction

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With 2015 just over the horizon, the Millennium Development Goals (MDGs) process is drawing to a close, and there is much stock-taking underway. How well has the world fared over the last 15 years? What worked especially well, what were the stumbling blocks, and what are the challenges that lie ahead? What are the most important lessons to be learned from this complex, global process? Most importantly, in light of what was and was not achieved, what comes next? In the spirit of 'what comes next', the Global Association of Master's in Development Practice – a network of 24 universities worldwide; see http://globalmdp.org/) – partnered with the Earth Institute at Columbia University (see http://www.earthinstitute.columbia.edu/sections/view/9) and the UN Sustainable Development Solutions Network (SDSN; see http://unsdsn.org/) to bring together scholars and practitioners from around the world in the 1st International Conference on Sustainable Development Practice (ICSDP) to reflect on the important theme of 'advancing evidence-based solutions for the post-2015 sustainable development agenda'.

The conference was organized around 12 themes. These themes mirror the Thematic Groups created by the SDSN which comprise 'leading scientists, engineers, academics and practitioners from business and civil society to promote solutions to key challenges of sustainable development. The Thematic Groups are solution oriented rather than research oriented and aim to identify practical solutions to the challenges of sustainable development' (http://unsdsn.org/what-we-do/thematic-groups/). These groups are as follows:

1. Macroeconomics, Population Dynamics, and Planetary Boundaries
2. Reducing Poverty and Building Peace in Fragile Regions
3. Challenges of Social Inclusion: Gender, Inequalities and Human Rights
4. Early Childhood Development, Education and Transition to Work
5. Health for All
6. Deep Decarbonization Pathways
7. Sustainable Agriculture and Food Systems
8. Forests, Oceans, Biodiversity and Ecosystem Services
9. Sustainable Cities: Inclusive, Resilient and Connected
10. Good Governance of Extractive and Land Resources
11. Global Governance and Norms for Sustainable Development
12. Redefining the Role of Business for Sustainable Development

Each Thematic Group has been tasked with addressing a set of five challenges: (i) identifying the main risks to 'business as usual'; (ii) identifying critical pathways to sustainable development, as well as highlighting the obstacles and lessons learned from the application of theory to practice; (iii) articulating 'the toughest questions' that need to be resolved within each thematic area; (iv) identifying the solutions presently available, as well

assessing why or why not they are being implemented, and reflecting on the ability to scale-up best practices; and (v) identifying the key metrics of sustainable development that must be developed and monitored; and reflecting on the ways the MDGs provided necessary and relevant data and support for achieving sustainable development. This conference provided scholars and practitioners with the opportunity to engage directly with the SDSN process. Given that one of the main partners in the conference was the MDP Association, there was a strong emphasis on providing young scholars and practitioners with a platform for presenting their work and engaging not only with the SDSN but with each other across MDP partner institutions, with students and faculty from other universities, and with members of the private sector and civil society from across the globe. The conference attracted 68 papers and posters, many of them multi-authored. It also involved keynote addresses from Jeffrey Sachs (Director, Earth Institute), Guido Schmidt (Executive Director, UN SDSN), David Donoghue (Permanent Representative of Ireland to the United Nations), and Amina J. Mohamed (UN Secretary General's Special Advisor on Post-2015 Development Planning), as well as a series of practice-oriented workshops involving members of the private sector and civil society.

Included here are 37 of these papers, constituting an innovative, eclectic and stimulating entry point for thinking about the key issues of sustainable development as we move toward the post-MDG era. As the reader will see, the themes are unequally represented with themes 1, 2, 4 and 6 comprising a total of only five papers. This in no way reflects our priorities, but rather the fact that we issued an open call for the 1st ICSDP and what you see here reflects the research and practice interests and strengths of those who were able to participate. As we move toward the 2nd ICSDP in New York in 2014, we are striving to achieve solid representation across all twelve of the thematic areas. While not following a strict peer-review process, the papers have been vetted for quality in several ways: the submission process was overseen by a scientific committee; the papers were read by scientific committee members who were organized by theme and feedback was sent to authors; the authors were asked to reflect on the feedback they received at the meeting and to incorporate it into their final papers. The editors, acting on behalf of the organizing committee, wanted to be as inclusive as possible with this collection, so it was left to the authors as to whether they wanted to be included or not: 'Ultimately you should sink or swim on your own merits!' they were told. We believe, and no doubt the reader will agree with us, that what we have produced here is a solid set of papers reflective of the spirit of positive change that is a hallmark of both the MDP association and the SDSN.

Despite the diversity of subject area, geographical region, methodology and theoretical approach, there are nevertheless five key theme areas that draw the collection together: (i) actor networks; (ii) tools; (iii) concepts; (iv) innovations; and (v) sustainable development. First, with regard to actor networks, what one sees across the papers is the emergence of creative mixed-actor coalitions: the state and civil society; social movements; (gender- or age-specific) cooperatives and collectives; and, more commonly the state-civil society-private sector arrangements variously labelled as P3, P4 or P5 approaches to development. Not one paper argues for a single-actor, single-focused approach. To the contrary, 'participation' is broadly defined and no constellation of particular actors is ruled out. This is quite surprising when one considers the issues at play: from affordable vaccines to national food security; from urban service delivery to laptops for kids; from earthquake recovery plans and programs to waste management.

The second area of connection involves tools for development. In order to advance evidence-based solutions for the post-2015 world, it is important that scholars and practitioners be able to show the results of their efforts. As shown in the papers in this collection, the tools at hand are often lacking in some way, so new approaches and/or new ways of using information that is already available must be devised. What we see across the papers are innovative ways of gathering information, analyzing data, and framing issues and challenges through such things as: use of 'big data'; creation of multidimensional indexes; utilization of indigenous knowledge and practice; development of community-scoping frameworks for urban sustainability plans; development of simulation exercises, sustainable development techniques and ways of bringing into the public eye issues and concerns that are too often overlooked. New measurement tools and metrics are often introduced, such as

the valuation of water as an economic good, or the addition of 'green water' into water audits. The diversity of these tools matches the diversity of the areas in which they are applied: from improved business performance to establishing empirically-quantifiable baselines of natural capital (forests; biodiversity; water; ecotourism; national parks; and so on).

This leads necessarily on to the third area of overlap: concepts. It is clear that finding sustainable solutions will require, across all twelve thematic areas, new ways of seeing and thinking about the challenges to hand. We often hear the phrase, 'thinking outside of the box', but in this collection we often see it. For example, poverty, which is often thought of as a stock (i.e. there are x per cent of a population in poverty), is here defined as a flow. There are lessons drawn from rural India to suggest solutions to abiding problems of inner-city poverty in Canada. Planetary boundaries are mapped out for humanity in a norm setting exercise. New concepts such as benefit sharing, green water, sustainable diets, wisdom dialogues, eudemonia as a social goal and conditional capacity for achieving food security are articulated to help practitioners better understand the nature of the challenge. Policy coherence is presented, not just as an administrative goal but as a benchmark for good governance. In order to sensitize the public, contaminated 'hot spots' are shown to threaten as many people in the global South as does malaria or airborne pollutants. The Labdoo group show us how to build what they call a humanitarian social network to deliver laptops to schools around the world. Everywhere, the potential of aboriginal groups, youth, women, and the disabled is demonstrated. Simple and long-known technologies, such as tree planting, are shown to be effective not out-dated; new ideas are tested and some are found wanting – but better to have tried and failed than to not have tried at all.

A hallmark, therefore, of the papers in this collection is their belief in the possibility of change. To quote the OECD Environmental Policy Committee, cited in one of the papers, 'resource efficiency is not a choice, it is inevitable'. Rather than fear change, the authors of these papers showcase people's willingness to embrace it. The fourth common theme, therefore, is one of innovation: micro-hydro; food waste and rural sanitation as business opportunities; private goods recast as public goods; critical interrogations of 'business as usual' to maximize both profit and social good; the promotion of resource exchange – be it surplus or waste – among businesses to promote both sustainability and profitability. The list goes on and on.

The fifth area of agreement, then, is the fact that all of the authors accept sustainable development as the appropriate framework for action. To be sure, the authors recognize that the term itself has too often been transformed into a contextual setting for diverse and often ideologically-opposed actors to come together and argue about frameworks for action, which is sometimes code for 'defending business as usual'. But none view this as a reason not to move forward. If we were to sum up the main message that stretches across the vast conceptual, theoretical and empirical terrain of this collection it is this: Do whatever works, wherever it is needed; be as creative as possible with the tools at hand; be critical and reflective; reach out to whoever you need in order to get things done; show the value of the action through better concepts and measures; and don't be afraid to fail.

While this collection offers no systematic approach to answering the five challenges asked of the leaders of the SDSN Thematic Groups outlined above, it does offer a hopeful message for the post-2015 world: there is an incredible amount of energy being expended on a lot of positive things. Granted, there are setbacks as well as successes. As will become apparent to the reader soon enough, in our view it is equally important to show the losses as well as the gains. In that way, perhaps, we can begin to see how to make the most of our efforts, to limit the negative outcomes and to broadly share the benefits of development practice broadly defined.

Section 1

Macroeconomics, Population Dynamics, and Planetary Boundaries

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Chapter 1

The Value of Water: Macroconomics of Water for a Sustainable Use

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Abstract

The following work deals with a very controversial, but nevertheless very important topic in the sustainable management of water as a natural resource: the value of water and the macroeconomics of water. Population growth, increasing demand, climate change and declining water supplies present a short term and medium term outlook where water stress and shortages may keep arising. Water stress is a situation that arises "when water demand is more important than the amount available for a specified period or when it is restricted by its low quality." This in turn "causes deterioration of resources fresh water in terms of quantity (aquifer overexploited, dry rivers, etc..) and quality (eutrophication, organic matter pollution, saline intrusion, etc..). "(UNEP 2012) If global patterns continue, we can see that we are headed into an increasingly complex landscape where water mismanagement increasingly compromises water availability. Added to this we have the phenomenon of climate change, which is already having an impact on water systems and cycles globally. This is why we must change the ethnocentric approach of our current development model, where resources are exploited without regard for the future. This analysis will use another approach based on sustainable development, and will go beyond ideological approaches and economic or political agendas, to treat water management and the macroeconomics of water pragmatically. Life on the planet depends on our success to manage our water resources in an efficient, responsible, and fair manner; this paper provides the general guidelines and practical recommendations to do so.

I. Introduction

The following work deals with a very controversial, but nevertheless very important topic in the sustainable management of fresh water as a natural resource: the value of clean potable water and water economics.

Population growth, increasing demand, climate change and declining water supply forecasts make the short and medium term outlook where global water stress may keep arising. Water stress is a situation that arises "when water demand is more important than the amount available for a specified period or when it is restricted by its low quality." This in turn "causes deterioration of fresh water resources water in terms of quantity (overexploited aquifer, dry rivers, etc.) and quality (eutrophication, organic matter pollution, saline intrusion, etc.)"(UNEP 2012). If global patterns continue, we can see that humanity is headed to an increasingly complex landscape where water mismanagement can increasingly compromise availability. Added to this, "we have the phenomenon of climate change, which is already having an impact on water systems and cycles globally." (Gabaldón 2012)

This is why we must change the ethnocentric approach of current development models, where resources are exploited in the present without regard for the future. That is why in this analysis we will use another approach based on sustainable development. This approach goes beyond ideological approaches and economic or political currents. It is an attempt to treat the subject of water management pragmatically, by addressing the value of water from both a human development and economic approach.

II. Theoretical Framework

The approach that will be applied to the water economics in this paper is based on the following definition of Sustainable Development: "Meeting the needs of the present without compromising the ability of future generations to meet their own needs." (Brundtland Report 1987)

This definition came from two different, and sometimes antagonizing, disciplines that had a common concern: sustainability. The first discipline, economics, worries about the effects of unlimited economic growth, and on the false premise that natural resources are inexhaustible. The second discipline, ecology, emerges as a posture of defense of the environment and nature. This defense is given against the attack, caused by the consumption patterns of the world, which points to the progressive and in some cases irreversible destruction of the environment and nature.

These two schools of thought formally conciliated at the World Commission on Environment and Development of the United Nations in 1983. This commission was created by the General Assembly of the United Nations in 1983 and bears the fruit of the Brundtland Report. This report, also called "Our Common Future" is a socio- economic report prepared by different nations to the UN in 1987, and its development was headed by Dr. Gro Harlem Brundtland. In this report we see the formal convergence of sensitive economic and environmental schools giving way to a new development paradigm under the name of Sustainable Development.

This definition is the basis for the analysis that will be undergone in this work. Sustainable Development's five dimensions will be considered. These dimensions are: political, social, economic, environmental, and cultural. (Duque 2012) Even though one might tend to associate water to a particular dimension, its underlying importance extends to all five dimensions.

When referring to water as a natural resource throughout this work, the reader must think of clean potable water. The definition, components, and overall quality of clean potable water will inevitably vary globally. The management and specific valuation analysis may also vary locally due to the aforementioned variables. However, the main general analysis and economic principles discussed can be applied globally.

The analysis brings forth the dilemma that presents an inescapable dichotomy between economic development and environmental conservation. This tradeoff seems to be an apparently unsolvable dilemma, but sustainable development, supported by analysis of this sort, aims to become a viable alternative.

III. Current Outlook

Access to clean water has been recognized by the countries of the world as a basic human right. The sixty-fourth session of the UN General Assembly in 2010, declared water and sanitation as a human right through the following resolutions:

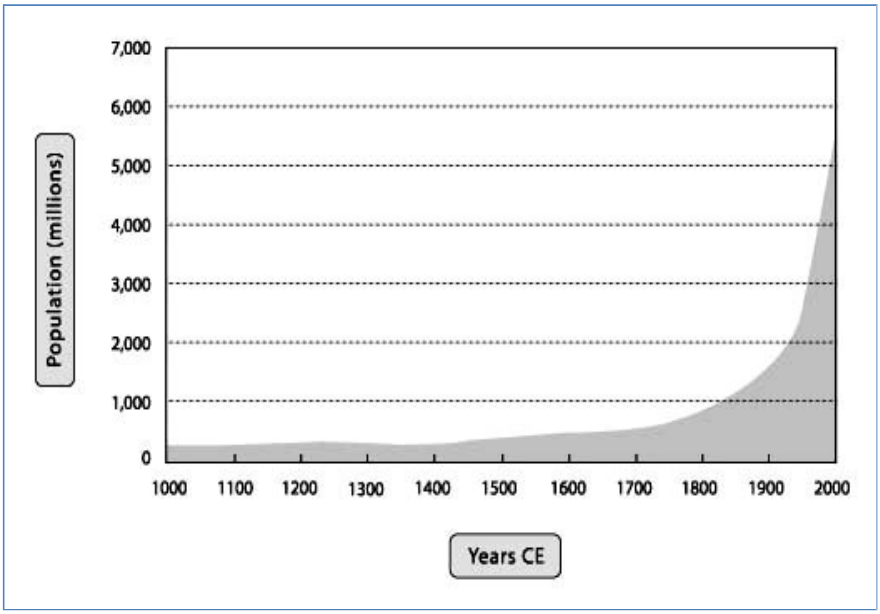
> **1.** "Declares the right to safe drinking water and sanitation as a right.
>
> **2.** Calls upon States and international organizations to provide financial resources and foster the capacity building and technology transfer through international assistance and cooperation, in particular to developing countries, in order to intensify efforts to provide all people affordable access to safe water and sanitation;

> **3.** Welcomes the decision of the Human Rights Council to request the independent expert on the issue of human rights obligations related to access to safe drinking water and sanitation present an annual report to the General Assembly 17, and encourages the independent expert to continue working on all aspects of its mandate and in consultation with all agencies, funds and programs of the United Nations, to include in its report to the Assembly at its sixty-sixth session of the main difficulties related to the realization of the human right to clean drinking water and sanitation, and the effect of these on the achievement of the Millennium Development Goals."

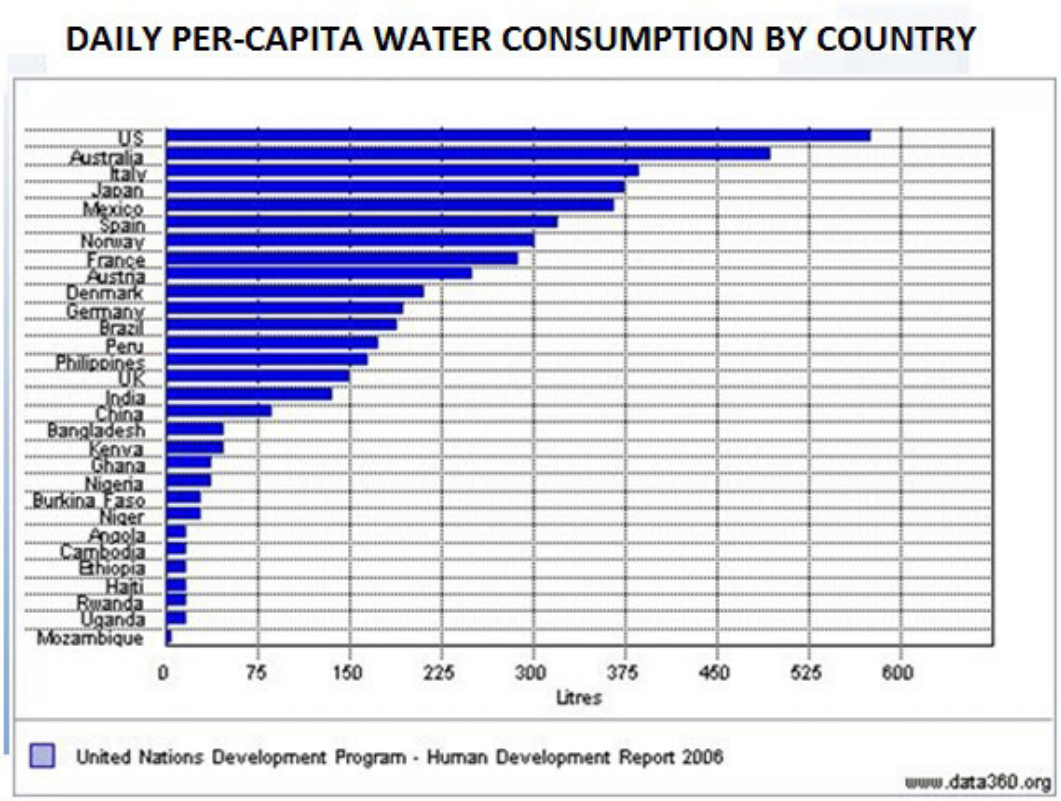
Thus, water is recognized as a human right essential to the full enjoyment of life and all human rights. Water is the basis for life on the planet and central to the life and development of human beings. Among human development goals of the Millennium, MDGs, the UN provided the basis for an agreement between 193 countries that agreed 8 goals to be met by 2015. Water plays an important role in human development. So much so that within Goal 7 (Ensure environmental sustainability), the main indicator to be achieved is "halve, by 2015, the proportion of people without sustainable access to safe drinking water and basic sanitation." (UNDP 2013). Furthermore, ongoing UN My World 2015 global survey from 194 countries is showing "access to clean water and sanitation" as a top five priority among a pool of 16 human development priorities.

If we consider that currently only 83% of the population has access to drinking water, then we have more than one billion people that are left without access to safe drinking water (WHO 2004). This alarming figure of 17% of the global population without access to safe drinking water presents a significant challenge for the countries of the world. Furthermore, "each year about 1.5 million children under 5 years die, and 443 million school days are lost, as a result of diseases related to water and sanitation" (UN 2010). Governments are faced with a difficult dilemma, diminishing water resources versus growing demand. This is where another big dilemma comes into play; the value of water. Is the natural resource of water a universal human right or a scarce economic good?

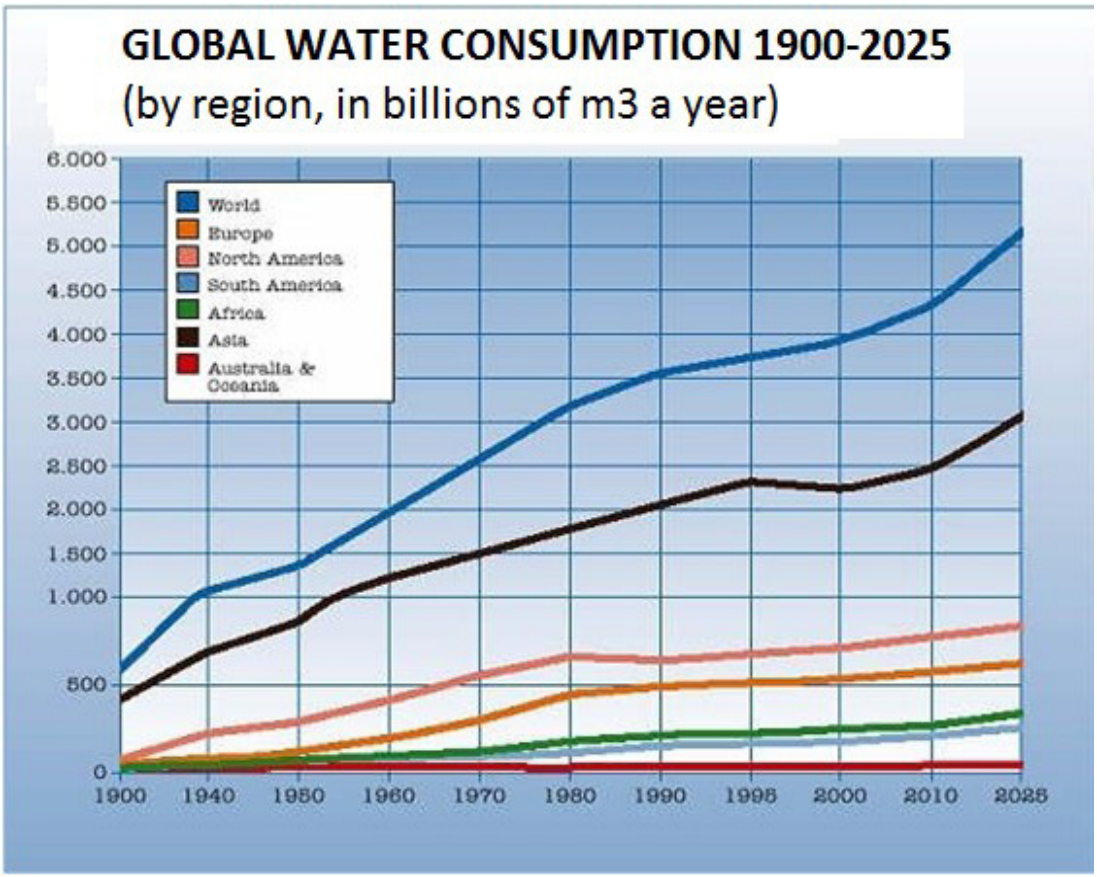
Population growth in the last 1000 years



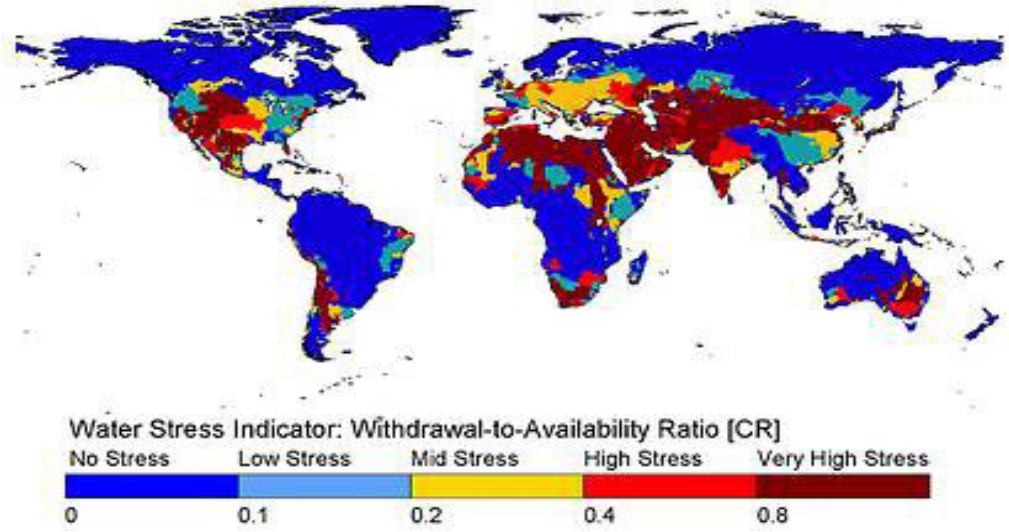
Source: World Bank 2012



Source: UNDP 2006



Source: UNEP 2010

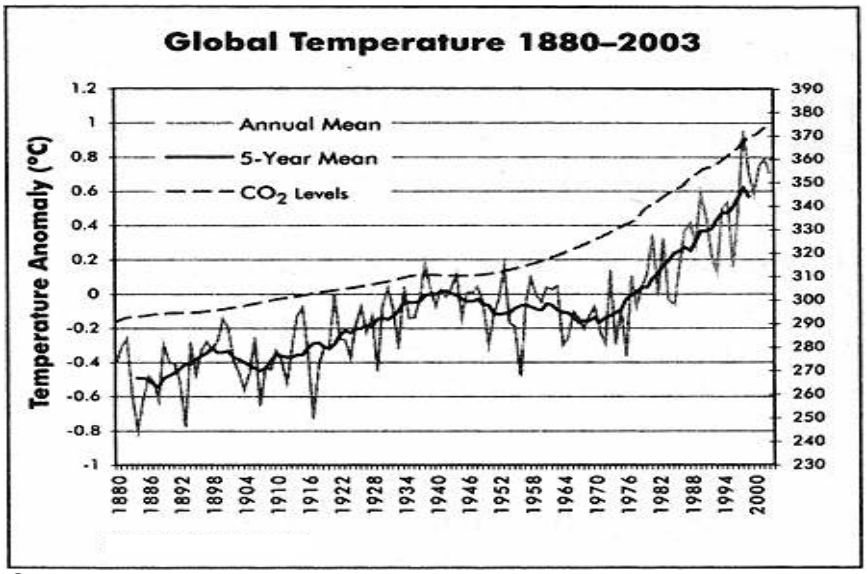


Source: Alcamo et al. 2000 at Gabaldón 2012

IV. Climate Change

Climate change and its causes, is another issue of great complexity and great controversy. This is why we will only contemplate and consider the effects of this phenomenon. All this in order to avoid getting into controversies of causality, but rather directly address the subject that interests us: climate change and its impact on the global potable water supplies.

Climate change, comprises two stages, natural climate variability and changes arising "directly or indirectly to human activity." The latter "alters the composition of the global atmosphere and adds to natural climate variability observed over comparable time periods." (UNFCCC 1992). The first and most obvious effect of climate change is global warming understood as the general increase in global temperatures caused by increased greenhouse gases. The following graph shows the historical trend in the global temperature increase.

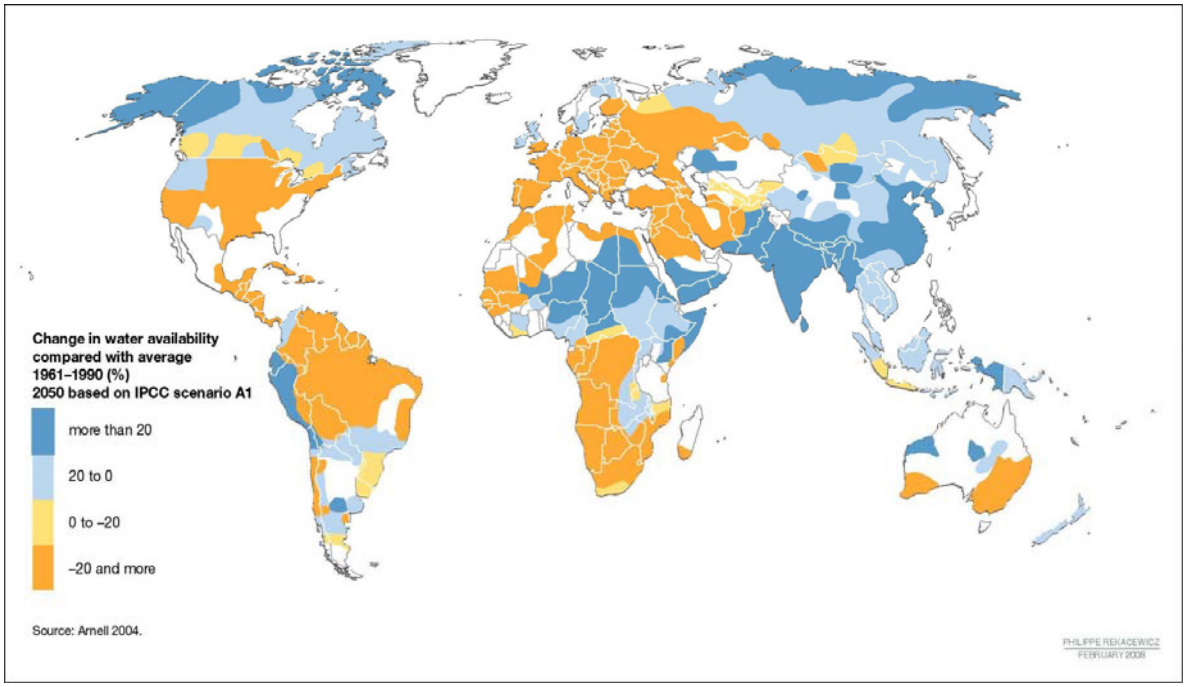


Source : giss.nasa.gov

The overall increase in temperature has affected the hydrological cycle. Not surprisingly, this occurs because water systems that are intrinsically linked to the levels of rainfall and runoff. These in turn are dependent on the evaporation and air currents, which are directly determined by the temperature and atmospheric composition.

It is so that we have global water systems have intensified sometimes bringing disruption and crisis. The general trend shows that in high rainfall areas, rainfall has tended to continue to increase, while in the lower rainfall areas, rainfall has tended to continue to decline. This phenomenon can be seen clearly in the figure below:

Water Systems' Global Trends



Source: (Arnell 2004)

Based on this data, we have that climate change will tend to reduce runoff in areas of low rainfall, becoming another negative factor as to what concerns water stress. This is why we should seriously consider the effects of this phenomenon on water planning in the long term.

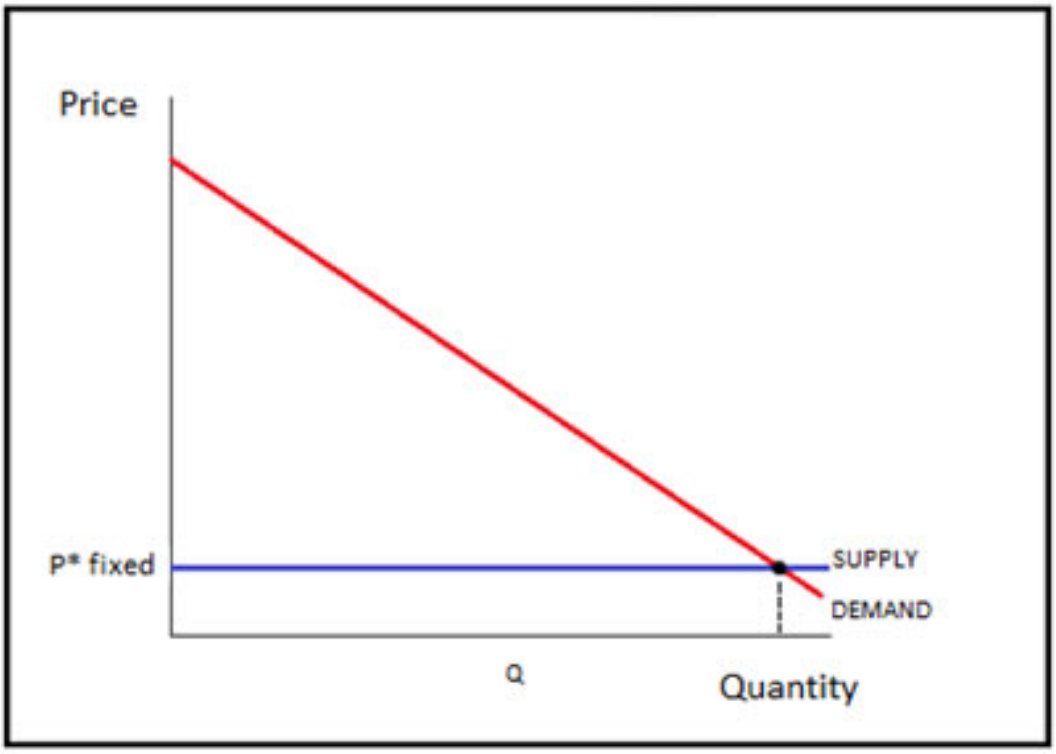
V. Water as a free Universal Human Right?

If we speak of water as a basic human right, then we must assume that governments of nations must ensure free, or low cost of water resources to the most needy. This school of thought is very popular in developing countries, with high levels of poverty. This is the case "especially in Latin America, where privatization efforts have led to catastrophic social effects." (Gabaldón 2012) Such is the case of the so-called water war in Bolivia in 1999, where poor planning, corruption, and social insensitivity shot a series of protests that ended with the failed privatization of water in Cochabamba.

We can say that social justice and sustainable social development involve universal access to safe drinking water. However, one cannot assume that we have an unlimited supply of potable water in the world. On the contrary, more and more we are destroying basic ecosystems that support water cycles, more and more polluting groundwater reservoirs, and with population growth that puts pressure on water demand. This is why water,

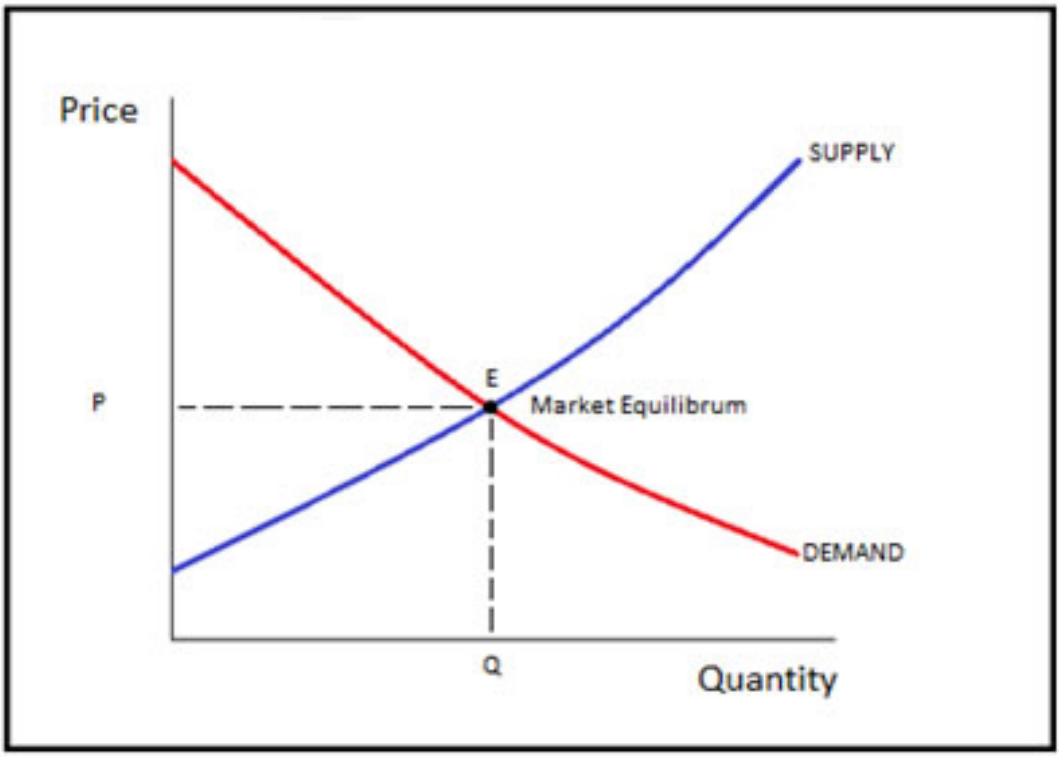
despite being a basic human right, is also a resource that has economic value. It is a scarce resource; therefore it has an intrinsic economic value. According to basic economic principles, increasing the demand of a finite good or service, results in a price increase. The price increase, in turn motivates a higher offer of good, as supply increases, prices are matched and stabilized in equilibrium:

Figure 1. The Market.



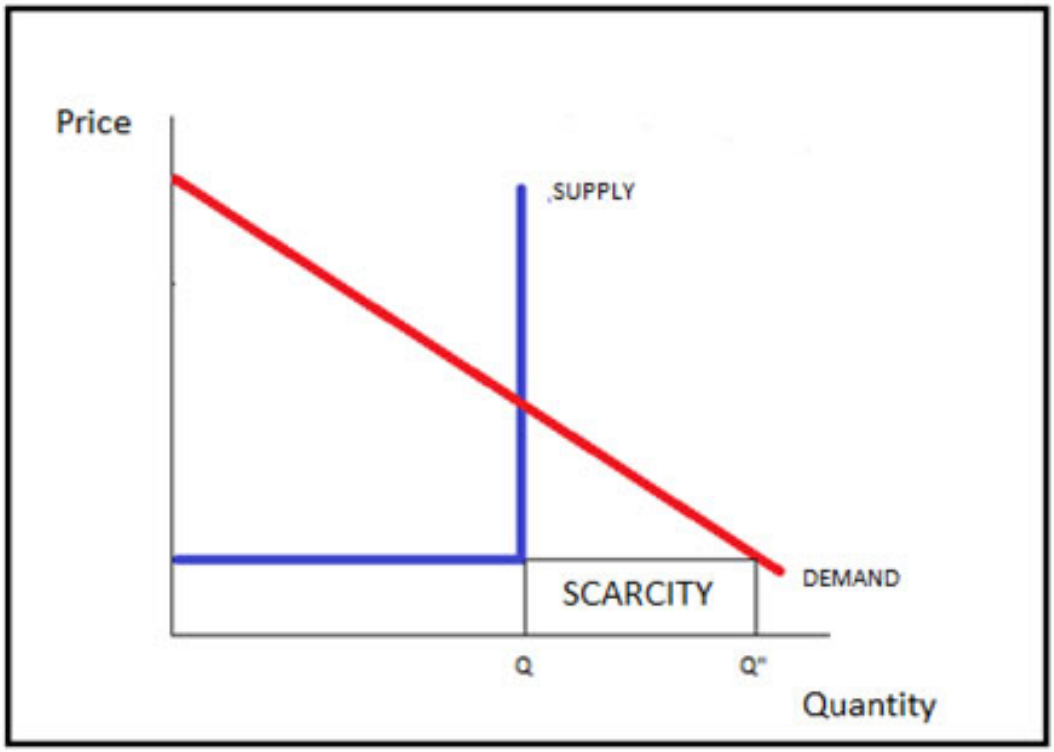
This situation of supply and demand leads us to consider the effects of undervaluing water as a free commodity.

Figure 2. The water market. Fixed price or free supply



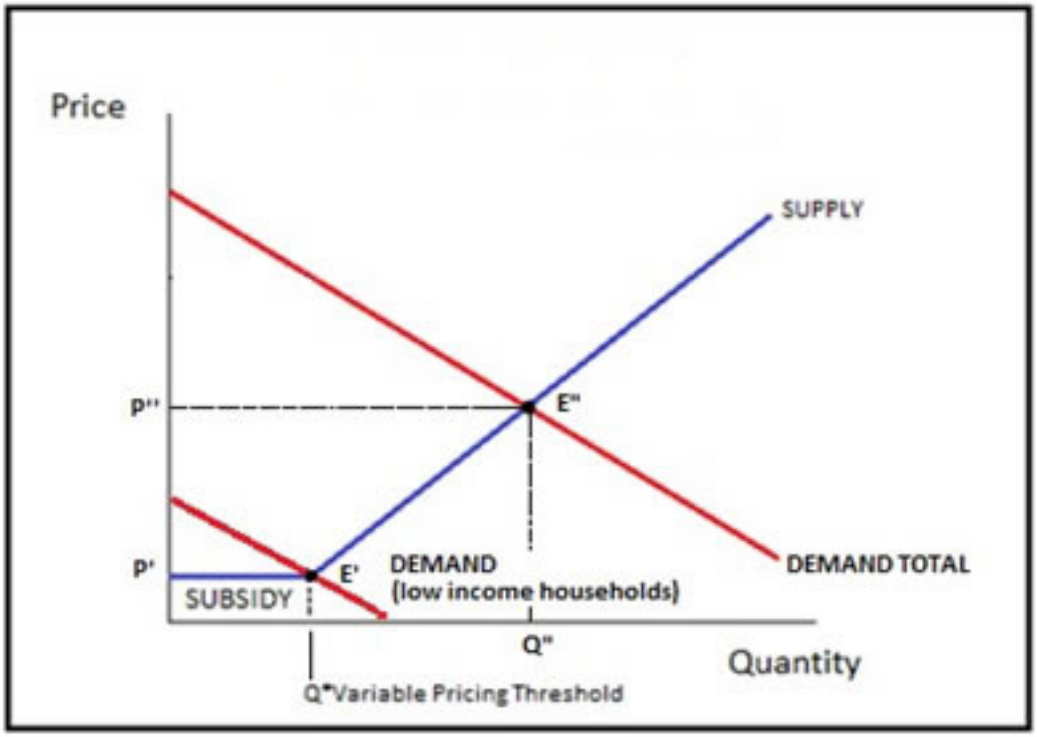
In Figure 2. We note that whenever water is considered as a free commodity, assuming for a perfectly elastic supply of water, the quantity demanded increases. This can lead to wastage. These cases occur when a locality, settlement, or city does not control the use of water and provides a free supply. Such is the case of Mexico City, where "for every 10 liters of water 3.8 are lost due to leakage of the network, the misuse of the liquid in homes and because some have not registered consumption meter" (Miranda 2010). If a situation like this is maintained in the long term, water resources will be depleted to the point that the water supply will be severely limited and become inelastic. This situation is exactly what Mexico City inhabitants have to live with: daily rationing and water shortages. Moreover, shortages usually tend to affect the most remote or poorly planned areas in urban or rural settings, where low income families are demographically present. This type of situation further increases inequalities, and hampers human development.

Figure 3. Free or fixed supply in the long term



On the other hand you can ensure access to clean water for those in need through a subsidy, while applying variable pricing from some consumption levels. This ensures that high intakes are controlled by a high price variable. In other words, the price increases relative to increased consumption. This way, price serves as a detriment to wasteful or inefficient water use. Policies that penalize resource wastage can also be implemented. These types of measures are now being implemented in Mexico City, and are "expected to reduce overall water From this basic economic relationship we can infer that water should not be regarded as a free good in order to be a basic human right. Considering water a free good, incentives inefficient use and in the long run, this policy of apparent social inclusion only leads to a situation of scarcity. These situations are usually catastrophic, given that these scenarios are usually difficult to correct in the short term, they require structural reforms such as appropriate measurement and fair pricing. In addition, the most affected families under scarcity usually are those in the lower-income strata. Lower income families do not have the means to acquire or construct large water storage tanks, or purchase water delivery services. On the other hand, supply can be ensured through a mixed-variable pricing policy that includes subsidies to low income households. Therefore, considering water's economic value therefore paves the way to an efficient use of the resource. "When water comes below its fair price, tends to be wasted. This is why it is said that the most efficient investment in water services is that aimed at reducing waste." (Gabaldon 2012).

Figure 4. Subsidy with variable pricing



VI. Water as an Economic Resource

According to the Dublin Declaration, Principle 4°. "Water has an economic value in all its competing uses to which and should be recognized as an economic good." However, this feature must not take precedence over the basic human right of access to water. On the contrary, this feature searches the appropriate valuation of water, in order to preserve it.

Oscar Wilde aptly said, in criticizing the market model: "Nowadays people know the price of everything and the value of nothing." Globally, water is undervalued, and misused and low prices reflects this. More than 70% of available water is currently used for agriculture irrigation (FAO 2013). In many cases farmers enjoy subsidies, and rarely use water efficiently. Moreover, "higher prices of irrigation water, which are generally

very low due to subsidizes, can promote more efficient and selective farming, expand grid systems to un-irrigated areas and thus help to bridge the food gap." (Gabaldón 2012). On the other hand, poor governance, or poor legal framework, in many cases allows farmers to waste water resources, not to mention the high pollution by pesticides and chemical fertilizers that are percolated into the blue waters and groundwater.

We also have industrial and mining activities, which are activities with a high degree of water pollution. Government mismanagement, coupled with poor legal framework allowed industrial and mining activities to develop with few environmental controls. As a result, mining activities continue to proliferate in areas of high biological diversity, where water resources are contaminated with highly toxic substances such as mercury and lead. As population pushes industrial and agricultural use of water, this leads us to believe that "appropriate pricing policy can help achieve a more efficient use of water and provide access to clean water to those who lack it" (Prager 2006).

VII. Water Privatization

Although privatization of water management and distribution has been contagious in recent decades, "today more than 90% of world water supply is in the hands of public bodies" (Prager 2006). The theme of a universal solution to the water problem has a kind of utopian prescription away from pragmatism. Privatization has to be seen from a pragmatic, non-ideological, human approach. In many countries or regions where the state does not have the resources or means to efficiently manage water supply, water privatization can be beneficial. This provided that management complies with people's human right to access to clean drinking water. On the other hand, in some countries with different cultures, and with an unsuitable legal framework, private interests may conflict with the interests of users. This may be reflected in unfair rates and discriminatory service, unjustified rates, etc. Interestingly enough, extreme undesirable situations rarely prevail in the long run because of massive public unrest. On December 1999, in Cochababma, Bolivia, people's unrest caused a reverse to public ownership. In these cases, the state is responsible for ensuring better water supply to the citizens by creating the appropriate legal framework and regulation.

VIII. Recommendations to policy makers

- Take into account that water supplies globally are finite.
- Consider that phenomena such as climate change and population growth sharpen water stress situations worldwide.
- Consider water as a universal human right, vital for life and human development.
- Consider that water is scarce and of finite proportion, and therefore should be valued accordingly.
-Take into account that mixed pricing systems can guarantee the supply of water as a universal right, while punishing its indiscriminate use.
- Emphasize the rational and efficient use of water as the most economical and feasible way to improve the situation.
- Introduce systems and technologies to enable universal and efficient measurement of consumption, and also help generate a greater supply with less waste of the resource.

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X. Attachments

Recommended Practices for Responsible Consumption of Water (Government of Catalonia 2010)•

• Water as a municipal jurisdiction and, as appropriate, is the same town who makes the supply or charge a service concession company. This approach generally tends to be more efficient and successful than centralized systems.

• Using water meters can be owned or rented and you will be discharged in supply. These are vital to monitor the consumption of subscribers.

• The rates of water consumption must be authorized by the commission of national or local prices as appropriate. This ensures consumer protection.

• The invoice can be generally coincides with the quarterly meter reading. When you can do the meter reading, it is an estimate of consumption. So is accounted for using a fair and adequate.

• The bill details the concepts and service fees (service fees and consumer segments) and other tax (canon water, sewer rates, VAT and other). These revenues must ensure the updating and maintenance of the infrastructure for the management, supply, and water treatment.

• The company can cut off the supply for non-payment, but not without first notifying vividly. This ensures the entry of vital resources necessary for the successful operation of the supply company.

• The company is responsible for the exterior of the water pipe to the entrance of the property. This ensures access to drinking water in remote areas.

• Adhesion contracts (eg water supply contract) should be available in local language. In order to have clear statutes.

• The water supply companies (being a basic service) must have a free telephone service care incidents and complaints.

Technique	Advantages	Disadvantages	Savings in Percentage (%)
Metering	-Easy to implement -Higher potential for savings	-High initial capital investment	25% in non-metered areas
Leak Repairs	-Reduces amount of not metered water	-Costs may be higher than that of water saved	9% approximately
Fares	-Can strongly lead to strong savings	-Objection by users -Requires properly designed structures for efficiency	10%
Efficient Devices	-Cheap -Fast efficiency	-Requires users' cooperation	At least 10% of residential use
Regulation	-Great potential for savings -Reduces residual water amounts	-Possible resistance by users	More than 10% of residential use
Restrictions of use	-Effective in home exteriors, especially during droughts	-Requires users' cooperation -Hard to establish	10 to 20% of residential use
Recycling and Efficient Gardens	-Significant savings -Low maintenance of water plants	-Low acceptance by users -Users' preference for determined water plants -Appropriate water plants may not be available	25% of residential use
Education	-May change bad habits -Long-term results -Promotes voluntary participation	-Requires a well planned and balanced effort	5%

Section 2

Poverty Reduction and Peace-Building

GLOBAL ASSOCIATION
Master's in Development Practice Programs

Sustainable Development Practice: Advancing Evidence-Based Solutions for the Post-2015 Agenda.

Proceedings of the 2013 International Conference on Sustainable Development Practice

Chapter 2

Replicating Data Mining Techniques for Development: A Toolkit for Civil Society

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Abstract

Data Mining is the subject of considerable controversy in the field of social science. Deemed by some as the 'wild west' of data analysis, Data Mining is the process of looking for interesting patterns and information in a data set. In World Development, Howard White (2002: 511-13) writes that data miners know what they are looking for and simply search until they find it, and that is the story they tell. He argues that Data Mining is mining for the 'right result'; the role of researchers should be to look for patterns in the data, rather than force the data into a 'preconceived view of the world'. This study challenges the reputation of Data Mining and argues that, whilst such a method (as with any other) can be abused, it has particular promise as a tool to be used for monitoring and explorative research, especially by smaller development organisations. The purpose of this research is to explore the potential for small civil society organisations to adapt Data Mining techniques for international development applications. There has recently been a significant increase in the importance placed upon Big Data for development work, yet Big Data techniques are not readily accessible to smaller organisations lacking technical expertise andhardware. Big Data has successfully transitioned from a primarily commercial usage to a development-focussed one, being applied to real-world social, health and economic issues. This research examines whether a similar transition is viable for Data Mining – that is, can a form of data analysis primarily used for email filtering and analysing product reviews on websites be adapted as a tool for development organisations needing accurate insights into real-world problems but lacking technical resources. A straightforward Data Mining methodology using open-source software is outlined, and demonstrated on several development issues using a body of 35,000 news articles from Africa and Asia over the past five years. The insights gained are accurate and relevant, and the methodology is directly transferable to small organisations working directly on development issues. The emphasis on an evidence-based transferable methodology holds particular promise for empowering local organisations to shed new light on existing development issues – and the findings are directly applicable for the work of the Poverty Reduction and Peace-Building in Fragile Regions thematic group, in particular insight into what are the particular challenges and opportunities facing the poorest countries.

1. Introduction

Data Mining is the subject of considerable controversy in the field of social science. Deemed by some as the 'wild west' of data analysis, Data Mining is the process of looking for interesting patterns and information in a data set (Miner et al 2012: 30). Data Mining has been derided for being ineffective, producing misleading results, and, when applied in real-life, leading to serious confidentiality and privacy issues. In World Development, Howard White (2002: 511-13) writes that data miners know what they are looking for and simply search until they find it, and that is the story they tell. He argues that Data Mining is mining for the 'right result'; the role of researchers should be to look for patterns in the data, rather than force the data into a 'preconceived view of the world'. This paper challenges the reputation of Data Mining and argues that, whilst such a method (as with any other) can be abused, it has particular promise as a tool to be used for monitoring and explorative research, especially by smaller development organisations working in low-income and fragile states.

Recent increases in technological capacity have introduced a new statistical tool for development: Big Data - the analysis of massive data sets. Much has been made of Big Data and the tremendous potential for yielding new insights into traditional development issues (Letouzé 2012: 4). However, limitations in technological infrastructure and technical expertise currently restrict Big Data to big organisations – a 'digital divide' exists with the vast majority of Big Data hardware existing in high income countries (Hilbert 2013: 17). Whilst Data Mining is not a direct substitute for Big Data, it can be used for similar analyses on a smaller scale. The data set is necessarily smaller, but the hardware requirements are minimal and the software is open source. Formerly the preserve of online businesses, Big Data techniques have successfully shifted to the development sector. A similar shift for Data Mining would enable small organisations access to the kind of novel insights that Big Data currently affords.

Several example applications of Data Mining as a monitoring tool are explored in this paper. However, the emphasis is on a transferable methodology that could be easily utilised by other development organisations.

2. 'Traditional' Statistics and Data Mining

The aim of Data Mining is to find patterns and interesting information, especially those that describe underlying structures in the data. Data Mining originated as early as 1941, with a set of 7,000 observations 'mined' for credit scoring (Baesens et al 2009: 16). The modern usage of Data Mining is predominantly commercial – for example, to analyse consumer shopping habits (if a customer purchases a book on gardening, what other products may they be interested in?) – and has its basis in the work of computer scientists in the 1980s (Franklin 2005: 84). Text Mining emerged as a subset of Data Mining with the need to catalogue text in books, and has evolved considerably since, including into the field of Artificial Intelligence. Text Mining is the central methodology of this study, and is defined as the 'discovery of previously unknown information in the text that is implicit but not immediately obvious' (Miner et al 2012: 4). Its use is also largely commercial – to 'mine' the attitude of consumers towards a product from online reviews, or strengthening spam filters – but also has increasing usage in molecular biology to classify genes and proteins.

Data Mining flips the statistical focus away from sampling and inference towards processing and tabulating data. Instead of using a sample to make inferences about a population, Data Mining often looks at the entire dataset. This leads to different statistical techniques, although the basic principle is unchanged – to reduce the 'noise' from data to produce information (Hand et al 2000: 112; Lambert 2003: 217-220). Nonetheless, the debate between 'traditional' statisticians and data miners is amongst the most fierce in the field (Franklin 2005: 84).

Other critics are concerned with the ethos of Data Mining, and the threat to privacy (Solove 2008: 343). For others, the issue is not Data Mining itself, but that the findings are not fully understood and effectively used (Kahn 2000: 127). The lessons for development are evident: ethical considerations of privacy and data protection are paramount, and a successful transition from the private to public sector is not as straightforward as simply transposing the technology from one sector to another; the merging of knowledge and data is crucial, and Data Mining should be but one tool in the effort to tackle development issues, and one part of the process in understanding them.

3. Big Data and Data Mining

In 2009, the UN Secretary General launched UN Global Pulse, an initiative aimed at 'analysing real-time digital data to detect early emerging vulnerabilities' (Letouzé 2012: 3). Early work from Global Pulse has used

social media data to predict changes in unemployment levels and website data to model food prices – the premise of the initiative is that the same 'Big Data' analysis techniques used by online retailers to predict customer shopping preferences can be adapted to help with international development research and interventions (Kirkpatrick 2012: 6). Whilst Global Pulse acknowledges that Big Data is not a panacea for development problems, the potential is exciting: increases in both data processing capabilities and access to data sets may 'reveal remarkable insights into the collective behaviour of communities' (Letouzé 2012: 6); hidden within large data sets lie 'valuable patterns and information, previously hidden because of the amount of work required to extract them' (Dumbill 2012: 3).

Big Data refers to data sets so large they exceed the processing capacity of conventional database systems. It picks up the central strand of Data Mining - that data can be used for predictive as well as descriptive purposes – and applies it on a massive scale (Ohlhorst 2013: 4). Placed in historical context, the motivation behind the rise of Big Data in the past few years and Data Mining in the past few decades is the same – 'to leverage large quantities of cheap computing power to perform analyses previously unthinkable at scales previously intractable' (Leetaru 2012: 16). Similarly, Big Data and Data Mining adopt the same statistical philosophy – instead of analysing the larger picture from a smaller sample, individual data points and the relation between them take on a greater significance; put simply, these methods deviate from traditional statistics by 'zooming in' rather than 'zooming out'. The same disclaimers also apply – larger data sets are not necessarily 'better', and the quality of the data overrides the importance of statistical methods (Janert 2010: 7).

However, whilst both Big Data and Data Mining have open source software options, Big Data requires considerable technical expertise and access to a distributed computing system – a set of powerful networked computers (Ohlhorst 2013: 9). This prohibits the adoption of Big Data analysis for many organisations, especially those in low-income countries (Hilbert 2013: 17). The World Economic Forum (2012: 6) notes that large companies often lack access to suitably skilled professionals for Data Mining analysis, let alone Big Data analysis. Similarly, Data Mining has been described as difficult to utilise without considerable effort and the application of specialist algorithms and software (Miner et al 2012: 37). It is hoped that this stripped-down methodology will help to redress common concerns that Data Mining techniques are out of the technical reach of small organisations, and demonstrate that these organisations can replicate some of the novel insights that larger development organisations, using Big Data techniques, have been afforded.

4. Climate Change

The Data Mining process is, upon first inspection, largely a technical one. However, there are two non-technical factors that are essential for a successful and useful project. The first is the need for contextual understanding of the results. Although the principal aim of Data Mining is to find new and interesting patterns and information, patterns that can be explained are more likely to be 'real' than those for which a convincing explanation cannot be found (Hand et al 2000: 117). Second, the data source should be of the highest quality before the process begins. Some preprocessing can (and should) 'clean' the data prior to analysis, but the most effective path to more useful results is to keep the model simple, and improve the data that goes into it (Baesens et al 2009: 17).

The process outlined here is for Text Mining, which is a subset of Data Mining but for which the same principles and methodological steps apply. Text Mining has much in common with Content Analysis, and more complex studies with a deeper analysis of the results will borrow heavily from Computational Linguistics. Put simply, however, Text Mining is a means of analysing the communications of other people (Miner et al 2012: 1008), and the analysis that follows can be reproduced by organisations without the technical expertise needed for more complex statistical analysis.

The form of Text Mining employed in this methodology is known as information extraction, and, as the name implies, involves extracting specific information which can then be analysed; this analysis can result in new information that is predictive in nature, as opposed to simply describing the original text (Miner et al 2012: 12-13). Indeed, analysis of text can be particularly valuable for international development – words can predict actions or activity, and analysing online text can produce near-identical results as household surveys and polls (Hilbert 2013: 7). The process begins by sourcing the data – in this case, news articles compiled by BBC Monitoring Reports.

RapidMiner, an open-source data mining and analysis program, was used to sort and clean the data. First, articles were grouped by year for time-series analysis. All articles were then 'tokenised', whereby each unit of analysis was specified – in this instance, each separate word was defined as a token. Third, all words were made lower case to avoid duplication (combining 'Afghanistan' and 'afghanistan', for example).

The underlying assumption of Text Mining is that the 'meaning' of a text can be represented by a frequency list of the words used in that text (Miner et al 2012: 80). At this stage, RapidMiner was used to perform specific data analyses:

1. For the primary analysis, a word vector was created of all words in the data set. This is an alphabetical list of every different word used, and a count of the number of times it appears. The underlying theme of all Text Mining operations is to transform text to numbers, so data analysis techniques can then be applied.

2. For the secondary analysis, the proximity of words to each other within the corpus was examined , known as a 'token region' analysis. To do this, a central word (or 'token') is specified – for example, 'corruption' – and significant words that co-exist within a set range of words either side of 'corruption' were included in the word vector. Depending on the specific token region analysis conducted, some commonly used words were then stripped from the word vector, as were single characters (such as 'I' or "s'), leaving the significant words most commonly found in close proximity to 'corruption'.

Word vectors were then analysed in Microsoft Excel. The examples that follow use the United Nations Secretariat Statistics Division's list of countries (UN 2013). This list of countries was adapted to include different spellings of the same country (Cameroon and Cameroun), and geopolitical variations (Myanmar and Burma). Multiple-word countries were reduced to single search terms where possible ('Sri Lanka' to 'Lanka', for example). Further word lists (such as cities or institutions) were selected from another open-source application, the General Architecture for Text Engineering (GATE). Using Excel's vlookup functionality (open source spreadsheet applications have similar functions), frequency counts for words on each of the lists were drawn from the larger word vector.

5. Example Applications

This methodology was applied using BBC Monitoring Reports as an example data set. This data set follows and transcribes news reports daily from over 150 countries in over 100 languages (BBC Monitoring 2013). Whilst the full archive dates back to 1979, these applications focus on a five-year period to February 2013. Although BBC Monitoring sReports are used here as an example data source (a civil society organisation (CSO) working at the national level may prefer a complete archive of national press, for example), awareness of the source limitations is central to the methodology. A thorough analysis of the source, together with full details of the applications, is available in the full technical paper.[1]

[1] Available online at http://bit.ly/14lxUhf

EXAMPLE ONE - INTERNATIONAL MOVEMENTS: ARMS DEALERS AND COCAINE

A search for 'arms dealer' in the BBC Monitoring Reports database yielded a relatively low total of 519 articles for the past five years, worldwide. Within these the words 'Russia' and 'Russian' appear over 2,500 times in total; China is the second ranked country by word occurrences, although USA also appears often. The Stockholm International Peace Research Institute (SIPRI) estimates the US and Russia to be the two largest arms exporters; China ranks fifth (SIPRI 2013). Viktor Bout, arguably the world's most infamous arms dealer (Austin 2002: 203), is mentioned over 750 times. His arrest in Bangkok in 2008 explains his prominence over this time period; 'Thailand' and 'Thai' also rank highly.

The methodology appears to be stronger at locating arms-exporting countries than arms-importing ones. Closer semantic analysis would be required to determine where arms may be headed. After the aforementioned countries, Yemen and Iran are mentioned most frequently – 340 and 294 times, respectively. Discussion of these countries in the corpus is noteworthy because of their absence from the top of SIPRI's arms import and export lists; instead, both have been implicated with shipping arms to al Shabaab militants in Somalia (Charbonneau 2013).

A different analysis was conducted on the data set, using 'cocaine' as the search term. As with arms transfers, cocaine is internationally trafficked and difficult to quantify and hence is a useful test for the methodology. The top mentioned country is the Russian Federation, followed by Serbia, Montenegro, Colombia and Ukraine. As the world's leading producer of cocaine, it is unsurprising to see Colombia in fourth place (Bolivia and Peru, also noted for production, are number six and 11 respectively). The UN office on Drugs and Crime noted an increase of seizures of cocaine of up to 30% during this time period in the Russian Federation and Ukraine as cocaine may be entering Europe through new routes; this may also explain the high ranking of Serbia and Montenegro (UNODC 2011: 112).

EXAMPLE TWO - NATIONAL STATISTICS: MALARIA AND TUBERCULOSIS

Information on global disease trends is relatively easy to obtain and is therefore straightforward to cross-reference to the source material. Recent work, such as Google Flu Trends, is already using human-created data – in this case, search engine trends – to predict and map disease spread (Letouzé 2012: 20). This test analysed the countries associated with malaria in the data set. China tops the list, in part due to public health interventions in other countries. Consequently, a country ranking using 'malaria' as the search term, for example, would not solely reflect prevalence of malaria, but also countries involved in fighting it.

Over the past five years, the top ranking countries for malaria in the source data are China, Pakistan, Eritrea, Nigeria and Uganda. Whilst none of these five countries are in the top five countries by number of reported malaria cases – Uganda is closest in sixth place, and Nigeria is number 17 (WHO 2013) – all with the exception of China (where reported cases have sharply dropped) have experienced a significant rise in the number of reported cases: Pakistan from 104,334 in 2008 to 240,591 in 2010, Eritrea from 8,764 to 35,982, Nigeria from 143,079 to 551,187 and Uganda from 979,298 to 1,581,160. The methodology is therefore able to track emerging trends and important actors, although contextual interpretation is required.

Tuberculosis (TB) was also tested. The World Health Organisation lists 22 High Burden Countries, accounting for 80 percent of all new TB cases each year (WHO 2012: 8). Four of the top five countries in the Data Mining analysis for tuberculosis are High Burden Countries; Ukraine, in third place, is not a High Burden Country but does have high levels of drug resistance, and unusually high public expenditure to tackle TB (WHO 2012: 64).

EXAMPLE THREE - INDEX OF DISCUSSION ABOUT CORRUPTION

Finally, an index of discussion about corruption was created, together with detailed analysis of the context and semantic structure. The data set used contains every document from BBC Monitoring that mentions 'corruption' within a five-year time frame – a total of 34,666 articles. Each article can range from 300 to 3,000 words; the corpus contains just over 140,000 different words, with a total of over 31 million words. The term 'corruption' appears 77,892 times within the corpus.

The result is an index of levels of discussion about corruption for 215 countries. This index could be a complement to existing corruption indices; it does not measure corruption itself, but discussion of corruption within the source material. As such, a small CSO working in a country regarded by the Transparency International's Corruption Perceptions Index (CPI) as being highly corrupt may wish to plan a country strategy to increase public awareness of corruption and corrupt practices. This index would allow the CSO to determine the level of public discussion of corruption – if levels are high, then perhaps popular knowledge about corruption is not the issue, rather there are institutional blockages that can be identified and work should be focussed on reducing these. If levels of discussion are low, perhaps a media strategy or public information campaign to highlight the negative effect of corruption is needed. Discussion may focus on a particular sector, department or individual – Data Mining can identify these, and the CSO can respond accordingly. Expert interpretation of the Data Mining data is essential to its success, and local CSOs are often the most knowledgeable on local context, and have experience of how to leverage new knowledge to increase the impact of their work; Data Mining is simply the tool.

Other CSOs exist to increase accountability and transparency. Corruption can 'flourish' without accountability, yet accountability needs to be accompanied by effective monitoring (Costa 2012: 1-2). Data Mining can identify trends in discussion – for example, can a sudden increase in discussion be attributed to an event or intervention? The dissemination of new concepts of governance, and new incidences of corruption, can be monitored. Of course, corruption and governance is but one example application of Data Mining. A human rights organisation may track the coverage of sexual violence in the media and, depending on the context, the *lack* of broadcast coverage may be of equal concern as a high level of discussion.

A Data Mining model has several other advantages. First, data can be processed in real time, without the lag associated with survey data – this means organisations can respond faster, and may be able to act pre-emptively (for example, investigating a mention of corruption in a public procurement project before the contract is signed). Second, the costs are considerably lower. Third, whilst this index does not measure corruption itself, the model is infinitely customisable and future work may lead to a measure more directly comparable to the CPI.

The top ranking countries – Afghanistan, Pakistan, Iran and Iraq – are also those that capture much of the political interest of the West, and may reflect bias in the source material. The top ranking cities also reflect these countries – Kabul heads the list, followed by Baghdad, Islamabad, Karachi and Tehran. Similarly, provinces and regions are overwhelmingly Afghan – Herat and Kandahar first and second respectively and Helmand fifth – with Arbil (Iraq) third and Punjab (India and Pakistan) fourth. This possible bias does not necessarily invalidate the rankings – Afghanistan, for example, is ranked as the most corrupt country (joint with Somalia and North Korea) in the 2012 CPI (Transparency International 2012: 3), and the Afghan population rated corruption a more pressing issue than poverty, external influence and the performance of the government in a recent UN survey (UNODC 2012: 3). The source material may, however, amplify the levels of discussion in select countries – pushing the ranking of Iran, for example, ahead of Somalia and weakening the value of the model for performing direct country comparisons.

The data was also be analysed for individuals, organisations, institutions and sectors. These examples were somewhat crude and are examples of Data Mining applications; an organisation wishing to analyse corruption by sector would draw up a far more comprehensive list, would analyse the results in the appropriate context, and, as with all analyses, would consider the limitations of the source material. Furthermore, as with the country scores, the sector information is most accurately interpreted with a more specific question or goal in mind – such as whether there is public discussion of corruption in the education and health sectors – rather than comparing sectors directly, where the relative values are misleading to compare. Arguably, Data Mining is more useful and accurate when the scope is as narrow as possible – for example, to track the discussion about one particular company in a particular country, or allegations about bribery or vote rigging.

Whilst the country index allows us to see the frequency of geographic references in the data, and context analysis affords an insight into people and institutions, a closer look at the words immediately surrounding the word 'corruption' can help us to understand the usage of the term in broadcast media.

The first analysis looked at the words immediately either side of the word 'corruption'; most notable is the consistency of 'anti-corruption' and 'fight corruption', together forming approximately 18-19 percent of corruption word combinations in each year – we can draw the tentative conclusion that a fifth of broadcast reporting in the data set is concerned with combating corruption. Also noteworthy is the lack of 'political' or 'economic' corruption; instead, more references are made to administrative corruption. The overall theme of each article may, of course, be related to corruption within economic or political areas, but analysis suggests the *nature* of the corruption itself is often administrative.

The second analysis looked at words in the same sentence as the word corruption. The median length of a journalistic sentence is 15 words (Kornai 2008: 187) – therefore, to gain an approximation of a sentence, the analysis looked at seven words either side of the word 'corruption'. 'Government' appears in the same sentence as 'corruption' in 11.6% of instances, and 'anti' appears in the same sentence as 'corruption' in 11% of instances. This suggests strong linkages between corruption and the state and, at first glance, perhaps between anti-corruption and the state. However, when 'government' replaces 'corruption' in the sentence analysis, 'anti' appears in the same sentence as 'government' in only 1.1% of occurrences ('fight' appears even fewer times; 'corruption' appears 6.6%). Therefore, whilst 'government' and 'anti' often appear in the same sentence as 'corruption', they do not appear together. This tentatively suggests that, in most of the broadcast material in the data set, the government is not associated with anti-corruption efforts.

6. Extending the Methodology

This paper presents a basic Data Mining methodology. There are exciting areas in which this work can be expanded and the model further refined, although in all applications the emphasis should remain on a 'clean' and simple methodology tailored for the purpose and that recognises the limitations of the source data. Conceptually, different themes and issues can be explored beyond the examples given here: migration, urbanisation or HIV/AIDS, for example. Different source materials such as social media could be used, or even transcripts from public speeches and parliament debates, or archives of all print media from a particular region.

There are also several directions that technical modifications can be made. Text Network Analysis can highlight the most important words and allows advanced interrogation of text. Sentiment mining can capture the tone of individual articles, and this *tone* can be tracked over time, as demonstrated by the work of 'Culturomics 2.0' (see Leetaru 2011). However, Data Mining, and in particular Text Mining, is still an emerging field, and considerable advances can be expected in a relatively short period of time. A greater convergence with the field of computational linguistics will allow 'deep discovery' of features such as sarcasm, innuendo and idiomatic language (Miner *et al* 2012: 12). Real-time Data Mining is also an emerging area, whereby data is analysed and interesting patterns found on a continuous basis (Baesens et al 2009: 22). Last, and perhaps of

greatest relevance for smaller organisations working in development, will be more advanced trend detection, and better multilingual analysis (Miner *et al* 2012: 24). Coupled with the recent increase in availability of large open datasets and the concept of 'data philanthropy' – large organisations stripping personal information from data records and releasing them for analysis (Letouzé 2012: 25) – the potential for gaining innovative, accessible insights is greater than ever before.

7. Conclusions

The purpose of this paper was to explore the potential for small civil society organisations to adapt Data Mining techniques for international development applications. There has recently been a significant increase in the importance placed upon Big Data for development work, yet Big Data techniques are not readily accessible to smaller organisations lacking technical expertise and hardware. Big Data has successfully transitioned from a primarily commercial usage to a development-focussed one, being applied to real-world social, health and economic issues. This paper has examined whether a similar transition is viable for Data Mining – that is, can a form of data analysis primarily used for email filtering and analysing product reviews on websites be adapted as a tool for development organisations needing accurate insights into real-world problems but lacking technical resources.

This paper developed a straightforward Data Mining methodology using open-source software. Several examples were explored, including corruption as an example of a development issue – a difficult phenomenon to measure and a challenging application of the methodology. Close scrutiny of the data source is an essential component of the process, and the BBC Monitoring Reports archive is expansive but has a questionable editorial bias – future applications may prefer a more 'narrow but deep' archive, such as the complete broadcast media of a specific region. Contextual interpretation is a second essential component, and this requires extensive cross-referencing and application of theory.

The results demonstrated a workable implementation of a Data Mining process. The quantitative methodology underpins a constant process of 'discovering apparent structure and interpreting that structure', and the results were framed within the limitations of the data source (Hand 2000: 177). Possible bias in the source material towards countries of political interest (such as Afghanistan, Pakistan and Iran) meant that cross-country comparisons were less trustworthy, and the most valuable information was found from closer analysis of countries, regions and concepts. A particular strength of the application is the degree of customisation possible – for example, disaggregating the data set by time, location or any other parameter useful for analysis enables a richer understanding of the issue. This does, however, necessitate careful planning and delineation of the analysis beforehand, and a clear understanding of the purpose and research questions – without these, Data Mining simply becomes 'fishing', a reputation that this study has challenged as unfair.

The insights possible are relevant and accurate. For example, the finding that anti-corruption efforts are rarely associated with governments may be relevant to an organisation lobbying for an anti-corruption commission to be established, or the finding that corruption is often seen as administrative could inspire a campaign to increase the accountability and spot-checking of bureaucratic processes. A key conclusion is that the most relevant and accurate insights are most likely to arise when the methodology is used (and adapted) by experts in a particular field – a sexual discrimination campaigner, or a food security researcher – who can both frame the study questions and interpret the results; a sound technical methodology is a complement rather than a substitute for specialist local knowledge.

These results are encouraging, but the applicability for Data Mining as a tool for small organisations to gain novel insights needs to be tested through extensive, real-world application. Different development issues need to be tested with different data sets. Training guides and case studies should be created. The previous barriers

for gaining such novel insights were technical expertise and technical capacity – these are now mostly obsolete for smaller analyses. Furthermore, never before have access to cheap computing power (these examples were completed on a laptop) and the availability of open data sets on the internet (boosted further by the rise in 'data philanthropy') evolved and converged to the point today where financial barriers have also mostly disappeared.

Tim Berners-Lee, founder of the World Wide Web, has stated that efforts are needed in both engineering and language development so that Data Mining can be made accessible to all without requiring computing resources that only the largest companies can afford (Smith *et al* 2006: 1682). Yet a stripped down, basic Data Mining methodology outlined in this paper can afford smaller organisations novel insights without the technical expertise or large data servers needed for larger scale analyses. Success is dependent on choosing the appropriate technique, applying contextual interpretation and, most importantly, careful selection of the data set. The data sets are necessarily smaller than those used for 'Big Data' analysis, but the techniques mirror those used by large companies and facilitate the discovery of new knowledge – the process of turning words to numbers and querying and interrogating these numbers can uncover useful information and hidden patterns that are otherwise inaccessible. The data becomes information, and with interpretation this information becomes knowledge: Data Mining can allow a data set to become more than the sum of its parts.

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Chapter 3

Effects of non-aid policies on fragile and conflict-affected countries

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Abstract

Recent research shows that uncoordinated proliferation of actors, approaches and aid allocation patterns by partner countries pose critical challenges to people in conflict-affected countries. Poor countries that depend on foreign assistance are therefore not only affected by aid policies but also by non-aid policies of partner countries. Despite the importance of the topic for human security and sustainable development in vulnerable countries, we know very little about the role of Policy Coherence for Development (PCD) in the context of conflict-affected states. Taking this disjunction as a starting point, the analysis in this paper puts the question of poverty reduction and peace-building in fragile regions in the context of the PCD debate. This paper offers a new perspective on the OECD PCD framework with a view to contribute to evidence-based solutions for future cooperation with fragile states. It uses a combination of desk research and semi-structured expert interviews to explore the added value of the PCD framework as an operational tool to promote sustainable human development and explains its limitations. In particular, the paper asks: What are the effects of non-aid policies in conflict-affected countries? In order to answer the research question, the paper first deals with conceptual matters pertaining to the definitions of sustainable human development; human security; policy coherence for development; and fragile and conflict-affected states. The paper argues that the added value of the PCD framework consists in its ability to deal with conflicting human rights and political interests through a public policy lens. Furthermore, its conceptual framework allows identifying synergies and non-intended effects of policies in the sensitive context of violence and political transformation through its focus on the impact of non-aid policies on sustainable human development. Yet, coherent cross-sectoral approaches of governments, which are needed in order to tackle multi-dimensional threats according to the PDC-Agenda, reveal practical difficulties. These problems challenge fragile states in particular but also democratic mechanisms of OECD countries. The second part of this paper therefore analyses the OECD PCD-agenda in greater detail. It presents first results from a comparative case study of Policy Coherence for Development in British, French and German development cooperation with conflict-affected states. Evidence from the case studies underlines the importance of a whole-of-government approach to fragile states. My research helps to identify cases of incoherent non-aid policies with regard to human security and sustainable development in fragile partner countries. Furthermore, it reveals limitations of the PCD framework with regard to coordinating multi-sectoral processes that affect fragile regions.

Introduction

Today, there is no common understanding of what constitutes fragile and conflict-affected states. Comparing the results of different international rankings that cluster countries according to their political order, state performance, economic structure, respect of human rights, rule of law, and regional and/or inner-state conflicts, show that a large number of European development partners are among the most vulnerable states. The British Department for International Development (DFID), the German Ministry for Development (BMZ) and the French Interdepartmental Committee for International Cooperation and Development (CICID) have therefore developed instruments aimed specifically at situations of fragility and conflict (AA et al. 2012; CICID 2007; DFID 2005; MAE 2008; OECD 2011a).

This paper uses the OECD/DAC's definition of fragile situations, according to which: "*A fragile region or state has weak capacity to carry out basic governance functions, and lacks the ability to develop mutually constructive relations with society. Fragile states are also more vulnerable to internal or external shocks such as economic crises or natural disasters. More resilient states exhibit the capacity and legitimacy of governing a population and its territory. They can manage and adapt to changing social needs and expectations, shifts in elite and other political agreements, and growing institutional complexity. Fragility and resilience should be seen as shifting points along a spectrum*" (OECD/DAC 2012: 15).

While current research analyses the effectiveness and impact of such aid policies, we know very little about the effects of non-aid policies of partner countries on fragile and conflict- affected states. As a result of globalization, non-aid policies focusing on security, migration, climate change, food security, trade, and technology have a profound impact on shaping the prospects of fragile and conflict-affected states. The OECD-Policy Coherence Agenda (OECD/DAC 2001; OECD 2009a) can be considered an important step towards establishing standards for areas that are not directly linked to development, providing research and monitoring results. Despite the importance of the topic for human security and sustainable development in vulnerable countries, we know very little about the role of Policy Coherence for Development (PCD) in the context of fragile and conflict-affected states.

Taking this disjunction as a starting point, the analysis in this paper focuses on the question of poverty reduction and peace-building in fragile regions in the context of the PCD debate. It uses a combination of desk research and semi-structured expert interviews to explore the added value of the PCD framework as an operational tool to promote sustainable human development while also explaining its limitations. In particular, the paper asks: What are the effects of non-aid policies in conflict-affected countries?

In order to answer the research question, the paper first deals with conceptual matters pertaining to the definitions of sustainable human development, policy coherence for development, and fragile and conflict-affected states. Section two provides a synthesis of the assessment of experiences with PCD in Germany and the UK. The case studies have been selected with a focus on recent experiences of Europe's major international actors. It is important to note that the study provides initial findings of an ongoing research project on PCD and the security-development nexus. The study therefore focuses on a small number of field-level experiences that are linked to non-aid policies. Section three discusses the implications of the case studies for donor governments, development practitioners and development countries in terms of future applications of Policy Coherence for Development.

1. PCD as an operational tool to promote sustainable human development in fragile and conflict-affected regions?

Despite the prominence on the international development agendas, attempts to deal with fragile and conflict-affected states have proven complex and difficult. Recent progress reports on the Millennium Development Goals (MDGs) and studies analyzing the situations in fragile and conflict-affected countries indicate that these countries face multidimensional challenges. Problems in fragile states touch upon a wide range of domains, e.g. human security, sound and legitimate political institutions, economic order, and the provision of social services. (OECD/DAC 2012a; United Nations 2013) From a human rights perspective, people in fragile and conflict-affected states lack fundamental social, cultural, economic, as well as civil and political rights. Vulnerable groups such as minorities, women, children and people with special needs face even greater human rights abuses in these countries (OECD/DAC 2012a; Worldbank 2011).

Due to the weak governmental capacity to deal with these challenges, fragile states are particularly vulnerable to external shocks and political decisions of partner countries – including political decisions that are not directly linked to development countries and fragile regions. In other words however, partner countries

of fragile states theoretically dispose of a wide range of tools across non-aid policies such as trade and finance, security, migration, climate change and environment, agriculture, education and health care that can be deployed to support fragile states.

Recent experiences in Syria and Libya have revealed the limitations of traditional development cooperation, diplomatic involvement and military responses to widespread human rights abuses and conflicts. In addition, despite long-term international engagement of the international community in Afghanistan, the government is still very fragile, it lacks democratic mechanisms and its citizens suffer from insecurity. (Eggelmeyer 2011; HRW 2013; OECD 2010)

Today, there is a growing recognition among development and security actors that successful long-term development in fragile and conflict-affected depends on holistic approaches. Human rights-based approaches to development which are supported by a growing number of donor countries (Twomey 2007; OECD & Worldbank 2006) have contributed to a better understanding of the interrelatedness and interdependency of human rights. Accordingly, national and international aid policies will not be successful in terms of sustainable human development in fragile and conflict-affected states if they lack coordination with non-aid policies.

The OECD Policy Coherence for Development Agenda that has gained increasing support since the Paris Declaration (2005) goes beyond the requirement of simple policy coordination and joint working mechanisms.

According to Guido Ashoff, Policy Coherence for Development means "*the absence of incoherences, which occur when other policies deliberately or accidentally impair the effects of development policy or run counter to its intentions. A second and more ambitious definition sees policy coherence as support for development policy from other policies or as the interaction of all policies that are relevant in the given context with a view to achieving overriding development objectives.*"(Ashoff 2005: 12)

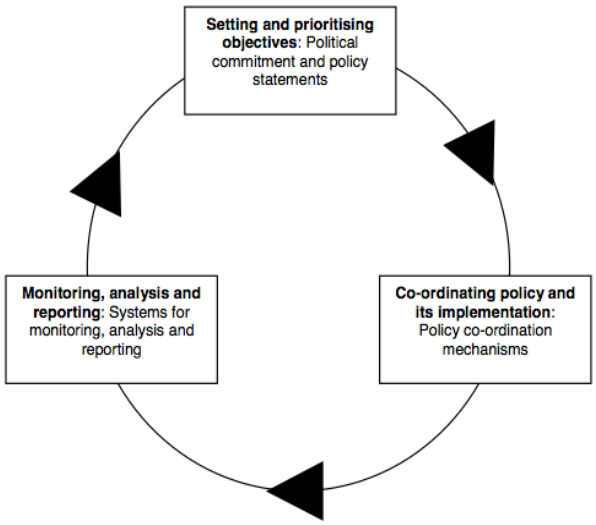
The PCD concept includes aspects of policy coordination, i.e. making different institutions work together for policy formulation, implementation and evaluation; and policy consistency (so-called "internal coherence"), i.e. ensuring that policies are not internally contradictory (OECD/DAC 2001: 104). Focusing solely on incoherences would limit PCD to a "do no harm" approach (OECD 2009b), which is essential for cooperation with fragile and conflict affected regions but which does not include all aspects of the PCD framework. Therefore, the second part of the definition is considered to be the main challenge.

Accordingly, the OECD states "*Policy coherence […; U.Z.]; involves the systematic promotion of mutually reinforcing policy action across government departments and agencies creating synergies towards achieving the defined objective.*" (OECD/DAC 2001:104) and further explains "*governments need to ensure that their policies on issues which go beyond aid and development assistance are supportive of, or at least do not undermine, their development-focused policies. This is the policy coherence for development (PCD) agenda.*" (OECD 2009: 15)

The systematic promotion of so-called *overriding development objectives* is the central part of the definition. Research on international development cooperation shows that there is no consensus on the definition of development. As a consequence, some scholars suggest using the term "development" according to its normative, historical and political context (Vogler 1997: 122). Over previous years the definition of "development" has evolved from a focus on economic development to a more holistic concept of *human development* that includes Sen's capability approach (Sen 2001) and a greater understanding of a human rights-based approach to development (Pogge 2002; Twomey 2007; OECD & Worldbank 2006). With a better knowledge of the complexity of political decisions, increasing awareness of climate change and the need to act within the limits of natural resources the notion of *sustainable human development* was introduced. According to the Human Development Report 2011 "*sustainable human development is the expansion of the substantive freedoms of people today while making*

reasonable efforts to avoid seriously compromising those of future generations"(UNDP 2011: 2). With the shifting understanding of the term development, development objectives have changed as well. The current debate on a post-2015 development agenda reflects the shift from the Millennium Development Goals (MDGs) to a new international framework of global development objectives that overcomes the shortcomings of the MDGs. Development goals are considered *overriding objectives* because they intend to promote a sustainable future for all human beings based on universal human rights and agreed upon by the international community in the UN Millennium Declaration.

In terms of the advantages of placing a greater focus on PCD, it is apparent that in order to have a greater impact on people suffering from the situations of fragility and conflict, OECD countries should go beyond providing a collection of independent policies guided by departmental mandates. PCD offers a framework to deal with conflicting political interests and human rights. It allows taking into consideration rights and interests of people that are not the primary target and rights holders as a requirement of globalization and global justice ('Think global, act local.'). The PCD framework sets clear objectives that can guide political decisions through prioritizing long-term global development goals over short-term goals and prominent decisions to win over the electorate. For example, France gets very low results in the security sector of the annual Commitment to Development Index. This ranking is mainly caused by its arms exports to non-democratic governments (CGDEV 2013). Studies show that the prominence of arms and weapons can delay or aggravate conflicts in fragile states (Grimmett & Kerr 2012; Holtom *et al.* 2012). In terms of sustainable human development, the French government should therefore carefully analyze possible global impacts of international arms trade before allowing such trade agreements. Depending on the particular case, this evaluation might also result in prohibiting a deal with a partner country and/or setting conditions for an arms trade agreement. Accordingly, the PCD framework requires OECD countries to make sure that development goals are considered at the policy formulation level, implementation level, and evaluation and monitoring level. The Policy Cycle that was developed by the OECD illustrates the different processes of policy making in which development goals should be considered (OECD 2009a):



1: Setting and prioritizing objectives: The OECD/DAC peer reviews show considerable variation in the extent of members' political commitment to PCD. Best practices are revealed for Netherlands and Sweden.

2: Coordinating policy and its implementation: According to the peer reviews OECD countries use informal mechanisms for coordination, systematic screening of legislative proposals for development impacts or policy coherence units.

3: Monitoring, analysis and reporting: The peer reviews reveal that for most members, systems for monitoring on development impacts are relatively weak although members such as Finland, Germany, the Netherlands, Sweden and the UK are making some progress. (OECD 2009a: 10, 20)

Considering sustainable human development as a guiding principle across all aid and non-aid policies allows identifying effects of policies on fragile and conflict-affected states. Thereby, PCD may contribute to the reduction of unintended, negative results and impacts of political decisions. Avoiding incoherences of non-aid policies is beneficial for both partner countries: more coherent policies of OECD countries (and developing and emerging countries for that matter) contribute to the broad objective of sustainable human development and stability in fragile and conflict-affected states at a lower fiscal cost and therefore eliciting a greater public support. (OECD 2005: 18) It reduces the risk of compromising aid policies and undermining overall development goals. The PCD framework thereby also reflects the shift from aid effectiveness to development effectiveness. (OECD/DAC 2012b)

The PCD framework does not only underline the necessity of peaceful and sustainable international order to promote common global goals, but it also allows to identify synergies between OECD countries and fragile states. For example, according to the Commitment to Development Index, the protection of maritime trade routes is considered developmentally friendly and generates mutual benefits for developing and OECD countries (CGDEV 2013). An even greater focus on PCD, i.e. sustainable human development goals on the formulation, implementation and evaluation level of such anti-piracy-policies, could increase synergies through securing international trade in the long term on the one hand and tackling the causes of piracy and terrorism through supporting programs for fragile and conflict-affected countries such as Somalia and Yemen on the other hand.

Finally, from the perspective of harmonization and alignment, achieving developmentally- coherent policies and activities may contribute to greater legitimacy in the eyes of people in fragile and conflict-affected countries and will therefore be more likely to receive a positive response. In a fragile state context with weak political institutions PCD may be one critical determinant of successful outcomes. (OECD 2005: 18)

2. The OECD PCD-Agenda for fragile states: first results of a comparative case study

Today, governments use different institutional approaches to increase Policy Coherence for Development across political sectors. The following synthesis provides an overview of three different approaches in Germany and the United Kingdom. The objective of this section is to explore recent experiences that address multidimensional development challenges. Assessing policy coherence for development requires research of inter-ministerial negotiations, a sound understanding of the role and impact of each policy on the development of partner countries with a special focus on the particular context of fragility and conflict; and a good understanding of the political culture in order to determine where policies can be changed to enhance policy coherence for development. This comparative study is based on desk research of official documents and OECD data, and a small number of expert interviews that were carried out in 2013 as part of an ongoing analysis on Policy Coherence for Development of Security Policies in the United Kingdom and Germany.

a) Addressing PCD through a specialized PCD-unit within the Federal Ministry for Economic Cooperation and Development

In 2012 the German government adopted inter-ministerial guidelines on how to relate to fragile states. That strategy provides a framework for better coordination between the security sector and development department in order to contribute to PCD. (AA *et al.* 2012) Germany's focus on PCD can also be seen in the creation of a PCD-unit within the Federal Ministry for Economic Cooperation and Development in 2011. (BMZ & Kopp 2012: 21) A detailed evaluation of the impact of these recent activities on fragile and conflict-affected states is not yet possible. However, they reflect Germany's experience with partner countries and raising awareness on matters of PCD within development practitioners and civil society that have put pressure on the government.

The arms export report of the Joint Conference on Church and Development (GKKE) provides a critical analysis of the German arms export policy regarding its impact on development and peace policy. The latest report indicates that Germany exports weapons to many undemocratic governments where a control of future re-exportation of arms cannot be controlled. In 2011 the German government allowed 5.149 licenses for arms exports to countries that are listed as critical according to the European Code of Conduct. In adition, 64 countries with conspicuous human rights situations received German weapons according to The Bonn International Center for Conversion. Among the most problematic recipients of German arms exports are Saudi-Arabia, Iraq, India and the United Arab Emirates.(GKKE & BICC 2012). The 2010 GKKE-report also criticized the coalition agreement concluded within the German government elected in late 2009 because Germany sets its arms trade policy primarily along economic and industrial interests to the detriment of peace and development policy considerations.(GKKE 2010)

b) Promoting PCD through Conflict Groups – the case of the UK

In 2001 the UK government created a funding mechanism for conflict prevention activities managed jointly by the Foreign and Commonwealth Office (FCO), the Department for International Development (DFID) and the Ministry of Defense (MOD). These Conflict Pools, previously called *Conflict Prevention Pools*, bring together the expertise in defense, diplomacy and development and encourage common approaches to addressing conflict around the world. In 2012 an evaluation was published that explored the contribution of the Conflict Pools in strengthening coordination and coherence across the three departments. According to this study, Afghanistan received the largest allocation of resources from the Conflict Pool (£75 million expenditure in 2010-11 against an allocation of £68.5 million). After Afghanistan, the top countries by 2010-11 expenditure were Pakistan (£13 million), Somalia (£7.9 million), Sudan (£7.2 million) and Sierra Leone (£7.1 million). In 2011-12, £8.5 million was allocated to Libya. (ICAI 2012: 1-3)

Despite the focus on achieving a multidisciplinary approach to conflict prevention and development goals, the evaluation report shows mixed results in terms of Policy Coherence for Development. For example, the Conflict Pool in Pakistan had difficulties in implementing its activities on a scale that matched its objectives. It undertook certain activities against extremist political groups but on too small a scale to reduce radicalism and improve cross- border dialogue. (ICAI 2012: 7-8) In the Democratic Republic of Congo, overall results for the Conflict Pools revealed even greater difficulties than in Pakistan. While certain objectives were met, the activities did not significantly contribute to sustainable development goals. Security sector reform could not be realized in the DRC and parts of the national army still support themselves through predatory behavior towards the people. Despite the difficult context, the Conflict Pool did not explore alternative options to improving the situation by working with civil society or international NGOs. (ICAI 2012: 8-9) The risk of unintended harm through a lack of attention to the particular context of fragility and conflict remained a serious problem despite the focus on policy coherence. (ICAI 2012: 1)

3. Discussion: What can we learn from these experiences?

Despite the importance of the realization of PCD from a theoretical perspective, the three case studies have revealed that PCD is only partly implemented through different institutional mechanisms. Detailed empirical data on the effects of PCD for fragile and conflict-affected countries is therefor not yet available. More research is needed in this regard.

My analysis shows that PCD goes further than a whole-of government approach that requires political, security and development objectives to be addressed in an integrated manner. The comparison of the experiences in the UK and Germany confirm results of a 2011 OECD study that finds that whole-of government approaches are recognized on paper by many development partners but are only rarely implemented in fragile situations. (OECD 2011b:31) More so is this true for the implementation of Policy Coherence for Development with a special focus on fragile and conflict-affected states.

Among others, the gap between political commitments is caused by practical challenges related to the implementation of PCD that are not only problematic for fragile and conflict- affected partner countries but also for democratic mechanisms in OECD-countries. To summarize the results from my analysis, difficulties for fragile and conflict-affected countries include:

- Dealing with contradictory and incoherent activities of partner countries, and with conflicting and unrealistic conditions for aid and non-aid cooperation with OECD countries (Köhler 2011; OECD 2009b; OECD 2011b)
- Political will to agree upon and to act according to global development goals. (DFID 2005; OECD 2011a; OECD 2011b)

Challenges for OECD-countries, namely the UK and Germany include:

- Determining the ideal level of support for sustainable development goals while taking political decisions according to a political mandate;
- Predictability, i.e. the challenge to foresee short-term results and long-term impacts of non-aid policies on fragile and conflict-affected situations
- Efficiency, i.e. the difficulty of taking political decisions within limited financial, temporal and personal resources, and to realize effective division of labor among governmental departments
- Public support and of political will for accepting and realizing their global responsibilities for people in fragile and conflict-affected states (OECD & Worldbank 2006; Twomey 2007)
- International awareness on PCD, i.e. the need for developing and emerging countries to take active measures to promote PCD because of increasing South-South cooperation (UNDP 2013)

PCD describes a complex framework. (King *et al*. 2012) This paper focused on only one dimension concerning the effects of non-aid policies of OECD countries for fragile and conflict-affected states. With increasing South-South cooperation, it is crucial to raise awareness for PCD, particularly in the context of fragile and conflict-affected states (c.f. section 1) and also in countries of the Global South. My theoretical analysis underlines the importance for all governments to agree on common objectives for sustainable development and to translate this commitment into action, i.e. promoting these human rights across all levels of government. Finally, it is important to share experiences regarding policy coordination. Development practitioners and civil society need to support this top-down commitment for PCD through providing information and the monitoring of the implementation of PCD.

Conclusion

The paper shows that the added value of the PCD framework consists in its ability to deal with conflicting human rights and political interests through a public policy lens. Furthermore, its conceptual framework allows identifying synergies and non-intended effects of policies in the sensitive context of violence and political transformation through its focus on the impact of non-aid policies on sustainable human development. Yet, development- friendly cross-sectoral approaches of governments, which are needed in order to tackle multi-dimensional threats related to fragile situations, reveal practical difficulties. These problems challenge fragile and conflict-affected states in particular but also democratic mechanisms of partner countries.

Consequently, in the framework of global sustainability and the post-2015 debate, PCD needs to be regarded as an internal requirement for all foreign and domestic policies. Mainstreaming PCD at all government levels (local, regional, national, international) is crucial for balancing short-term and long-term goals in fragile situations. As a result of globalization, the importance of PCD will increase in the future. It will require industrialized and development countries to operationalize development goals in their policies and to define clear mechanisms so that business may also comply with these efforts.

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Section 3

Challenges of Social Inclusion Gender

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Chapter 4

A Eudeimonic Approach to Social Inclusion: A Proposal for a Multidimensional Index of Social Inclusion for People with Disabilities (PDW) in Colombia.

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Abstract

Social inclusion is a requisite for sustainable development. A socially inclusive society is one where all individuals feel valued, their differences are respected, and they can live with dignity. Sustainable development is a concept closely linked to subjective well-being seen from a eudaimonic perspective. Subjective well-being explores the positive and negative evaluations made by individuals and communities regarding their satisfaction with life as a whole. Having individuals who feel included in society denotes a positive state that contributes to subjective well-being. More traditional approaches, in contrast, have focused on solving the negative state of social exclusion in society. We consider this difference important because focusing on positive realizations or removing obstacles from negative states will have different effects for subjective well-being and, in turn, for sustainable development. Traditionally, policies and actions have been aimed at to mitigating ill-being and social exclusion and fewer efforts have been made to promote the opportunities, capacities, and functioning derived from social inclusion and subjective well-being. Seeing social inclusion from a positive perspective requires a subjective involvement of the individual, an exercise of the individual's agency and self-determination as well as an increased sense of responsibility in terms of promoting and implementing actions and policies. We propose a multidimensional and multilevel index for social inclusion with the involvement of social psychology, economics, sociology and philosophy. Contributions from the schools of human development and new school of positive psychology with their mutual emphasis on variables such as autonomy, self-determination, hope, empowerment and positive emotions provide an important new angle for this discussion. These characteristics are particularly important for disabled individuals. Advantages and limitations of this approach are discussed from the point of view of the practitioner of development.

Introduction

Social inclusion is a requisite for sustainable development. A socially inclusive society is one where all the individuals feel valued, their differences are respected and they can live in dignity (Nussbaum, 2009). Social inclusion contributes to the subjective well-being of individuals and communities; a concept closely linked to sustainable development. We stress the importance of defining subjective well-being as well as social inclusion from a eudaimonic point of view: as a positive state. We will focus our attention on positive antecedents of social inclusion such as autonomy, agency, empowerment, hope, and a sense of responsibility that enable individuals to grow, flourish and develop in society. This, in contrast to more conventional approaches that have focused on removing obstacles of negative states (social exclusion and disabled people) as a central point of attention for the formulation and implementation of public policy. Based on these antecedents—stressed by both the school of human development and that of positive psychology—we propose to developa multidimensional index of social inclusion as a guide for public policy. Despite the coincidences, the integration between variables and approaches from the school of human development and that of positive psychology has not yet been discussed in the literature regarding development studies. Both schools highlight the importance of subjective feelings as complementary to objective structural conditions and establish the importance of agency, empowerment and self-determination, among others, for a responsible action to guide an intended process of change. The positive turn we adopt on social inclusionwill have important advantages forthe definition of sustainable development,

closely linked, in this case, to the concept of subjective well-being from a eudaimonic point of view, as we will later explain.On the other hand, disability should be seen as part of a multicultural and diverse society, not only from a vulnerability and basic needs approach.

The purpose of this paper is to discuss the advantages of framing sustainable development as subjective well-being (SWB) that has as an antecedent, the feelings of social inclusion. We consider that a Life good lived is the ultimate goal to be attained in development processes of change undertaken by agents, groups and communities. In that sense, we affirm that social inclusion is a requirement for sustainable development. We propose a multidimensional and multilevel index to measure such development and guide the formulation and evaluation of public policy. We discuss the advantages and limitations of this approach from the practitioner point of view and suggest avenues of future research.

Sustainable Development, Subjective Well-Being and Eudaimonia

We understand sustainable development as a process of social construction of change, whereby the actors and communities involved acquire the freedoms, capabilities and "functionings" (Sen, 1996) that enable them to construct the life they want to live during their life span. Understanding development under this perspective implies a shift in the framing of what development means. We consider development as closely related to well-being, which, in turn, is one of the most central concerns in human experience. Today, in a globalized and uncertain world of insecurities and of opportunities, to know what makes life worth living is of crucial importance (Pawelski et al, 2013). This is true, in particular, for people with disabilities who have to experience and value their well-being under particular parameters of what they feel is a life well lived. The construction of an index that assesses these individuals' and communities' perceived levels of social inclusion is an important step towards qualifying the formulation of public policies and to implementing, evaluating and monitoring them. Additional to the subjective perceptions, the index should also include the generation of capabilities at the institutional level in municipalities and regions as well as the quality and effectiveness of the public policy used to enhance social inclusion.

Well-being as a proxy for sustainable development comes as a result of significant efforts to change the objective conditions that hinder an individual's or community's freedom to choose the life, she or he wants to live. It also comes as a result of a conscious process to modify a person's subjective experience. We emphasize, in this definition of development, the subjective feelings of individuals, groups and communities that thrive in their autonomy to construct the life they want to live. This view of development emphasizes subjective well-being(SWB) under a eudaimonic approach. Research in this field has inquired how people perceive their well-being in different settings, including different cultures, regions and cities (Diener et al, 1999., Wills- Herrera et al, 2010).The empirical study of subjective well-being (SWB) has been growing in prominence over the last 30 years (Diener et al., 1999). The search for antecedents and correlates of subjective well-being promises to enrich perspectives on social welfare and public policy that have previously suffered from a purely materialistic bias (e.g. Easterlin 1995). Subjective well-being is important to development because public preferences may be better revealed by bottom-up approaches (Brief et al., 1993)to measure the satisfaction of the people directly involved with different domains of life. As has been stated recently, "measures of SWB can be useful in assessing the need for certain policies and in measuring the outcomes of policy intervention" (Diener, 2006).

The idea of development as closely linked to subjective experiences and feelings of well-beingis closely linked to Sen´s (1996) view of agency and freedom for development, as well as to new approaches that have stated that development should be defined from the people's own perspective, stressing their overall subjective satisfaction with life as a whole (Diener, 1983, Cummins et al, 2003, Wills, 2009). The level of freedom an agent develops will be capitalized to construct a life welllived under a eudemonic approach (Deci & Ryan, 2000, Wills, 2009). A life well lived, as eudaimonia, was originally affirmed by the Greek philosophers, particularly Aristotle, who expressed that "the good life" or "doing well" is the same thing as eudaimonia. This term that derives from the greek "eu" good or well-being and "demon", spirit, suggests that well-being lies in the actualization of human potentials and in the capacity of an individual to flourish or a community to thrive. Eudaimonia refers to the

things that make life worth living the most, enabling individuals to thrive. This idea is particularly important to vulnerable groups such as people who live in poverty, people with disabilities, children in developing countries, and minorities who do not easily feel socially included.

This term has been traditionally translated into English as happiness, which is a problematic translation (Pawelski & Moores, 2013) given that the Greek word suggests an overall sense of flourishing, including a search for meaning in life and not so muchthe momentary experience of pleasure.

Subjective well-being SWB, from a eudaimonic point of view,focuses on meaning, self-realization, positive experiences,and considerswhether an individual or group is really functioning at the level of his opportunities and capacities. In a literature review about subjective well-being as synonymous to development, it is interesting to note that an increasing number of scholars and disciplines are focusingon finding the causal factors and consequences for the development of subjective well-being. This positive trend in studies on well-being and development highlights an increasing number of scholars who are less concerned about ideological pronouncements about negative states such as exclusions, without denying them, and are more interested in innovative studies of what causes individuals to flourish and communities to thrive. In agreement with Pawelski and Moores (2013), we call thisthe eudaimonic turn in development studies, and consider that this turn proposes innovative ways of understanding and measuring social inclusion as well as development as opposed to focusing on solving social exclusion as a negative state.

Developing an index of social inclusion under this approach will stress that individuals, groups and communities have their own responsibility in advancing strategies, objectives and goals of social inclusion. The index also stresses the importance that individuals be empowered so that they can advance in the direction they aim, and that their autonomy, self-determination and freedoms are prerequisites for any action aimed at achieving more equitable communities and societies. Emphasis on positive feelings and emotions, as well as positive processes such as solidarity between individuals in groups is another important issue toconsider.

If, from a eudaimonic point of view, higher levels of subjective well-beingthrough developmental processesare desirable states to be achieved, to feel socially included becomes a requisite and antecedent of those levels. For establishing how higher levels of feeling of social inclusion contribute to higher levels of subjective well-being, an index for social inclusion has to be proposed. Such an index must have the potential to identify who feels high levels of social inclusion and to identify the factors that most contribute to those feelings of inclusion. Additionally to the psychological perceptions and feelings of well-being the index shall combine indicators of the quality of public policy and the construction of capabilities at the family level, school level, municipal and regional levels.

A Positive Turn to Understand and Measure Social Inclusion.

Social inclusion implies that people are included in their community and in society. Their voices are heard so that they can effectively participate, they are able to use their capabilities and access resources so that their opportunities for a good life are enhanced. Social inclusion is different from integrating into society from a market point of view. The former is based on the value of the diversity of values, attitudes and beliefs. Participative practices with reflective agents who make value judgments to select positive values, attitudes and behaviors that foster social inclusionare also present in processes of social inclusion.

Social inclusion as a requirement of sustainable human development should consider where the efforts of public policies aim towards, and how limited resources should be used in order to maximize subjective well-being and the flourishing of individuals in society. Should the focus be on the promotion of what is directly positive and beneficial to an individual or a community,or should it focus on removing obstacles derived from negative states and impediments to self-growth? Focusing on the positive realization or removing the negative will have different effects for subjective well-being. Until recently, policies and actions have focused on mitigating ill-being and fewer efforts have been made to promote the opportunities, capacities, functioning for

well-being which requires a direct subjective involvement of the individual as well as an increased sense of his responsibility to promote and implement actions and policies. This emphasis on the positive shouldlead also to a multidisciplinary approach which includes contributions from the fields of social psychology, economics, sociology and philosophy. The contributions of the new school of positive psychology and its emphasis on variables such as hope, joy, gratitude, self-determination, autonomy, compassion, mastering and empowerment are important to consider in that respect.

It is also important to stress that focusing on the positive characteristics of well-being does not exclude the understanding and treatment for ill-being and the removing of structural obstacles to development. Despite the fact that well-being and ill-being are substantially different, they are also closely related and interact robustly. Our emphasis on the positive turn of social inclusion as a requisite for development is based on the simple idea that good things in life occur during the processes of development in a particular country, region or municipality, and that these are just as real as the obstacles, negative states and limitations that must be overcome. Positive emotions and behaviors (such as citizenship behaviors) are just as real as negative emotions and are not just the relief or transformation of negative states (social exclusion, in this case). In the same direction, mental and physical health are not the mere absence of pathologies and illnesses. But this does not imply that we should dismiss the negative, in particular when it comes to incompliance with basic human rights or the exclusion of people from society because of their particular status, race, age, etc.At the same time,social inclusion is a broad, multidimensional concept,which is different from social integration into society via the labor market. Two basic and important questions about social inclusion are: a) Who should feelincluded? And,b) What should the degree of inclusion ofdifferent individuals and groups be?

The answers to these questions imply different approaches to social inclusion. Theyhighlight ideological and ethical postures. Three main schools can be identified in this respect: a) the neoliberal school, that sees social inclusion as a problem of access and economic resources through market mechanisms; b) the school of social justice, that emphasizes community participation and the entitlement and exercise of fundamental rights; and, c) the schools of positive human development, that stresses individual and group agency and empowerment. We work with the two latter approaches and add a newapproach from quality of life studies and the positive psychology movement that stresseswell-being as eudemonia and human flourishing. This latter approach changes the focus of analysis and intervention from deprivation and deficits to one of human potential, capabilities and empowerment to change.

Is Social inclusion the Opposite of Social Exclusion?

To decide to construct an indicator either for social exclusion or social inclusion requires, in the words of the famous positive psychologist, Mihaly Csikszentmihalyi (2009), a new metaphysical orientation, which holds that positive aspects in life (social inclusion) are as real and important as negative factors (social exclusion).

Social exclusion has been understood as one of the most severe problems related to development in countries such as Colombia. It is understood as the inability of certain individuals and groups to access opportunities that allow their human development. Within the discourse of social justice, basic rights and citizenship, the status of being socially excluded does not refer exclusively to a lack of access to basic goods and resources but as a lack of access to basic rights. For example, when the person does not have the freedom to choose from a set of alternatives and is constricted by laws, institutions, culture, a deliberate practice, a particular law or others' behaviors. In the case of a child, it is the creation of certain conditions that will not allow the child to actively and autonomously participate in his future choices freely, resulting in reduced human capabilities. Social exclusion is not only characterized by material deprivation but particularly by feelings of alienation, shame, loss and guilt. It is related to status, self-perception, self-esteem and self-efficacy.

Social exclusion has been one of the factors that always come to mind when pursuing revolutionary changes in society. We agree that the structural causal factors associated to social exclusion must be removed to guarantee a more equitable and sustainable society. However, we consider that focusing only on the negative disallows

the potentiality of incorporating strengths, virtues and capacities that individuals, groups and communities can mobilize in their process of becoming agents of their own development. Therefore, we propose that social inclusion is not the opposite of social exclusion. They are two distinct and orthogonal variables. An individual can, at the same time, feel levels of social inclusion and of social exclusion.

The usual approach in health sciences and psychology has been to focus on illness and not on the potential for growth and flourishing. A positive turn implies that positive emotions, attitudes and behaviors are not just the relief or transformation of negative states (its opposite), but that positive states have their own causal variables and manifestations. It is not the absence of social exclusion in which we are interested. It is the development of social inclusion, which has a value in itself and which opens possibilities for development that are different to merely solving the negative state of social exclusion. This approach does not imply dismissing social exclusion but, on the contrary, to focus on the positive advantages of the concept and practice of inclusion. Social inclusion refers to opportunities rather than problems. Getting rid of negative states does not necessarily result in the growth of beneficial states. Children who stop crying do not necessarily begin to smile. For instance, individuals and societies that focus their attention on the construction of civic institutions, excellent and inclusive schools, and growth of social capital, will typically reduce social conflict and exclusion. Positive and beneficial states are of great value for the life of children and individuals. The purpose of life and the objectives of development should certainly be broader than solving basic needs or eliminating negative states that threaten people's well-being. The distinction between things that are beneficial for society and things that are problematic have deep psychological and sociological roots that must be carefullyconsidered. This will lead to what in psychology is known as approach strategies (Hinnings, 1997).

There are two different approaches to a life well lived: societies must work directly on what is good for them (social inclusion) and indirectly on diminishing what is harmful for them. Through this perspective, we see that social exclusion and social inclusion are not independent orthogonal variables, each lying at the opposite extreme of a continuum. They exist simultaneously,each withits own causal mechanism and variables, and different consequences and manifestations. Social inclusion and social exclusion are not existential opposites since they are not the presence or absence of the same substance. They are substantive opposites; each is real in its own terms. The question for public policy then arises: should the focus be on the application of what is beneficial or on removing obstacles, basic needs and resolving problems? Our approach is to base decisions on the positive.

Under these bases we propose the following hypothesis:

H1: Social inclusion is not the opposite of social exclusion. It entails additional synergies that allow individuals to flourish and communities to thrive.

H2: An index for measuring social inclusion has to be multidimensional and multilevel. We propose that the index consider social –psychological variables of feelings of being included, the generation of institutional capabilities and the quality of public policy.

H3: Antecedents for perceptions of feeling included are: autonomy, self-determination, empowerment, felt responsibility, hope and voice.

H4: From a public policy point of view it is different to focus on the positive (social inclusion) than on removing obstacles derived from negative states (social exclusion).

Social Inclusion: a Complex, Multidimensional and Multilevel Process

Social inclusion is a multidimensional, plural and multilevel concept. It should be constructed from the individual, including individual traits, attitudes, emotions and behaviors; passing through the group level starting with the family; the community level; the organizational level (school, for example); and territorial levels of governance including the local and municipal, and the regional and national levels where public policies are formulated, implemented, evaluated and monitored.

We combine approaches from the school of human development (Nussbaum and Sen, 1993), the multidimensionality of poverty (Alkire,2009) and positive psychology (Diener and Seligman,2004) to stress the importance of concepts such as agency, freedom, capabilities, positive attitudes, emotions, feeling and behaviors, as well as removing structural obstacles to social inclusion by public policy. This leads to the construction of multidimensional and multilevel indexes. For instance, agency, which is a central concept for social inclusion, in Sen´s view, is plural in both its content and measurement. It is exercised with regards to the goals in life that an individual values. Agency requires effective power the individuals' and groups' ability to control and guide the meaning, direction and sense of their development process. The exercise of agency in social inclusion will also advance the well-being and therefore the development of individuals and groups. Finally, an increasing sense of responsibility of agents during this process is needed. A sense of responsibility—or felt responsibility—is a complement to the external faces of responsibility such as accountability (Wills, 2009). When an individual senses an increasing level of responsibility, he will be motivated to act and decide according to the goals he values most, increasing the individual's levels of felt responsibility is also important in order to not hand over the responsibility of inclusion entirely to public policies and State reforms.

We propose a discussion of social inclusion that is based on a positive development perspective. The notion of positive development stresses the notion of positive, subjective experiences from individuals and groups that can be expressed in positive institutions for society (for instance inclusive schools for self-growth of people with disabilities). Discussing social inclusion through a positive focus implies that the positive attitudes, emotions and behaviors that must be considered as part of the multidimensional index are not the relief or transformation of the negative states that social exclusion implies. Seeing social inclusion as a positive process implies that actors and communities should be empowered during this process in order to make their decisions autonomously (that is to say that they become agents), but also that certain structural factors be removed by means of public policies so that they can freely participate and their voices be heard to define the future life they expect. We consider that social inclusion means more than merely not being excluded from access to basic goods and services. It means to have a sense of belonging, shared identities and shared values that allow participation and the exercise of solidarity and trust. In that sense, social inclusion must be supported by public policy, laws and social norms as well as entitlements to exercise basic fundamental human rights.

We propose the construction of a new multidimensional index for social inclusion that is based on an approach of promotion,rather than one of prevention (Maslow, 1955., Higgins, 1997). These approaches allow the integration of concepts such as agency and autonomy, self-determination, hope, positive self-images, voices being heard (participation), dialogue, effective power as empowerment, felt responsibility.

Despite its multidimensionality and the number of levels involved, we think that an index for social inclusion must be narrowed to specific situations and conditions. In this regard, we are interested in exploring our approach in infants with disabilities at their early stages of schooling. Such an index will be different from other conditions of social inclusion in adult populations acting in other sectorial or geographic contexts. The more specialized an index, the more effective it will be in answering the question of who is included and at what level of inclusion.

One of the institutions that most heavily influence the future social inclusion of any individual is the educational system. In particular, schools as organizations play a fundamental role in shaping values, beliefs, attitudes and behaviors that will influence whether an infant will be socially included in his immediate future. This is particularly the case for infants and children who are physically or mentally challenged.

Levels of Analysis

At the micro level, the index considers the different aspects related to the quality of life of disabled individuals and their families. The three following capacities are considered for social inclusion:

-Agency: what a person is free to do and achieve in pursuit of whatever goals and values he pursues (Sen, 1985).

-Empowerment: which must occur at the micro level (attitudes, behaviors, feelings), in terms of social relationships, and, at the macro level, regarding beliefs as well as behaviors.It implies an increase in power understood as a greater control of certain individuals over their own destinies. Empowerment also refers to the preconditions (economic, social, and cultural) to exert agency, and it is positively correlated with good governance.

-Self-determination: is concerned with supporting our natural or intrinsic tendencies to behave in effective and healthy ways (Ryan et al, 2008., Deci & Ryan, 1985). It stresses the importance of autonomy, mastery and relatedness in an individual for positive motivation for action.Self- determination propositions also focus on how social and cultural factors facilitate or undermine people's sense of volition and initiative, in addition to their well-being and the quality of their performance. Autonomy developed in psychology by Deci & Ryan is closely matched to Sen´s concept of agency and it defines autonomy for an individual: "when the behavior of a person is experienced as willingly enacted and when he fully endorses the actions in which he is engaged." (Alkire, 2005). The Deci & Ryan indicators of autonomy have been empirically proven in many countries and in different contexts.

- Felt responsibility (Wills, 2009): a sense of responsibility that includes both cognitive and affective dimensions and that motivates an individual to behave in relation to attain the goals he most values.
- Attitudes in relation to prejudice and discrimination
- Feeling entitled to participate in public policy.
- Capacity to be informed about causes of incapacity and the services available for attending it

At family level, it is important to stress the family's affective support of the disabled individual; the ability to know their rights, to act, and to demand differential attention; family autonomy and the family's support of the autonomy and self-determination of the disabled individual, including a sense of respect in terms of the decisions made by the disabled person. The household is a fundamental building block in society and the place where individuals deal with basic concerns, norms, power and power relations. It is important to evaluate the family's power in terms of decision-makingand the participation of family members, in particular, disabled ones, in such processes. Feelings of control over decisions will be an important indicator to consider.

Relatedness is also an important factor for families in their capacity to develop social networks and a capacity to act cooperatively with other families.

At school level, it is important to incorporate the schools' capacity for an inclusive education. This implies the capacity to generate climates for inclusion and an organizational culture where diversity is one of the most important values to be considered.The index also has to include the capacities of the governmental agencies—particularly local level ones—that have a direct influence and impact on social inclusion, such as inclusive governance models, capacity to act and development of citizenship thorough the diffusion of values for social inclusion.

Methodology

We will follow this discussion with an analogy of the Multidimensional Poverty Index developed by Alkire and Foster (2009, 2011), but stressing positive states rather than deprivation. As an analogy, the multidimensional method for measuring poverty can be applied to other purposes and dimensions as has been applied to the measurement of betterments in child poverty (Roche, Oxford Working Papers,No 57, 2013). In our case, we will substitute negative stateswith positive variables and characteristics. to do this, it is necessary to adopt different specifications, different dimensions and variables, different cut-off ratios to those originally used by Alkire and Foster (2009) for poverty measurement. This requires participative practices with reflecting agents who must choose the values that will guide public policy. It is also important to follow enduring consensus found in the

scientific literature as we have shown in relation to concepts worked on simultaneously by the schools of human development and positive psychology. Whether available data exist must also be taken into account.

We propose to develop a multidimensional indicator for potential social inclusion of infants, based on the Multidimensional Poverty Index methodology, adjusting fit or specifications, dimensions, and cutoffs. To do this, we have to discuss, first, how to measure social inclusion and whether this is a concept that is antonymous or opposite to social exclusion. Another aspect to take into account is whether the indicator will be used for public policy formulation or for monitoring of local conditions by, for example, an NGO. In the first case, the principal criteria to be met—in addition to inclusivity and parsimony—is transparency, so that accountability can be exercised. In the second case, an inclusive participatory approach is needed so that all the different stakeholders can make their voice heard. Similarly, the choice of data is very important since it will not be independent of the purpose at hand.

Multilevel analysis is also required. If we are going to focus on child development, it would seem logical to use the infant as the primary unit of analysis, but, in doing this, we need to be aware of the difficulties and challenges this entails. What constitutes dimensions of social inclusion for a child will depend on their age status, so a particular indicator may not be applicable to all groups.

The multidimensional method follows two steps: i) identification of the individuals, and ii) aggregation of dimensions. The method scrutinizes the information provided by the joint distributions of deprivation. In our case, we will not include deprivations but positive traits, attitudes and behaviors. We need to construct a profile of each person and assess how many positive dimensions they are present in simultaneously. This approach follows the idea that positive states and dimensions of different types and different dimensions have to be integrated in a general framework. A matrix of n individuals with d dimensions that may explain social inclusion is constructed. Each row level establishes the individual level result in the d dimensions. A cut-off index is established for each dimension so that the individuals who are above that level are seen as included.

To identify those that are socially included, first, individuals with disabilities in any dimension are identified. The cutoff level is a value judgment decision and not a technical one, and, as such, it has to be reached through consensus, which is built through deliberation of all the stakeholders included.This dialogue should be carried out at family level and at school level. The inclusion of indicators should be discussed in terms of their specificity to context (disabled people, school) or universality, whether they are intrinsic (of their own value) or instrumental, individual or collective and their level of application. Indicators must be relevant for the individuals' involved (disabled people) and should be comparable. They have to assess the intrinsic values of the properties analyzed not only their instrumental value. As we are interested in the process of social inclusion, indicators shall have the capacity to identify social and individual changes over time.

This index follows the intuitive methodology of counting on diverse dimensions of positive traits that may explain inclusion. Its opposite, the Multidimensional Poverty Index has a long history of empirical evidence implementation.

The identification step consists of a dual cut-off approximation. First, individuals who feel socially included will be identified by a figure which is above a cut-off level in any particular dimension and, second,the person with disabilities will assess the weights of different dimensions that influence his/her feelings. Then a union or intersection approach may be followed to aggregate. Which dimensions are selected is a choice that has been defined among participants at the family and school levels. These dimensions must be of importance for each local setting (school, municipality in our case) and must be appropriate to guide public policy.

Implications for Practitioners

Practitioners for development should focus on positive opportunities that promote sustainable

development. During this process they can work closely with communities in bottom-up approach that allow them to thrive and individuals to flourish. Under this perspective is better to focus on processes of social inclusion rather than concentrating only on removing structural obstacles that generate social exclusion. They have to understand based on the new school of human development and positive psychology that social inclusion generates particular synergies that allow individuals and communities to increase their subjective well-being. To measure subjective perceptions of well-being as well as feeling of inclusion require the construction of a multidimensional an multilevel index. Antecedents for the construction of this index are variables such as autonomy, self-determination, feelings of responsibility, feeling entitled to reclaim basic rights, hope and voice. Other indicators such as construction of capabilities at the family, school, municipal and regional level as well as indicators for measuring the quality of public policy are needed. As a limitation, some analyst may claim that focus on the process of construction of the positive with individuals and communities may neglect the transformation of structural issues of societies such as social exclusion and that it can signal that the responsibility of the state is diminished.

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Chapter 5

Revisiting the Relevance of Gender in Developing Livelihoods and Community Strategies to Cope with Environmental Shock and Stress

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Abstract

Gender is a critical factor in efforts to address ecological management and recovery in situations of environmental shocks and stress. Research has shown that women are more vulnerable to ecological disasters that are now increasing in intensity and frequency due to the effect of climate change (Segnestam 2009). Access and control men and women have over the different household and community capitals, can play an important role in the development of strategies to face and recover from natural disaster situations. Systematic analysis of the effects of ecological disasters (such as devastating forest fires and drought) on rural communities showed that there is a direct relationship between a healthy community, one with balance and synergy among the capitals (including equity at all levels), and a healthy ecosystem, one that provides and supports the resources required for a healthy human community (Gutierrez-Montes 2005, Segnestam 2009). In the current context with the increasing likelihood of disasters and women's high vulnerability to them, the need to increase women's access and control over resources is critical. We propose the use of the community capitals framework to analyze how women in rural Latin American settings invest the different capitals they have access to, to recover from ecological disasters. Using a case study from Chiapas, Mexico, we found thatwomen have and preserve local knowledge (cultural capital) related with their natural capital: i. e., agrobiodiversity, natural resources traditional uses, etc. (Gutierrez- Montes et al. 2012). This local knowledge (cultural capital) combined with their skills and capacities (human capital)and the relationships with neighbors', family and friends (bonding social capital) are a starting point to promote the development of a learning environment in which participantscan learn, share and apply more and betterknowledge and skillsto improve their livelihoods within what we calleda ***wisdom dialogue*** (cultural capital) toward social and ecological resilience.

Social Vulnerability and Climate Change

Climate change, and its increasingly felt consequences, deeply affects social structures with particular effects on rural communities whose livelihoods' are directly related with natural capital. Moreover, reality has been showing complex and dynamic links between gender relations and climate change(Terry 2009). Gender is therefore a critical factor in efforts to address ecological management and recovery in situations of environmental shocks and stress.

Research conducted in different parts of the world has shown that women, and especially rural women in developing countries, are one of the most vulnerable groups to ecological disasters that are now increasing in intensity and frequency due to the effect of climate change, since they "depend on natural resources for their livelihoods, do most of the agricultural work and are responsible for collecting water and fuel" (Terry 2009).

System Level Approaches to understand and promote changes

"Systems based thinking (and doing) is holistic; it allows us to search for ways to integrate research and practice from multiple perspectives and disciplines, to look at change across institutions and communities and embrace the complexity of interactions between levels and among elements of the system" (Gutierrez- Montes et al. 2012). Systems thinking has been used to understand issues related with natural resource management

and rural communities (Bosch et al. 2007). Systematic analysis of the effects of ecological disasters (such as devastating forest fires and drought) on rural communities showed that there is a direct relationship between a healthy community, one with balance and synergy among the capitals (including equity at all levels), and a healthy ecosystem, one that provides and supports the resources required for a healthy human community (Gutierrez-Montes 2005, Segnestam 2009). In the current context with the increasing likelihood of disasters and women's high vulnerability to them, the need to increase women's access and control over resources is critical.

Vulnerability to natural hazards, in India, Peru, Nicaragua and Mexico for example, arises from poverty, isolation and marginalization, beyond the physical and related expected effects (Ahmed and Fajber 2009, Rivero-Reyes 2009, Segnestam 2009, Soares and Gutierrez 2012). Access and control men and women have over the different household and community capitals, can play an important role in the development of strategies to cope, face and recover from natural disaster situations (Segnestam 2009).After a through case study in the dry zone of Nicaragua, Segnestam (2009) found that women and men use different combined strategies or "changing livelihoods" at times of drought to reduce its impacts. Applying a gender perspective, author found a riskier situation for women due to their lack of ownership and access to several capitals': mainly political, cultural and financial, as well as human and social (Segnestam 2009). Similar conclusions are pointed out from experiences in Peru, where topics as claim rights and participation within decision making structures (political capital) are key to women towards development and recognition of own capacities to face and transform their situation (Rivero-Reyes 2009).

Community resources' or capitals and climate hazards: challenges and proposal to action

Community Capitals Framework (CCF), a systems based approach developed by Flora et al. (2004) is particularly helpful for understanding the downward spiraling effect of poverty and environmental degradation (and the possibilities for reversing such a spiral) (Gutierrez- Montes et al. 2009, 2012). Moreover, CCF provides a methodological and conceptual approach to analyzethe close relationship between rural communities' wellbeing and a healthy environment (Gutierrez- Montes 2005).

CCF highlights that every community, no matter how rural, isolated and marginalized, has resources or capitals that can be invested and multiply in the promotion of endogenous development (Flora y Flora. 2013). Authors´ divide resources' or capitals in two categories or factors: human (human, social, political and cultural capitals) and material (natural, financial and built capitals (Table 1).

Table 1. Communty Capitals

Factors	Capital	Definition	Examples
Human	**Human**	People: its skills and abilities to face challenges.	Skills, abilities, education, health and self- esteem
	Cultural	Way people know and act within the world	Traditions, heritage, ethnic festivals, local knowledge. languages.
	Social	Relations and connections of mutual assistance; networks, trust, reciprocity, collective action	Organization, local groups, community involvement, leadership, exchanges, cooperation
	Poliltical	Access to power structures and power brokers	Participation in decision making structures

Material	**Financial**	Financial resourcesavailable to invest	Productive activities, savings, credits, incentives, remittances
	Built	Infrastructure that supports families and communities	Housing, productive infrastructure, telecommunications, water and sewer systems.
	Natural	Natural resources	Water, soils, biodiversity, landscape, ecosystems (goods and services)

Source: Bautista- Solís and Gutiérrez- Montes (2012), DFID (1999), Flora and Flora. (2013), Gutierrez- Montes et al. (2012)

We used the CCF as a methodological and conceptual approach to answer the research question: What are the mainstrengths, opportunities and challenges of indigenouswomen to face climate hazards in the state of Chiapas?

Results presented were obtain from the analysis of secondary sources, 161 surveys (90 women; 71 men), 32 semi structure interviews with key informants and participant observation in ten communities: Sitalá (main municipality), Paraíso Chicotánil, La Merced, Picoté Pamalá, Guadalupe Peña Blanca, Don Pedro, El Porvenir, Frontera Mevajá, San Agustin y San Juan Shucaíl.

Human capital. People within the community, particularly women, pointing out that despite the difficulties faced, they are not very keen to outmigration, allowing generational relevance and permanent availability of labor force. Families with some degree of diversified livelihoods to face stress and shocks.

Challenges: Improvement of education (bilingual education), specially targeting girls and women; opening spaces for training opportunities for women (i.e. prevention of disasters related with climate hazards) with a focus on a promotion of actions to face hazards; early alarms systems in Spanish not reaching women whom do not speak Spanish;improvement of access to health services and inclusion of traditional practices.
Proposals for action: Development and promotion of activities towards capacity building (including early alarm systems) in local language (Tzeltal); stressing the importance of improving community educational levels (bilingual education Spanish- Tzeltal) special emphasis on women and girls and promotion of employment opportunities for young women.

Cultural capital. Persistence of Tzeltal cosmovision and language. Women with a strong role preserving local/traditional knowledge. Existence and recognition of community communication channels during emergencies.

Challenges: Appreciationand recognition of knowledge and traditional practices.
Proposals for action: Recognition and valuing of Tzeltal heritage and its effects on social organization towards community communication and solidarity.

Social capital. Strong presence of bonding social capital (women's) which allows good communication and community solidarity facing crisis.Awareness of the importance of local organizations for wellbeing and expressed interest in active participation.

Challenges: Promotion of support networks especially promotion of women support groups; support women participation in community organizations
Proposals for action: Closer collaboration with religious groups (source of social capital- especially women's social capital); more presence of governmental and non-governmental organizations related with hazards; stressing the importance of female participation in community activities.

Political capital. Felt need for closer relationships between local and external groups.Expressed interest in active participation

Challenges: Promotion and facilitation of open communications between communities' authorities and external government; promotion of an ample participation of women and young people within decision making structures.
Proposals for action: Creation of spaces to exchange ideas, proposals and needs (promoting the inclusion and participation of women and young people) with government representatives (local, state and federal).

Natural capital. Recognition of the importance of natural resources' in people's livelihoods strategies; Traditional agricultural practices recognized for being environmentally friendly and expressed commitment with environmental preservation

Challenges: Promotion of agroforestry systems beyond existing home gardens: with coffee and silvopastoral systems (as recognized sources of fuel wood and environmental goods and services); information and training on climate change and effects on natural capital (i.e. water, forests, soils, biodiversity).
Proposals for action: Promotion of sustainable management of natural resources' as an opportunity to improve agricultural production and human wellbeing;broader diversification of livelihoods'; promotion of adaptation/ mitigation strategies (such as agroforestry systems).

Built capital. Roads in good shape and expressed recognition of the importance of housing and community infrastructure improvement.

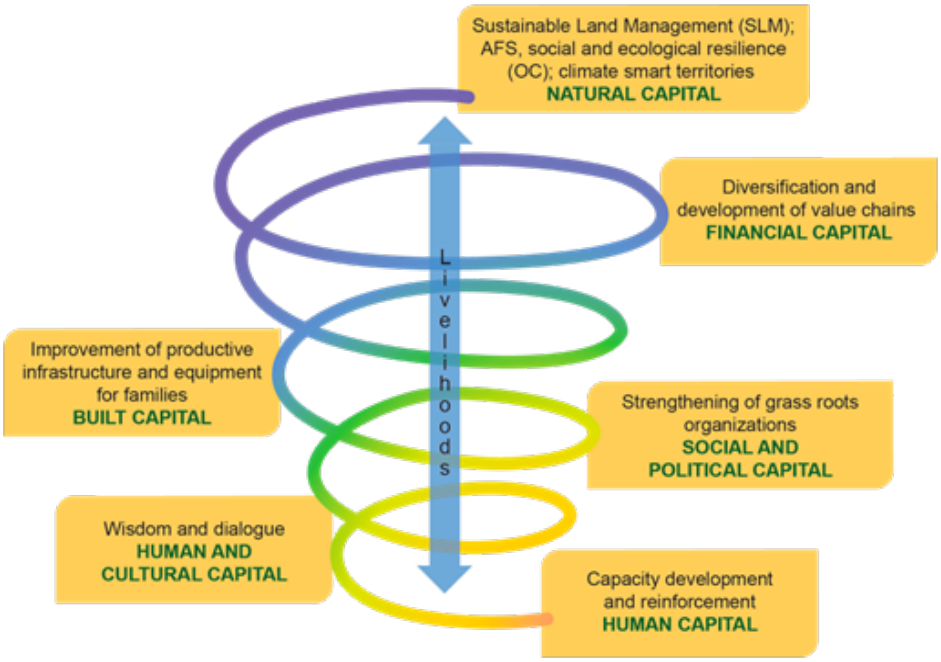
Challenges: Promotion of housing improvement and collective analysis of community infrastructure readiness to face climate events.
Proposals for action: Development of appropriate infrastructure; maintenance of access roadsto avoid isolation in case of an emergency.

Financial capital. Women's access to governmental programs (in relation with children's health and education).Some degree of income diversification, but openness for more diversified livelihoods.

Challenges: Promotion of productive alternatives (in relation with adaptation and mitigation); Awareness of the importance of access to financial and built capitals for women; Recognition of women participation within productive activities; Access to credits for women and young people.
Proposals for action: Urgent need for the reinforcement quantity but moreover quality of family income; Emphasis on existing governmental programs towards productive diversification; Credits and financial resources' targeting women.

In summary, we found that women have and preserve local knowledge (cultural capital) related with their natural capital: i. e., agrobiodiversity, natural resources traditional uses, etc. This local knowledge (cultural capital) combined with better and improve skills and capacities (human capital) and the relationships with neighbors', family and friends (bonding social capital) are a starting point to promote the development of a learning environment in which participantscan acquire, share and apply more and betterknowledge and skillsto improve their livelihoods within what we called a ***wisdom dialogue*** (cultural capital) toward social and ecological resilience (Figure 1).

Figure 1. Upward spiral



Relevance of the solution and implications for policy

• Policy makers must take responsibility in the creation of an enabling environment to open access and control over community assets or capitals for women; not only in relation with natural and built capitals (target of most of development initiatives), but human, social and financial capitals and specially focusing in cultural and political capitals.

- o **Human capital:** efforts and effective programs to improve women and girls indicators of education and health; revisiting early alarm systems to guarantee everybody has access to up-to-date relevant information.
- o **Financial capital:** credits and financial resources' and programstargeting women.Efforts towards the creation of payments for environmental services that consider people without land tenure security (something common in indigenous lands and especially women).
- o **Social:** recognition and reinforcement of women's groups.
- o **Political capital:** promotion of the inclusion and participation of women and young people in decision making structures and reinforcement of existing governmental programs towards productive activities diversification (targeting women).
- o **Cultural capital:** recognition and celebration of women´s knowledge in relation with natural resources traditional uses and preservation.

Relevance of the solution and implications for business

• Business have an important role in terms of promotion and open access and control over community assets or capitals for women, especially financial capital. Efforts toward social responsibility must target women and girls in terms of:

- o **Human capital:** financing programs to improve women and girls indicators of education and health and preparedness to explore income alternatives and employment opportunities.
- o **Financial capital:** credits and financial resources' and programs targeting women and promotion/ support of female entrepreneurship.

Relevance of the solution and implications for practitioners.

• Practitioners of development have an important role in terms of recognize the importance of system levels approaches that guarantee effective and sustainable access and control over all the community assets or capitals for women: human, cultural, social, political, natural, built and financial.

• Practitioners of development have the responsibility of promote and open spaces toward the process of full participation of traditionally excluded and denied social groups, such as women and young people within decision making structures, from family, to local, state and beyond levels.

- **Human capital:** financing programs to improve women and girls indicators of education and health.
- **Social:** efforts to strengthening women's groups; efforts toward the construction of bridging social capital in order to guarantee women have access to external resources.
- **Political capital:** efforts in the promotion of the inclusion and participation of women and young people in decision making structures. Capacity building towards leadership positions.
- **Cultural capital:** recognition and celebration of women´s knowledge in relation with natural resources traditional uses and preservation.
- **Financial capital:** credits and financial resources' and programs targeting women and promotion/support of female entrepreneurship as well as creation of payments for environmental services that considers people without land tenure (something common in indigenous lands and especially women).
- **Built capital:** productive infrastructure women's- friendly;
- **Natural capital: (see cultural capital).**

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Chapter 6

Messy, Necessary and Possible: Engaging with customary systems to further women's inclusion and human rights

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Abstract

In many developing countries, including conflict-affected societies, customary systems significantly govern the degree to which women and other marginalized groups are included and their human rights protected. However, despite the primacy of these systems for many people, the dominant trend over the past several decades of the international development community – particularly law and governance sectors – has been to invest almost exclusively in formal, state institutions. This approach has often yielded unimpressive results. This paper argues that engagement with customary systems must be considered as part of the solution and that decisions as to the entry–point and type of engagement should be context-specific as well as informed by sound empirical analysis. It also provides such an empirical basis, drawing on the author's original research of a NGO intervention in post-conflict Bougainville, Papua New Guinea along with recent evaluative research on engagement with customary systems in diverse contexts. The reasons international actors have eschewed engagement with customary systems are understandable: outside actors often lack the legitimacy to effectively engage with customary systems; customary systems frequently discriminate against women and fail to uphold human rights; their norms and processes vary considerably from place to place; and they are not conducive to 'quick fixes'. The realities of customary systems are messy. However, their position as institutions that reflect, debate and enforce varied local dynamics relating to politics, social life, economics and dispute resolution means they have considerable influence over the extent to which marginalized groups are included. Furthermore, their geographical, cultural, and financial accessibility relative to their state counterparts means they are the preferred - perhaps even the only - option for many people, especially in conflict-affected societies. Thus, it is necessary to at least consider engagement. Furthermore, it is now empirically shown that engagement that produces sustainable results for women's inclusion and human rights is also possible. While the contested, dynamic and flexible nature of many customary systems presents challenges for equitable inclusion, it also offers inroads for sustainable empowerment and reform. Such potential can be harnessed through nuanced, well-informed and pragmatic interventions that are locally driven and owned, and reflective of the local context. One such approach considered by the author is NGO-led engagement, which facilitates dialogue between all sectors of society, stimulated by new human rights and gender information while drawing on recognized customary values. The strategy includes the provision of training and leadership opportunities – not only to traditional customary authorities – but also to marginalized groups such as women and youth. Where this type of intervention was carried out in post-conflict Bougainville, it had measurable success in firstly, engaging diverse sectors of society in a way that held considerable ongoing local legitimacy; while second, empowering the latter, through their increased social inclusion, to slowly but sustainably challenge the dominant and sometimes discriminatory customary norms. Recent case studies in a range of other contexts have shown similar possibilities. Thus while messy, it is necessary to at least consider engaging with customary systems. Further, in many circumstances, profitable engagement is possible.

Introduction

In many developing countries, including conflict-affected societies, customary systems significantly govern the degree to which women and other marginalized groups are included and their human rights protected.However, despite the primacy of these systems for many people, the dominant trend over the past several decades of the international development community – particularly in rule of law and governance sectors – has been to invest almost exclusively in formal, state institutions. This approach has often yielded unimpressive results. This paper argues that carefully crafted engagement with customary systems, based on

local exigencies, must be considered as part of the solution towardsthe increased inclusion of marginalized people and the protection of human rights.

The paper begins by discussing the 'messy' nature of customary systems, acknowledging the reasons international actors have often eschewed engagement, tried to eradicate them or incorporate them fully within the state. It then outlines the influence of customary systems for social inclusion, briefly answering why it is necessary to at least consider engagement with them. Then three central characteristics of customary systems are noted, dynamism, flexibility and contestation. These provide possibilities for the advancement of equitable social inclusion and the protection of human rights through customary systems.

The discussion then highlights the possibilities and implicationsevidenced by several recent empirically based analyses of programmes around the globe that have worked with customary systems. These include the author's study based primarily on 84 interviews on an NGO, known as People and Community Empowerment/ PEACE Foundation Melanesia (PFM), and its programme during and after the ten-year civil conflict in Bougainville, an autonomous region of Papua New Guinea, Melanesia. PFM carried out dispute resolution training focusing on mediation and custom throughout the conflict-affected areas for a range of community actors including customary chiefs, and women. It also carried out more general community courses that included material on women and men, rights, power sharing, custom, leadership, listening and understanding one's self.

These studies show that while complicated, it is possible to make sustainable advances. However, they also show that every situation is different and there is no 'one size fits all' model. The 'solution' is rather that if interventions are to sustainably further inclusion and human rights protection through customary systems, they should be nuanced and pragmatic; based on sound, current local understanding of the specific context; holistic; open to incremental reforms; aim to empower local actors; and have strong local legitimacy. Other related recommendations for policy makers and practitioners are outlined in the last section.

Customary systems

Before launching in, a brief explanatory note is called for. The term 'customary system' is used here to refer to systems that often undertake a variety of functions relating to governance and dispute resolution, which operate primarily outside the state system. Thus customary systems draw on a number of sources for their content, processes and authority, though to a large degree the state is not among these. Dominant cultural and spiritual beliefs are important sources as well as, inter alia, history, kinship, economics and ecology. They have often been developed and maintained over a long period of time and are sometimes referred to as 'traditional' systems, but they have the capacity to change in response to contemporary forces, in accordance with the society to which they are inextricably linked.

A. Manoeuvring through the mess

One of the reasons international actors, and sometimes national governments, have eschewed engagement with customary systems is because the realities of customary systems are messy. They are complicated, political, diverse and by no means static.

To begin with, their norms and processes vary considerably from place to place. Not only between countries, but sometimes even between neighbouring villages. For example, in Bougainville, although widespread training by PEACE Foundation Melanesia (PFM) means that now a similar process is generally followed throughout the region, a variety of customary norms are drawn on. Also, customary dispute resolution and governance – including the range of ways they interact with the formal state system – depend fairly heavily on the chief or mediator in the village and how they individually interpret norms and respond to new information. Furthermore, as customary systems are dynamic and contestable in nature, they can be relatively fluid, changing over time

in response to various factors. Thus generalisation is difficult, and often unhelpful. This all means effective engagement requires in-depth and up-to-date local knowledge.

Engagement is also tricky because outside actors often lack the legitimacy to effectively work with customary systems. Because the authority of customary systems is primarily dependent not on state force or coercion, but on the strength of local buy-in, any intervention seeking to reform aspects of the system must also have strong local legitimacy. In Bougainville, even PFM, established and based in mainland Papua New Guinea, could easily have been considered an outsider due to historical and conflict-related reasons. However, strong local legitimacy was gained in several ways. These included only working when and where they were invited, developing programmes in close partnership with local chiefs, being cognisant of ongoing local politics and strategically leveraging these, as well as immediately training local volunteer staff who quickly recognised commonalities with their indigenous customary values and processes. They in turn conducted trainings in the local dialect to their own communities on location in often-isolated villages.

A further key reason is customary systems frequently discriminate against women and other socially marginalized groups and fail to uphold international standards of human rights. Working with such systems is antithetical to the mandate of most international actors.Customary systems often reflect and maintain the dominant beliefs of their societies, thus preserving a conservative social order often marked by inequalities. In Bougainville customary systems share characteristics related to this that are common to customary systems elsewhere. For example, they are largely unregulated, often lacking procedural safeguards and external accountability. As a result, they are susceptible to bias and elite capture and to perpetuating societal power asymmetries. This can expose marginalized community members such as women to coercive solutions that can be violent, discriminatory and/or exclusionary.

For a more specific example,gender-based violence is a severe and widespread problem in Melanesia.Due to prevailing social and cultural views, some customary norms currently tolerate it.However, often *in practice*, the state system does also. This is a pattern by no means specific to Melanesia or to cases of gender based violence.[x] Thus, any polarizing glasses that view the customary or state systems in a way that either romanticizes them, or dismisses them as only perpetrating human right abuses, must be removed. Empirical research of both systems to see how they operate in practise, not simply the idealised 'on the books' version, is critical. In addition, it is important to look closely at the beliefs underlying customary systems, which shows "they are not just poor substitutes for Western-style formal system – they represent alternative conceptions of justice, grounded in sociocultural realities with their own definition of what constitutes an offense and what is an effective remedy." [xi]Pragmatic and informed actors accept that sustainable social change takes time and is often achieved incrementally, whether in relation to the state or customary systems. The strong influence of customary systems means however, that not only the state system should be considered as forum for this change.

B. Necessary: The centrality of custom for communities

The centrality of customary systems for innumerable aspects of community life, including politics, social life, spirituality, economics and dispute resolution, is a central reason why they must, at the very least, be acknowledged and considered by international actors.[xii] Several studies estimate that around 80-90 percent of disputes in developing societies are dealt with by customary systems.[xiii] Further, because disputes are not shaped by western concepts of crime or civil conflicts, customary dispute resolution systems are far reaching, affecting almost any area considered to be a 'social problem'.[xiv] In Bougainville, this includes issues from gossip, insults, adultery, drunkenness, and sorcery to aspects of the peace and reconciliation process such as conflict-related murders or severe human rights abuses. In addition to this, they also deal with many conflicts recognised by a western framework. This is one of the reasons these systems have considerable influence over the extent to which marginalized groups are included and their human rights recognised.

In addition, customary systems are often geographically, culturally, and financially more accessible relative to their state counterparts. This means they are the preferred, perhaps even the only, option for many

people, especially in conflict-affected societies. For example, in Bougainville, there were essentially no state governance or justice systems functioning during most periods of the conflict. These days, twelve years after the peace agreement, and seven years after it gained autonomous status, the Autonomous Bougainville Government (ABG)'s institutions are primarily located in one town in the north, far from the most conflict-affected areas. Relative to the customary system, which operates in almost every village, the state alternatives are expensive and far away. To a large degree, they are perceived as foreign, irrelevant and inappropriate. For instance, some see the formal justice system as the "white man courts".[xv] Furthermore, it is part of the ABG's narrative that it is time to 'go back' to a "Bougainville way" of doing life.[xvi] A central component of this is held to be the use of customary dispute resolution and governance systems. Interviews showed that a range of community members support this agenda. Interviews also revealed that even when cases were taken to formal institutions, they were often sent back to the village customary authorities to deal with. In short, the ABGlacks the legitimacy, funds, will and capacity to carry outmany of the tasks frequently associated with the modern state. Developing these will take many years, if not decades. Thus, for most people in Bougainville the customary systems have been, and will continue to be for a considerable time, the primary governance and dispute resolution systems affecting their everyday social life. Many of these features are also present in other developing countries, particularly war torn societies. [xvii]

Further, many attributes of customary systems are positive for tightly knit communities and conflict-affected societies. For example, the value placed on restoring community harmony responds to the needs ofkinship-based communities whose members share close bonds of social and economic dependency and who are experiencing conflict-related distrust and trauma.[xviii] Similarly, the emphasis of the PFM program in Bougainville on root causes and mediated 'win-win' solutions that left both parties feeling satisfied, was largely accepted in local villages and continues to be used extensively. This is partly because of very real conflict-related security concerns as well as a strong desire for local-level reconciliation and a dispute resolution system that is not seen as divisive[xix]. This was particularly apt in Bougainville because while the conflict was originally with the central Papua New Guinea government, it evolved into intra-Bougainville warfare; member of warring parties now live back in neighboring villages. However, many Bougainvillean interviewees – including women – were of the view that disputes should still be resolved at the village level using customary resources, albeit with some qualifications, even if 'law and order' was firmly established after the conflict. An important reason for this is local conceptions and corresponding expectations of justice. [xx]

Thus a mixture of factors result in customary systems strongly influencingthe degree to which social inclusion is equitable and human rights are protected.

C. Possibilities for advancing inclusion and equality

The challenges presented by customary systems, combined with their strong influence and their positive attributes means that effective engagement, whichis able to preserve their positive aspects and local legitimacy while also advancing equality and human rights, would be significant. The question is whether this is possible, and if so, how. It is posited that while the dynamic and flexible and contested nature of many customary systems presents challenges for equitable inclusion, it also offers a way to achieve sustainable empowerment and reform.[xxi]

1) Dynamism: Changing custom and those who control it

First, customary law, while often derived from tradition, is dynamic and constantly developing in response to changing social, economic, political and security conditions.[xxii] Even when absolute assertions are made in relation to the content or processes of custom, these can be seen in part as the result of contemporary politics rather than uncontestable descriptions of 'tradition'.[xxiii] In Bougainville,customary systems have adapted over centuries.[xxiv] Similar to the dynamics in many other countries, numerous internal and external factors have modified the content of customary law as well as its application and standing withinsociety. However, the challenge for altering norms that exclude marginalized groups is that the power hierarchy controlling the customary system may apply and manipulate custom to retain their relative position of power.[xxv]

Although interestingly there are several recent examples where men and chiefs have been part of and supportive of the change process towards gender equality for various reasons.[xxvi] For example in Somalia there was an initiative of traditional elders, supported by the Danish Refugee Council, to revise their customary law to bring it in line with human rights standards and Islamic Law.[xxvii] In Bougainville, one of the program results was women's increased involvement in dispute resolution and governance, including as mediators, on village committees and village court magistrates. In many cases this seemed to be supported by men and chiefs. This support was perhaps partly because the training program had widespread coverage and included women and men, the latter of chiefly and non-chiefly position, in their training programs, thus promoting a community-wide appreciation of women's rights and more equitable community involvement.[xxviii] They also sometimes tackled issues in an indirect way that did not alienate specific groups, such as talking about power sharing in general, rather than only in terms of gender.

2) Flexibility: A two-way street

Second, customary law is inherently flexible, allowing it to respond to localized situations and norms. This flexibility allows decision makers to craft pragmatic solutions that suit local conditions and respond to the issues at the crux of a dispute.[xxix] However it also means that customary systems may lack consistency and predictability. Also, rules may be applied differently to separate groups based on socially conservative ideas, resulting in arbitrary or discriminatory solutions. Moreover, such flexibility, without recognition of essential legal rights, opens entry points for bias or conflicts of interest, as well as other natural justice issues concerning a fair hearing and proportionality.[xxx] However, this flexibility can work both ways. As it can be exploited by those in power, it can also provide a way to increase equality.[xxxi]

For example, there may be some flexibility in relation to certain practices or processes that are discriminatory or against human rights. More often than not, these practices will address a very real social purpose or need – even if it is one that western actors might struggle to understand. It is not necessary to accept these practices, but when they are understood, especially in relation to the system's "internal logic and social bases", then another, less discriminatory way of meeting the underlying social need, can be developed.[xxxii] The flexibility of such systems means that they can be open to a more equitable solution to the social purpose, if the proposed change is conducted in a local legitimate way, which may often mean inside agents come up with the new solution. This is likely to have more sustainable, long-term success than attempts to simply prohibit practices that are counter to human rights.

Without understanding these social needs and the local contexts, there can be unexpected results from worthy attempts for increased rights protection. For example, in Kenya, evidence suggests that when statutory law was introduced in an attempt to transform customary land tenure and increase women's access to land, in fact it had the opposite effect. This was partly because men registered their names on the formalized land deeds due to family structures, which left women in an even less powerful position in relation to land claims.[xxxiii] Similarly in Timor-Leste there was a UN human rights worker who was dedicated to prosecuting all the cases of domestic violence in court, however soon women stopped reporting cases once their husbands went to jail, leaving them economically and socially more vulnerable. More recently, a local initiative by a women's group has produced more incremental but pragmatic advances by promoting compensation for the victims of gender-based violence.[xxxiv] Finally in Bougainville, interviewees in one village reported that the PFM training on people's rights was interpreted in such a way it had at perverse consequences; some men stated it as authority they had the right to leave their wives and children without consequence and the right to no longer participate in valued community and subsistence work. However, on the other hand, male interviewees in another village stated the training had helped them to realise that they had previously treated their wives "as slaves" and reported that now they valued women's increased involvement.

3) Contestation: Challenging the interpretation and application of custom

Customary systems are often open to contestation. They can be seen as "a series of political, social and economic institutions embedded in local contexts that are called into question, reformulated and remade."[xxxv] Thus, customary systems have the potential to be forums where change can be facilitated; their flexibility provides possibilities for reform. Though because of their embedded, localized nature, this is likely to be most successful and sustainable when locally owned or undertaken largely from within. However, international collaboration that helps facilitate this is important. Further, because the customary authority of leaders is generally connected – at least to a degree – with their ability to maintain and reflect the community's interest and values, there is a strong motivation for them to respond to community expectations.[xxxvi] They must be relatively responsive to local developments, including those relating to social order and justice standards. Accordingly, while leaders might more often benefit from the status quo, when women are sufficiently empowered with knowledge and can communicate this in a way that does alienate such leaders, they may be able to put pressure on the customary system to change.

One approach to facilitating this type of contestation that retains local legitimacy is to provide a space where customary practices can be reviewed and (re)interpreted. A range of sources that have local authority can be used to facilitate this discussion and inject new ideas, thus developing cultural legitimacy for concepts relating to women's rights, human rights and social equality.[xxxvii] A related idea is to provide opportunities for women to be more involved in customary systems, including in leadership.

This process was facilitated in Bougainville was by training men and womentogether in small working groups — a situation that pushed cultural boundaries – to discuss concepts relating to conflict resolution, social life, communication and governance. The training material drew on a range of locally authoritative sources such as the PNG Constitution, local custom and culture and Christianity to develop increased awareness and respect for peaceful dispute resolution, power sharing, rights protection and equality. These training groups, most often conducted by a local trainer in their own dialect, provided a forum for women to try out their skills as mediators and decision-makers, while chiefs and other menwere compelled to observe them in these roles. This facilitative space was controlled throughestablished guidelines on issues such as mutual respect, which were communicated at thebeginning of the training and monitored by the facilitator.Following this, many men without chiefly status and women began working as mediators, and there is evidence to suggest that some of them have been slowly challenging gender norms.

Recent case studies in a range of other contexts have shown similar possibilities.In the Solomon Islands a women's group drew on customary practice, cultural values and principles from Christianity to increase their roles relating to decision-making, land and dispute resolution during the escalating violence in the mid-2000s.[xxxviii] Interestingly, drawing on human rights or state law was not part of their strategy, perhaps because other sources had more authority and legitimacy in that context. Also customary bodies made up of all women have been established in Afghanistan, providing a forum for women to have more gender sensitive dispute resolution, and to participate in community projects.[xxxix] In Kenya, the Wajir Peace and Development Committee (comprising a women's and youth committee) has used, inter alia, customary approaches to develop strategies against exclusion, tackling a range of issues such as credit schemes to young ex-combatants, reconciliation meetings, investment in girl's education.[xl] Advances towards inclusion made by women's collective organizations in South Africa and Cambodia also merit examination.[xli]

Some of these cases also reflect that particularly in times of significant social upheaval, such as during and after a conflict, disaster or change of government, the characteristics of dynamism, flexibility and contestation come strongly into play. Customary systems are often naturally flexible enough to deal with even dramatic change, whichis one reason theysurvive and sometimes become strongerwhile state systems languish during these periods. In addition, this time may provide increased opportunities for contestation because of the specific political and social developments. Thus there are openings for well-crafted and flexible interventions that understand and can tap into these dynamics to empower local change agents. This was true in Bougainville,

but has also been the case in several other recent studies inAceh,South Africa and Afghanistan.[xlii] Also, this is reflected in Ubink's evaluation of activities led by the Traditional Authority of Uukwami in Namibia to combat severe gender exclusion. She posits that advances would not have been possible if not for the dynamic transitional period of Namibia's independence, the support of the national government which desired to harmonize local laws with its new constitution.[xliii]

In sum, while messy, it is necessary to at least consider engaging with customary systems. Further, in many circumstances, profitable engagement is possible. The potential for increased gender equality and inclusion can be harnessed through nuanced, well-informed and pragmatic interventions that are locally driven and owned, and reflective of the local context.

D. Recommendations and Implications

The recommendations below are perhaps not the hoped-for clear practical steps. However, it is suggested that in the long run they are more likely to provide sustainable solutions than a formulaic prescription of square dimensions, forced on a multiplicity of differently shaped situations.

1) A pragmatic, incremental approach based on local exigencies and sound empirical research

i) Craft context-specific interventions that respond to local needs and take into consideration local perceptions and expectations of justice and governance

The results of an intervention engaging with customary systems depend on a whole range of factors specific to the situation. These include contemporary politics, economics, globalisation, social norms, cultural and spiritual beliefs, the operation of the state systems and whether a transitional period due to conflict or disaster is in play. All of these types of factors will shape what local populations expect of and need from systems that affect their social inclusion and human rights, as well as how they perceive them. Because these vary from place to place there is no 'one size fits all' programming option.

According to Harper, successful customary justice programming requires "an in-depth knowledge of the target country, its people, the customary legal systems, as well as the theories and practicalities" relating to empowerment, gender and customary systems programming.

ii) Develop interventions using in-depth and up-to-date information about local context, based on multi disciplinary empirical research

In order to craft effective context specific interventions, an in-depth understanding of the factors mentioned above is critical. Further, because the contextual factors and the customary systems embedded within the society may well change, the information must be current and relevant. An accurate historical perspective will also be important for understanding the wider context, but grasping clearly where things stand in the present is critical. This can help programmers to decide what type of intervention and at what moment it will be most effective.

Multidisciplinary empirical research is an important tool for obtaining such an understanding of the important contextual factors, including what local needs and expectations are. Research that reveals how and why the state and customary systems operate and are experienced in practice, not simply their idealised form, creates a robust foundation for policy development. Ongoing research and evaluation that can feedback into the interventions is also important, particularly in transitional situations where dynamics can move rapidly.

iii) Aim for incremental but sustainable changes rather than sweeping reforms, aiming for the 'ideal' that are unlikely to 'stick'

Any type of sustainable social change, particularly relating to challenging areas such as gender equality

and the protection of human rights, take time. This is true with state systems but perhaps even more relevant for customary systems, which are inextricably embedded in the society to which they belong. Practitioners should make realistic and pragmatic strategies based on the situation, and aim for incremental changes "recognizing the complex and interrelated processes of social change and political and economic development required to reach the ideal." These are likely to be more successful in the long term than sweeping, often top-down changes that try to quickly achieve an abstracted 'ideal' state. Further, by learning from each programmatic attempt and remaining flexible and reflexive, changes are more likely to be sustainable.

As noted by Harper, these kinds of labor and time-intensive approaches may be somewhat incompatible with current donor expectations and traditional programming approaches, which can be characterized by demanding timeframes, replication of 'best practices', and expectations of idealized end-states.

2) Ensuring local legitimacy and empowering local actors

i) Draw on local knowledge and empower marginalized actors while using sources that hold strong local legitimacy and authority

Because outside actors often lack the legitimacy to effectively work with customary systems, and because the authority of customary systems is closely linked with the strength of local buy-in, the empowerment of marginalized local actors is critical. Drawing on values and actors that hold strong local legitimacy is one key to this. This might include using religious principles or including religious leaders; customary values and chiefs; cultural practices knowledge; and possibly state or international law, where it is perceived positively.

This is also key for changing specific practices that are counter to human rights. As outlined earlier, the flexibility of customary systems provides a way where the underlying social purpose could be met by a more equitable alternative, or where the social concern itself is amended. However, efforts to understand the practise and its raison d'etre, as well as develop workable alternatives will be most successful when reformers work in close collaboration with inside actors, listening carefully to and learning from them.

ii) Ensure traditional authorities are brought on board rather than alienated

Efforts to empower marginalized groups from within and develop creative, more inclusive solutions will be of little avail if those who currently hold power, such as customary chiefs, state officials and religious leaders, feel significantly threatened or alienated. They are likely to entrench their relative position of power. The various ways the PFM intervention included and collaborated with such groups, while at the same time empowering marginalized groups was key for the sustainability of increased equality.

In two programme studies in Africa the support of men was raised as a key issue. One study concluded that a strategic NGO intervention has helped to gradually change men's behaviours towards women's political participation and economic empowerment through more progressive interpretations of the Qur'an. The second study of a pilot land reform programme in Rwanda concluded that men must be involved, rather than challenged, in the change process. They suggest that this can achieved by appealing to their sense of responsibility for community members, and by looking for ways that changes might also meet the interests of the men.

iii) Avoid human or women's rights as the only lens through which customary systems are engaged with

Previous case studies have shown that using primarily human rights and/or women's rights as a framework for change when engaging with customary systems can have negative consequences. Communities might be dubious of these concepts or the associated language to begin with. One of the dangers is that human rights are relegated to "women's business", or seen as irrelevant and imposed by outsiders. Interestingly, the Bougainville intervention very rarely used the term human rights, nor did they focus strongly only on the rights of women.

Rather, a variety of sources were drawn on in training, and while the equality of women was a central purpose of the training, it was achieved in more indirect ways. For example the roles of men and women were discussed in terms of working together to further peacebuilding and development in the community by involving everyone and using their strengths.

iv) Engage with customary systems in a holistic, multidimensional way

Because customary systems reflect the society in which they are embedded, in order to make sustainable advances for social inclusion, equality and human rights, interventions must address a range of wider barriers relating to politics, economics, social and cultural life that affect the operation of the customary system. Rather than superficial 'fixes' or interventions that deal with only one aspect of the customary system, meaningful change is far more likely to occur when various contextual dimensions are addressed.

The PFM intervention in Bougainville was successful in this to a degree. First, it trained a wide range of people, from police officers and village court magistrates, to paramount chiefs, ex-combatants, women and youth. This critical mass of people who understood similar ways of thinking about dispute resolution for example, was identified by one interviewee as a key to change. Second, by tackling a wide range of context-specific issues such as reintegration of ex-combatants, conflict-related psychological trauma, understanding one's self, values relating to power and leadership, communication and political participation the intervention addressed wider practical needs and concerns. This not only resulted in the program gaining local trust and legitimacy but it simultaneously dealt with some of the broader equality issues. However, one area where it neglected to do this was economic barriers. Many women were initially able to have increased influence and inclusion working as mediators and leaders. However it seems the majority soon ceased their involvement because, as primary caregivers and without regular income, they did not have the requisite time and financial resources.

[i] However, over the past few years, there has been increased interest and investment relating to customary systems. Evaluations of these attempts, such as those mentioned in this paper have only emerged in the last two years. At the same time, the United Nations is becoming more open to such approaches. See for example the 2011 UN Secretary General Report, which recognised "the potential of informal justice mechanisms in strengthening the rule of law" and also "the potential role of informal justice practices to enhance peace and security through traditional mediation techniques" UN Security Council, The Rule of Law and Transitional Justice in Conflict and Post-Conflict Societies Report of the Secretary-General (11 October 2011) UN Doc S/2011/634 [39].

[ii] For two notable examples also in Melanesia of where the international community tried, at different times, to eradicate and ignore the customary justice system, with negative consequences, see Solomon Islands, John Braithwaite, Sinclair Dinnen, Matthew Allen, Valerie Braithwaite and Hilary Charlesworth, Pillars and Shadows: Statebuilding as Peacebuilding in Solomon Islands, Peacebuilding Compared (Canberra: ANU EPress, 2010). see Timor Leste, Carolyn Graydon, "Local Justice Systems in Timor Leste: Washed up, or Watch This Space?," Development Bulletin 68 (2005).

[iii] These examples are drawn primarily from four recent excellent collections of empirically based analysis, namely Erica Harper, Customary Justice: From Program Design to Impact Evaluation (Rome: IDLO, 2011).; IDLO, ed., Accessing Justice: Models, Strategies and Best Practices on Women's Empowerment (Rome: IDLO, 2013).; Journeys from Exclusion to Inclusion: Marginalized women's successes in overcoming political exclusion (Forthcoming October 2013, IDEA: Stockholm); and finally Deborah Isser, ed., Customary

Justice and the Rule of Law in War-Torn Societies (Washington: USIP Press, 2011). is an invaluable resource. The recommendations outlined in this paper also draw from the conclusions reached in these volumes, the first three of which each include a chapter outlining the author's quantitative study on this topic.

[iv] The field research was conducted in Bougainville in 2010 and 2012. From 2005 to 2010 when it wound up, the Bougainville branch of the NGO became separate and was known as the Bougainville Peace and Reconciliation Centre.

[v] Though in many circumstances, there will be some link with the state system. Either the state system might incorporate or recognise customary authorities or law, for example in the 2005 Bougainville Constitution, or there may be hybrid institutions such as Village Courts or the Council of Chiefs in Bougainville, which are under the umbrella of the state, but rely on custom to make decisions.

[vi] Harper, Customary Justice: From Program Design to Impact Evaluation 17.

[vii] Many other customary systems similarly span a variety of norms due to their localised nature See for example in Mozambique, Stephen Lubkemann, Helen Kyed and Jennifer Garvey, "Dilemmas of Articulation in Mozambique: Customary Justice in Transition," Customary Justice and the Rule of Law in War-Torn Societies, ed. Deborah Isser (Washington: United States Institute of Peace, 2011) 24-25, 33.; in Afghanistan, Thomas Barfield, Neamat Nojumi and J Alexander Thier, "The Clash of Two Goods: State and Nonstate Dispute Resolution in Afghanistan," Customary Justice and the Rule of Law in War-Torn Societies, ed. Deborah Isser (Washington: United States Insitute of Peace, 2011) 164-65.; in South Sudan Francis M. Deng, "Customary Law in the Cross Fire of Sudan's War of Identities," Customary Justice and the Rule of Law in War-Torn Societies, ed. Deborah Isser (Washington: United States Institute of Peace, 2011) 291.

[viii] See for example, in the case of Timor Leste, Tanja Chopra, Christian Ranheim and Rod Nixon, "Local-Level Justice under Transitional Administration: Lessons from East Timor," Customary Justice and the Rule of Law in War-Torn Societies, ed. Deborah Isser (Washington: United States Institute of Peace, 2011) 154. and in Afghanistan Barfield, Nojumi and Thier, "The Clash of Two Goods: State and Nonstate Dispute Resolution in Afghanistan," 191.

[ix] Deborah Isser, "Conclusion: Understanding and Engaging Customary Justice Systems," Customary Justice and the Rule of Law in War-Torn Societies, ed. Deborah Isser (Washington: United States Institute of Peace, 2011) 334.

[x] This is also true in many other situations. For example, in the of the 112 countries included, 86 of them were reported to have discriminatory laws in relation to property and inheritance. Organization for Economic Cooperation and Development Centre, 2012 Social Institutes and Gender Index: Understanding the Drivers of Gender Inequality, 4, available at www.genderindex/org/content/team In a United Nations report, 102 states were not known to have any specific legal provisions on domestic violence, UN General Assembly "In-depth Study of All Forms of Violence against Women: Reports of the Secretary –General {6 July 2006) UN Doc A/61/122/Add. 1[318] Furthermore, this does not even take into consideration the practise of the formal just system in relation to those issues, which is often less ideal than the laws on the books.

[xi] Isser@328.

[xii] This is certainly the case in Bougainville, but also in many other situations. See for example in {Lubkemann, 2011 #117@25}

[xiii] United Kingdom Department for International Development (DFID), Non-state Justice and Security Systems, 2004, 3. Similar figures have been quoted in specific country studies. For example in Afghanistan, Asai Foundation, "Afghanistan in 2006: A Survey of the Afghan People", http;//asiafoundation.org/publications/pdf/21; and in .See also East Timor, Asia Foundation "Law and Justice in East Timor,: A Survey of Citizen awareness and Attitudes Regarding Law and Justice in East Timor" (Report, Feb 2004), http://asiafoundation.org/pdf/easttimor_lawsurvey.pdf. For Afghanistan, see UNDP "Bridging Modernity and Tradition" (Afghanistan Human Development Report, Centre for Policy and Human Development, 2007), http://hdr.undp.org/en/reports/nationalreport/asiathepacific/Afghanistan/name,3408,en,html; for Liberia, see Isser, Lubkemann and N'Tow "Looking for Justice": Liberian Experiences and Perceptions of Local Justice Options" (USIP, Peaceworks no.63, 2009).

[xiv] Similarly, in a discussion about customary law in Iraq, it has been stated "Customary law encompasses the entire range of human social existence and can be used to resolve any dispute that a tribes will ever face… Tribal law also regulates everyday life and behaviour, relations between sexes and men's and women's roles in society." Patricio Asfura-Heim, "Tribal Customary Law and Legal Pluralism in Al Anbar, Iraq," Customary Justice and the Rule of Law in War-Torn Societies, ed. Deborah Isser (Washington: United States Institute Peace, 2011) 253..

[xv] Author interview with female civil society leader, Arawa, Bougainville, 2010.

[vxi] In other countries, this dynamic varies; it depends significantly on local politics and history. Sometimes, new governments after civil conflict or independence can be very adverse to customary systems with the state-building agenda. See for example the early independence stage in Mozambique. Interestingly however, this policy was not successful in eradicating the customary system, and has slowly been reversed. Lubkemann, Kyed and Garvey, "Dilemmas of Articulation in Mozambique: Customary Justice in Transition."

[xvii] For example, many of the same conditions were present in post-conflict Aceh (Indonesia), S Clark and M Stephens, "Reducing

Injustice? A Grounded Appraoch to Strengthening Hybrid Justice Systems: Lessons from Indonesia," Customary Justice: Perspectives on Legal Empowerment, ed. Janine Ubink (Rome: IDLO, 2011) 67,79.; Timor Leste Graydon, "Local Justice Systems in Timor Leste: Washed up, or Watch This Space?," 119-20.; Mozambique Lubkemann, Kyed and Garvey, "Dilemmas of Articulation in Mozambique: Customary Justice in Transition," 17-24.; Afghanistan Barfield, Nojumi and Thier, "The Clash of Two Goods: State and Nonstate Dispute Resolution in Afghanistan," 159-61, 82.; Liberia Lubkemann, Isser and III, "Unintended Consequences: Constraint of Customary Justice in Post-Conflict Liberia," 206-08.; Iraq Asfura-Heim, "Tribal Customary Law and Legal Pluralism in Al Anbar, Iraq," 239, 50-51, 71-74.

[xviii] Naomi Johnstone, "Bush Justice in Bougainville: Mediating Change through Challenging the Custodianship of Custom," Working with Customary Justice Systems: Post-Conflict and Fragile States, ed. Erica Harper (Rome: IDLO, 2011) 16.

[xix] A similar dynamic has been described in relation to chiefs' dispute resolution in Liberia: "Chief often speak about "compromising" a case, which means finding a resolution that satisfied both parties and allows them "to leave with smiles on their faces." Stephen Lubkemann, Deborah Isser and Philip A. Z. Banks III, "Unintended Consequences: Constraint of Customary Justice in Post-Conflict Liberia," Customary Justice and the Rule of Law in War-Torn Societies, ed. Deborah Isser (Washington: United States Institute of Peace, 2011) 209.

[xx] Again, this is not just in Bougainville. For clear preferences towards the customary system, even if the formal system was functioning very well, see Lubkemann, Isser and III, "Unintended Consequences: Constraint of Customary Justice in Post-Conflict Liberia," 217-18.

[xxi] Johnstone, "Bush Justice in Bougainville: Mediating Change through Challenging the Custodianship of Custom," 16.

[xxii] New Zealand Law Commission, Custom and Human Rights in the Pacific (Wellington: New Zealand Law Commission 2006), 46.

[xxiii] C Nyamu, "How Should Human Rights and Development Respond to Cultural Legitimization of Gender Heirachy in Developing Countries," Harvard International Law Journal 41.2 (2000): 405.

[xxiv] The most influential forces of change have been colonial contact, Christianity, globalization and the internationally-run copper mine, followed by the civil conflict, then the region's autonomous status.

[xxv] Abdullahi A. An-Na'im, "Problems of Universal Cultural Legitimacy for Human Rights," Human Rights in Africa: Cross-Cultural Perspectives, ed. Francis M Deng Abdullahi Ahmed An-Na'im (Washington, DC: The Brookings Institute, 1990) 27-28.

[xxvi] See the conclusion of the forthcoming publication, Journeys from Exclusion to Inclusion: Marginalized women's successes in overcoming political exclusion (Forthcoming October 2013, IDEA: Stockholm).

[xxvii] For an assessment of this initiative, see Maria Simojoki, "Unlikely Allies: Working with Traditional Leaders to Reform Customar Law in Somalia," Working with Customary Justice Systems: Post-Conflict and Fragile States, ed. Erica Harper (Rome: IDLO, 2011).

[xxviii] There were also several context-specific factors, such as the positive role women played in the peacebuilding efforts, and the relative loss of power of chiefs in general, which may have meant they were more open to power sharing.

[xxix] Johnstone, "Bush Justice in Bougainville: Mediating Change through Challenging the Custodianship of Custom," 17.

[xxx] Commission, Custom and Human Rights in the Pacific, 158.

[xxxi] Johnstone, "Bush Justice in Bougainville: Mediating Change through Challenging the Custodianship of Custom," 18.

[xxxii] Isser, "Conclusion: Understanding and Engaging Customary Justice Systems," 334.

[xxxiii] Tanja Chopra and A Harrington, Arguing Traditions: Denying Kenya's Women Access to Land Rights, Justice for the Poor Research Project (World Bank, 2010).

[xxxiv] Isser, "Conclusion: Understanding and Engaging Customary Justice Systems," 353-54.

[xxxv] Harper, Customary Justice: From Program Design to Impact Evaluation Foreword by Deborah Isser.

[xxxvi] IDLO, ed., Accessing Justice: Models, Strategies and Best Practices on Women's Empowerment 8.

[xxxvii] An-Na'im, "Problems of Universal Cultural Legitimacy for Human Rights," 27-28.

[xxxviii] Rebecca Monson, "Negotiating Land Tenure: Women, Men and the Transformation of Land Tenure in the Solomon Islands," Customary Justice: Perspectives on Legal Empowerment, ed. Stephen Golub (Rome: IDLO, 2013) 184.

[xxxix] Isser, "Conclusion: Understanding and Engaging Customary Justice Systems," 355.

[xl] For more, see Leah, Kimathi "Breaking through the confines of traditions: The Wajir Peace and Development Committee in northern Kenya" in Journeys from Exclusion to Inclusion: Marginalized women's successes in overcoming political exclusion (Forthcoming October 2013, IDEA: Stockholm).

[xli] See Lisa Heemann "Living customary law in South Africa: a space for women to overcome exclusion" in Journeys from Exclusion to Inclusion: Marginalized women's successes in overcoming political exclusion (Forthcoming October 2013, IDEA: Stockholm).

[xlii] In Aceh, see Erica Harper, Promoting Legal Empowerment in the Aftermath of Disaster: An Evaluation of Post-Tsunami Legal Assistance Initatives in Indonesia (Rome: IDLO, 2010)., in relation to women in rural in South Africa, Lisa Heeman, "Living customary

law in South Africa: a space for women to overcome exclusion" in Journeys from Exclusion to Inclusion: Marginalized women's successes in overcoming political exclusion (Forthcoming October 2013, IDEA: Stockholm); in Afghanistan see Barfield, Nojumi and Thier, "The Clash of Two Goods: State and Nonstate Dispute Resolution in Afghanistan," 163.

[xliii] Janine Ubink, "Gender Equality on the Horizon, the Case of Uukwambi Traditional Authority, Northern Nambia," Working with Customary Justice Systems: Post-Conflict and Fragile States, ed. Erica Harper (Rome: IDLO, 2011).

[xliv] Erica Harper, ed., Working with Customary Justice Systems: Post-Conflict and Fragile States (Rome: IDLO, 2011) 13.

[xlv] Isser, ed., Customary Justice and the Rule of Law in War-Torn Societies 204.

[xlvi] Isser, "Conclusion: Understanding and Engaging Customary Justice Systems," 347.

[xlvii] Isser, ed., Customary Justice and the Rule of Law in War-Torn Societies 235.

[xlviii] Johnstone, "Bush Justice in Bougainville: Mediating Change through Challenging the Custodianship of Custom," 29.

[xlix] Harper, ed., Working with Customary Justice Systems: Post-Conflict and Fragile States 13.

[l] Isser, "Conclusion: Understanding and Engaging Customary Justice Systems," 353.

[li] See Michael Walls, "Women's political participation in Somaliland" in Journeys from Exclusion to Inclusion: Marginalized women's successes in overcoming political exclusion (Forthcoming October 2013, IDEA: Stockholm).

[lii] Marco Lankhorst and Muriel Veldman, "Engaging with Customary Law to Create Scope for Realizing Women's Formally Protected Land Rights in Rwanda," Accessing Justice: Models, Strategies and Best Practices on Women's Empowerment, ed. IDLO (Rome: IDLO, 2013) 45.

[liii] Isser, "Conclusion: Understanding and Engaging Customary Justice Systems," 352.

[liv] New Zealand Law Commission, Custom and Human Rights in the Pacific.

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Chapter 7

Moving Towars Sustainability: Addressing The Inequalities Experienced by Special Needs Individuals in Norway House Cree Nation

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Abstract

Over 1 million Indigenous peoples currently live in Canada and this population is rapidly growing as is evidenced by the 45% increase between 1996 and 2006. Despite the large population and their status as 'first peoples', they face significantly lower standards of living compared to non-Indigenous Canadians. Norway House Cree Nation (NHCN) has a population of 7,421 people and is one of the largest First Nations in Manitoba. Although the population and degree of development are comparatively higher than other First Nations in Manitoba, NHCN still faces significant social inequalities in comparison to non-Indigenous urban centers. There are approximately 250 individuals with Special Needs in the community. Access to programs and services for this population is limited or non-existent due to jurisdictional disputes between the Provincial and Federal government regarding who is responsible for funding them on First Nations. Due to these limitations, families of individuals with Special Needs can place individuals in institutional care, relocate to larger urban centers to access services, or remain in the community with no services. Regardless of the option chosen, individuals and families still face exclusion through isolation, marginalization, and complex daily challenges. This is further compounded by the endemic levels of poverty, lack of access to health care, limited social services, and restricted educational opportunities that are characteristic of First Nations across the country. As a result, individuals with Special Needs and their families struggle every day to attain their basic requirements. The development of an independent living home for adults with Special Needs would help fill the vast gap in services and programs that is present today. The proposed unit would feature twelve beds, 24 hour staff, and healthy meal options in an environment where independence and self-sufficiency are encouraged. In addition to providing affordable and safe housing opportunities, this unit would also provide activities and occupational programs for the entire Special Needs community in NHCN. The implementation of this initiative would significantly raise the quality of life of Special Needs individuals in NHCN and would contribute to the sustainability of the community. For First Nations communities in Canada, the provision of adequate health care and social programming has been almost entirely unfulfilled; this is in large part a reflection of a lack of freedom of self-determination and self-government. This initiative will partially rectify this situation as it is a community-led response to a self-identified problem. It addresses the challenge of social inclusion by incorporating a diversity of stakeholders' perspectives. It would provide a multi-disciplinary and holistic way of addressing the necessities of Special Needs individuals in NHCN by working towards social development, improvement of healthcare, and economic independence. Finally, the success of this initiative would provide a blueprint for addressing Special Needs individuals' requirements in First Nation communities across Canada. In doing so, it would incorporate the voices of a population that is largely excluded from the privileges that are enjoyed by most Canadians. This would help address an overall lack of awareness and lack of understanding that permeates Canadian society.

Introduction

The inequalities that exist in Canada between Aboriginal peoples and non-Aboriginal peoples are substantial. This has been manifested in Aboriginal communities in the form of a lack of access to health care, poverty, housing shortages, and extremely limited economic opportunities. In recent years, there has been a greater recognition of these 'gaps' and efforts have been made to lessen some of the inequalities that persist today.

Despite these efforts, issues of social exclusion permeate Aboriginal society today. Furthermore even within

Aboriginal communities, disparities exist and are often felt by the community's most vulnerable members. This has been the case for individuals with Special Needs who feel even more isolated from their community and experience even fewer economic opportunities, lack of housing options, and extremely limited opportunities for social inclusion. Although limited programming and funding is available to some children with Special Needs, once they 'age out' of the system and become adults, there are no options available to them while still living on-reserve.

In recent decades there has been an Independent Living movement, which recognizes the importance of the rights of an individual with Special Needs to lead a fulfilled life in the community of their choice. For individuals with Special Needs in Norway House Cree Nation (NHCN), this is often not a reality. Although Norway House is one of the largest and more developed First Nations in Manitoba, funding and services for adults with Special Needs are largely non-existent.

The community has proposed the creation of an independent living facility in Norway House Cree Nation that would provide occupational programs, access to health care, daily activities, and a safe living environment for adults with Special Needs in the community. The development of this facility would not only benefit the Special Needs community but would contribute to the overall sustainability of the community as a whole. By encouraging social inclusion and working to eliminate the inequalities that exist at the community level, the community will become more sustainable and serve as a blueprint for independent living facilities in other First Nations communities across Canada.

Aboriginal Peoples in Canada

Over 1.4 million Aboriginal peoples live in Canada today. Aboriginal peoples are one of the fastest growing and youngest populations in the country, which is evidenced by the 20.1% growth in population between 2006 and 2011 (Government of Canada, 2013a). As defined in Canada's *Constitution* Act, 1982, Aboriginal peoples comprise Indians [First Nations], Inuit, and Métis peoples.

The *Constitution Act, 1867* "granted the federal Parliament legislative authority over 'Indians, and Lands Reserved for the Indians'" (Hurley, 2002). The federal government's control of Aboriginal peoples in Canada was further entrenched in the *Indian Act, 1876*. This legislation continued assimilative policies that were pervasive in federal legislation and, although the Act has seen amendments over the years, it is still a widely contested piece of legislation today (Aboriginal Affairs and Northern Development Canada, 2010). More recently, the *Constitution Act, 1982* "recognized and affirmed" Aboriginal and treaty rights (Government of Canada, 2013b), which the Supreme Court of Canada has interpreted to the benefit of several First Nations in cases brought against the Crown. Despite these limited victories however, Aboriginal peoples in Canada continue to face significantly lower standards of living compared to non- Aboriginal Canadians.

The significant disparities between living conditions for Aboriginal peoples and non- Aboriginal peoples in Canada were perhaps best summarized in the 1996 *Royal Commission on Aboriginal Peoples*. This report was undertaken to provide recommendations as to how to change and improve the relationship between the Government of Canada and Aboriginal peoples. Highlights of the report were that "Aboriginal people endure ill health, run-down and overcrowded housing, polluted water, inadequate schools, poverty and family breakdown at rates found more often in developing countries than in Canada" (Aboriginal Affairs and Northern Development Canada, 2010). Although recommendations were made to improve these dire circumstances, these issues are still prevalent today.

Norway House Cree Nation (NHCN)

Norway House Cree Nation (NHCN) is a First Nations community located 812 driving kilometers, 450 flying kilometers, from the province's capital city of Winnipeg [see Appendix 1]. Norway House has a population of 4,071 people and is one of the largest First Nations in Manitoba. The community has a small airport but can

also be reached on land via ferry in the summer months and a 'Winter' or ice road in the winter. Despite its remote location, the community, reflecting its size, offers a variety of goods and services. There are several grocery stores, a Multiplex, a law office, a daycare facility, public works services, a University College of the North Regional Centre, and a state of the art educational facility serving nursery to grade 12 students.

Although the population and degree of development are comparatively higher than other First Nations in Manitoba, the community still faces significant social inequalities in comparison to non-Indigenous and/or urban centers. Norway House has a very young population with a median age of 22.2 years; only 2,630 of the total 4,071 population are over the age of 15 years (Statistics Canada, 2010). With regards to education, only 340 individuals hold a High School Certificate or Equivalent, making up 18.4% of the total population aged 25 years and over. In comparison, 29.6% of the province's population aged 25 years and over holds a High School Certificate or Equivalent (Statistics Canada, 2010). The unemployment rate in Norway House is 24.4% which is also considerably higher than the provincial average of 15.4% (Statistics Canada, 2010). The median income in the community is $8,557, which again is significantly lower than the provincial average of $15,246 (Statistics Canada, 2010). Overcrowded and unsafe housing is an issue in the community; 16% of dwellings have more than one person per room, in comparison to the provincial rate of 6% (Statistics Canada, 2010). Of 1,000 private dwellings, 700 require "minor" or "major" maintenance work (Statistics Canada, 2010).

Health care services for Aboriginal peoples in Canada remain well below that of the Canadian population. Health Canada has acknowledged this as being a result of "historical, political, cultural, geographical and jurisdictional factors" (Health Canada, 2012a). Chronic and contagious diseases, as well as lower life expectancy, are prevalent in Aboriginal populations across Canada. More specifically, the rate of heart disease in Aboriginal peoples is 1.5 times higher than the Canadian average; the rate of Type 2 diabetes is 3 to 5 times higher; and tuberculosis rates are 8 to 10 times higher (Health Canada, 2012b).

To address the health care needs of the community, Norway House has a Community Physician's Clinic, a Public Health Clinic, Telehealth ["the use of information technology to connect people to health care services at a distance" (MBTelehealth, 2013)], the Home and Community Care Program, the Pinaow Wachi Personal Care Home, among other services (Norway House Health Services Inc, n.d.). Despite these services however, chronic and communicable disease still persist in the community.

Special Needs Community in Norway House Cree Nation

In Canada, the rate of disabilities among Aboriginal peoples is 32% – twice the national average (Durst, South & Bluechardt; 2006). In addition to chronic and communicable disease prevalence in the community, Norway House also has a large Special Needs population. The Home and Community Care Program is responsible for service delivery to this population, however, issues of funding place a significant constraint on their ability to do so (Gamblin, 2013; Woodgate, 2013a; Woodgate, 2013b). As a result of insufficient funding, the Home and Community Care Program is unable to provide the full range of programs and services that are available under the provincial health care system (Norway House Cree Nation, 2013).

A lack of funding for people living with Special Needs on First Nations is largely a result of jurisdictional issues that arise between the federal and provincial government. As was previously discussed, the *Constitution Act, 1867* and the *Indian Act, 1876* gave the federal government responsibility for First Nations peoples. At the same time however, the provincial government is responsible for health care delivery to all residents. This has resulted in an ongoing disagreement between levels of government as to who is responsible to fund services for this population (Government of Manitoba, n.d.). This has yet to be settled, and cases are now being elevated to the Supreme Court of Canada. In the meantime, individuals continue to wait for services and some never do receive the services they need.

Due to these limitations, families of individuals with Special Needs living on-reserve are left with four options for care. Firstly, families can place individuals in institutional care, which is costly and would likely be

away from the community. Secondly, the entire family can relocate to larger urban centers to access services – in the case of Norway House they would likely be relocating to Thompson [a three hour drive from Norway House] or Winnipeg [an eight hour drive from Norway House]. A third option is to remain in the community with no or few services. The final option for families of children with Special Needs is to give up your parental rights to the child and give your child up to Child and Family Services in order to give the child access to services (Norway House Cree Nation, 2013). Regardless of the option chosen, individuals and families still face exclusion through isolation, marginalization, and complex daily challenges. This is further compounded by the endemic levels of poverty, lack of access to health care, limited social services, and restricted educational opportunities that are characteristic of First Nations across the country (Woodgate, 2013a; Woodgate, 2013b). As a result, individuals with Special Needs and their families struggle every day to attain their basic requirements.

At present, there are at least 250 individuals with Special Needs in Norway House. Exact numbers are unknown as a result of limited access to health care services for diagnosis, the stigma attached to diagnosis, and administrative limitations (Woodgate, 2013a; Woodgate, 2013b). The Special Needs in the community range in type and severity, with the five most prevalent being "mental disability, physical disability, developmental disorder, autism, and lifelong complex medical needs which result in the child's dependency on medical technology" (Norway House Cree Nation, 2013).

Adults with Special Needs in Norway House Cree Nation

There are currently no programs in NHCN designed to meet the specific requirements of adults with Special Needs. Children are eligible to receive some services through the school system, but once they reach the age of 21 these are no longer available to them as they have 'aged out'. Although not all adults with Special Needs require constant assistance and supervision; often their needs exceed the means of their families. This all leads to an added strain on the families of these individuals once they reach adulthood.

Given the nature of these disabilities, the individual's needs do not change upon reaching a certain age. Although an individual may legally be an adult, their mental capacity and physical capabilities may not have developed beyond a certain stage. As was repeatedly stated at the *First Nations Families of Children with Disabilities Summits* in both Winnipeg and Norway House, this reality is regularly ignored. Parents feel that nothing changes when their child becomes an adult other than their size. This poses further challenges to parents, especially with respect to mobility (Gamblin, 2013). The individual is now larger and it requires more strength on the part of the caregiver to assist them with their daily routines. Additionally, this limits their ability to leave their home, which further isolates the individual and their family and contributes to social exclusion in the community (Gamblin, 2013; Woodgate, 2013a; Woodgate, 2013b).

The above conditions all result in a poorer quality of life for adults living with Special Needs in Norway House Cree Nation. In response to this, community members have identified four main areas where improvement is needed to raise the quality of life for these individuals: housing, occupational programs, activities, and health care.

Housing. As has been previously discussed, the housing situation in Norway House is a primary concern. There are not enough housing units in the community, which has resulted in a significant waiting list for band members. For existing housing, issues of quality and quantity are repeatedly criticized as homes are often overcrowded and have fallen in to a state of disrepair. At the *First Nations Families of Children with Disabilities Summits* in both Winnipeg and Norway House, one family discussed the challenges of accommodating their family member's wheelchair. Due to overcrowding and limited space, the hallway was so narrow that the chair would not fit down the hallway. Another family spoke about how their family member's wheelchair would not fit in the washroom (2013a; 2013b). For those individuals wanting to live independently in the community, there is no opportunity to do so due to housing constraints. Housing with staff for individuals who require assistance is also limited. Norway House does have the Pinaow Wachi Personal Care Home, but this primarily caters to the needs of elderly community members and has a limited number of beds. There have been instances

of adults with Special Needs living in this facility in the past, however as the home caters to the elderly, it has not been a good fit. Individuals often felt isolated and lonely as a result of limited possibilities for social interaction. Norway House also has the Phillip Evans Memorial Home for homeless men in the community. Men with Special Needs have lived there, however there is often a wait list and there are other issues with the quality of the home's operations. In addition this opportunity is only available for men, which further excludes women with Special Needs in the community. Overall, these factors all contribute to limited opportunities for independence.

Occupational Programs. As mentioned before, unemployment in the community is high as a result of limited job opportunities available in the area. The top four occupational areas are "sales and service occupations", "trades, transport and equipment operators and related occupations", "occupations in social science, education, government and religion", and "business, finance and administration occupation" (Statistics Canada, 2010). These jobs are often not flexible positions with fewer hours and therefore are not conducive to adults with Special Needs. This reality in combination with other factors has resulted in work opportunities for adults with Special Needs in Norway House being virtually "non-existent" (Gamblin, 2013). These positions are often not entry level and require further training and education. Opportunities to create positions that are a good fit with adults with Special Needs could be, but have not been, established in the community. For example, a position working with the band or in the band- owned Multiplex could be implemented to meet an individual's needs. The resultant lack of income limits an individual's ability to secure housing and to be economically independent. The inability to participate in the community in this way exacerbates their social exclusion and contributes to feelings of 'lack of purpose' (Gamblin, 2013).

Activities. In addition to the lack of economic opportunities, there are currently no activities or additional programming options for adults with Special Needs in the community. While activities and programs for children in Norway House are also limited, these opportunities are available for those able to attend one of the two schools in the community. Student Services Consultants, education assistants, physical and occupational therapists, among other professionals, are available to students with Special Needs. Although access to these services is still shamefully limited, these are almost no options for adults with Special Needs in the community. The only available options are for elders in the Pinaow Wachi Personal Care Home which, as previously stated, has a limited number of beds available (Gamblin, 2013). As a result of this, individuals who have aged out of the school system then have no opportunities for growth, learning, and development. This in turn limits an individual's ability to learn important life skills [e.g. cooking], which leaves individuals vulnerable to dependent lifestyles.

Health Care. As has been discussed in previous sections, health care on First Nations is difficult to access and devastatingly limited at the best of times as a result of jurisdictional disputes over the responsibility of funding. The Government of Manitoba has publicly acknowledged this, specifically with regards to health care for individuals with Special Needs on-reserve:

> As a consequence, non-insured provincial health services, such as wheelchair services and home-care services, the training resources of the Provincial Vocational Rehabilitation Services Program and some other provincial services and programs, have been unavailable to on-reserve First Nations persons with disabilities. At the same time, federal services provided to such First Nations persons with disabilities who are on reserve are reported to be either non-existent or inferior to provincial services.
>
> (Government of Manitoba, n.d.)

Due to these limitations, many adults with Special Needs are forced to leave the community to obtain proper health care services. While this can provide individuals with access to the care that they require, the process is time consuming and tiring (Gamblin, 2013). Despite being "thankful for the little they do have", individuals experience feelings of loneliness and feel that the significant travel involved to gain access to services can be debilitating to their overall health (Gamblin, 2013).

In sum, all of the above conditions lead to a solitary environment and feelings of being "excluded and unimportant" (Gamblin, 2013). This limits the ability of adults with Special Needs in Norway House to socialize with others, participate in public events, and find a meaningful place in the community. Overall this further contributes to the continued social exclusion of an already marginalized group.

Proposal of Phillip Evans Independent Living Facility

The development of an independent living facility for adults with Special Needs would help fill the vast gap in services and programs that is present today. It will provide a safe and stable home for those who desire an independent living environment, but who still require some degree of assistance and care. The facility will encourage individuals to lead healthy and independent lives through the provision of a holistic support system.

The proposed site for the Independent Living Facility is the Phillip Evans Memorial Home (PEMH) in NHCN. Now under the responsibility of the Home and Community Care Program, the PEMH provides a home for homeless men in the community. The home is often without vacancy and has a capacity of six residents; however, over the years there have been numerous issues with fulfillment of the home's original mandate. There have been recent instances of residents refusing to pay their rent, which makes the home financially insecure as the Home and Community Care Program absorbs the deficit. Furthermore, residents' independence is no longer promoted and many are not actively seeking employment or permanent living situations. For these reasons, members of Norway House Cree Nation's Health Division have proposed a change in the use of this facility. Recently, this site was suggested as the future location of an independent living facility for adults living with Special Needs in Norway House.

The proposed unit would expand the current facility to feature twelve beds, 24 hour staff, and healthy meal options in an environment where independence and self-sufficiency are encouraged. In addition to providing affordable and safe housing opportunities, this unit would also provide activities and occupational programs for the entire Special Needs community in NHCN.

The residents of the independent living facility will have various responsibilities that are required to be fulfilled to remain in the facility. These responsibilities will be geared towards fostering independence and ensuring the sustainability of the facility [see TABLE 1]. Additional programming and activities that are open to all community members with Special Needs will be made available through the facility. As such, non-residents participating in the program will have responsibilities that they must fulfill in order to continue attending [see TABLE 2]. To ensure the safety and support of residents, a Program Coordinator and qualified Home and Community Care Program Support Workers will oversee all of the Home's services and programs. Their responsibilities are outlined in TABLE 3 and TABLE 4.

Table 1 – Responsibilities of residents

Resident's Responsibilities
Take part in planning and preparing daily meals
Be responsible for the upkeep of the facility
Clean up after themselves
Maintain their own sleeping quarters
Participate in activities and additional programming
Participate in occupational programs
Contribute to planning daily activities and additional programming
Work through a curriculum that will help in the development of life skills

Table 2 – Responsibilities of non-residents

Non-Resident's Responsibilities
Contribute to planning daily activities
Participate in occupational programs
Participate in community events
Work through a curriculum that will help in the development of life skills

Table 3 – Responsibilities of Program Coordinator

Program Coordinator's Responsibilities
Oversee intake of residents and non-residents
Develop and coordinate program activities
Oversee staffing and scheduling
Oversee the finances of the facility while operating within the allotted budget

Table 4 – Responsibilities of Support Workers

Support Workers' Responsibilities
Provide 24 hour staffing in the facility
Promote a safe and respectful environment
Respond to the varying needs of residents
Assist with program delivery
Duties as assigned by the Program Coordinator

In conclusion, the creation of an independent living facility will serve the requirements of Norway House community members with Special Needs and their families. This growing population of individuals in the community is currently overlooked in service delivery. The facility would tend to individuals' well-being while providing a safe home, nurturing a sense of purpose, and encouraging independence. This will "benefit the physical, emotional, and mental well-being of adults living with disabilities. A huge advantage would be INCLUSION" (Gamblin, 2013).

Benefits of Independent Living Facilities

The benefits of the independent living facility have been clearly expressed by Norway House community members. It would provide a multi-disciplinary and holistic way of addressing the necessities of Special Needs individuals in NHCN by working towards social development, improvement of healthcare, and economic independence. As a community-led initiative, the facility will reflect the values of the community and its culture. The need for culturally appropriate services for individuals with Special Needs has also been expressed by the Government of Manitoba. Service delivery must "be designed with appropriate consideration for Aboriginal culture, language, tradition, and values" (Government of Manitoba, n.d.).

This culturally appropriate response ensures the best possible outcome for the individual. Independent Living is an established concept and philosophy; it is not just living on one's own. It "is founded on the right of people with disabilities to: live with dignity in their chosen community; participate in all aspects of their life; and control and make decisions about their own lives" (Independent Living Canada, n.d.). This movement

began in Berkeley, California and diffused to Canada in the early 1980s. This perspective benefits the individual because it stresses that the root cause of disability is in the society, and not the individual. This is a result of societal discrimination, and the subsequent systemic barriers, which limit an individual with Special Needs' opportunities in society (Oliver, 1990 as cited in Driedger & Hansen, 2011).

Independent Living has been shown to produce positive changes in self-esteem; increase literacy skills; increase opportunities for employment; further individuals' educational attainment; foster new ways of learning; and build community connections and gain independence (Driedger & Hansen, 2011). The facility will offer opportunities for socialization and peer support. This allows individuals to build their self-confidence as they are in a safe and respectful environment. They are empowered and encouraged to make their own decisions, achieve their own goals, and self-advocate; this ultimately allows them to be healthy and contributing members of their community (Katz, n.d.).

The need for inclusion of adults with Special Needs in Norway House has been repeatedly expressed by families and key informants (Woodgate, 2013a; Woodgate, 2013b). Individuals with Special Needs and their families have reported feelings of isolation and that they are not usually a part of community activities. As previously stated, many services and amenities in Norway House Cree Nation are not conducive or accessible to individuals with Special Needs. For example, there is a shortage of ramps (Gamblin, 2013) and sidewalks in the community, which limits what an individual in a wheelchair is able to attain. This further contributes to the stigma felt by individuals with Special Needs and their families; "parents [feel] that society in general, watched and judged them more harshly compared to other parents" (Woodgate, 2013a; Woodgate, 2013b). Although the proposed facility will not fully eliminate the discrimination exhibited towards individuals with Special Needs, it would bring awareness to, and advocate for, this community. This would facilitate lobbying for legislation that "promotes equal opportunities and prohibits segregation and discrimination" (Ratzka, 2005).

With respect to practical implementation, positive results have been seen in other facilities across the country. Canada is internationally viewed as a leader in the Independent Living movement (Walters, 2002). Although much research exists on Independent Living Resource Centres and the programming that they offer, there is limited documentation of the benefits of a live-in facility on-reserve. As presented by Durst, South and Bluechardt, off-reserve First Nations peoples with Special Needs face a unique set of difficulties and challenges (2006). Participants in the study highlighted the following as being barriers to independent living: transportation; employment and income; education and training; housing; and personal supports (Durst, South & Bluechardt, 2006). It is important to note that on-reserve First Nations peoples with Special Needs face these challenges in addition to those that are often typical of on-reserve living. These include geographical isolation, jurisdictional disputes, and higher costs of living. Having an independent living facility on-reserve would help to address these issues, thereby benefitting individuals with Special Needs in the community. The implementation of this initiative would significantly raise the quality of life of Special Needs individuals in NHCN and would contribute to the sustainability of the community.

Sustainability

For First Nations communities in Canada, the provision of adequate health care and social programming has been almost entirely unfulfilled; this is in large part a reflection of the lack of opportunities for community-led development. The inability of First Nations communities to make decisions regarding what is best for their people has contributed to the significant gaps in services that are seen in communities today.

Sustainable Community Development is embraced as an innovative approach to development. It is "a participatory, holistic, and inclusive process that leads to positive, concrete changes in communities by creating

employment, reducing poverty, restoring the health of the natural environment, stabilizing local economies, and increasing community control" (Simon Fraser University, n.d.). Sustainability cannot be considered in a First Nations context without taking a holistic approach. Based on teachings associated with the Medicine Wheel, it is important to "look at the issues in a holistic manner, understanding that everything is connected and issues should not be dealt with in isolation" (Rust, 2008).

The proposed independent living facility is a positive example of this as it is a community-led response to a self-identified problem. It will help its residents find employment, thereby reducing poverty in the community. It will increase community control as it will be a community-owned and operated facility. It will also enhance the holistic wellbeing of the residents so that they are able to fully participate in the community and increase social cohesion. This would help to foster a more sustainable community environment because it works to include every member of a community. A community cannot be 'sustainable' until all members enjoy equal access and the ability to participate fully. As it stands, individuals with Special Needs in Norway House Cree Nation are largely "excluded and unimportant" (Gamblin, 2013). Work is currently being done in Canada to raise standards of living for First Nations as they lag well behind the standards enjoyed by non-Aboriginal Canadians. While some important gains are being made, it is important to remember that there are inequalities within First Nations as well and that these must be addressed to ensure the sustainability of the community as a whole.

Finally, the success of this initiative would provide a blueprint for addressing Special Needs individuals' requirements in First Nation communities across Canada. The facility in Norway House can become a model for future facilities on other First Nations as these issues are not unique to Norway House. In doing so, it would incorporate the voices of a population that is largely excluded from the privileges that are enjoyed by most Canadians. This would help address an overall lack of awareness and lack of understanding that permeates Canadian society. The ability of First Nations to fully contribute to, and participate in, Canadian society would increase equality and contribute to the overall sustainability of the country as a whole.

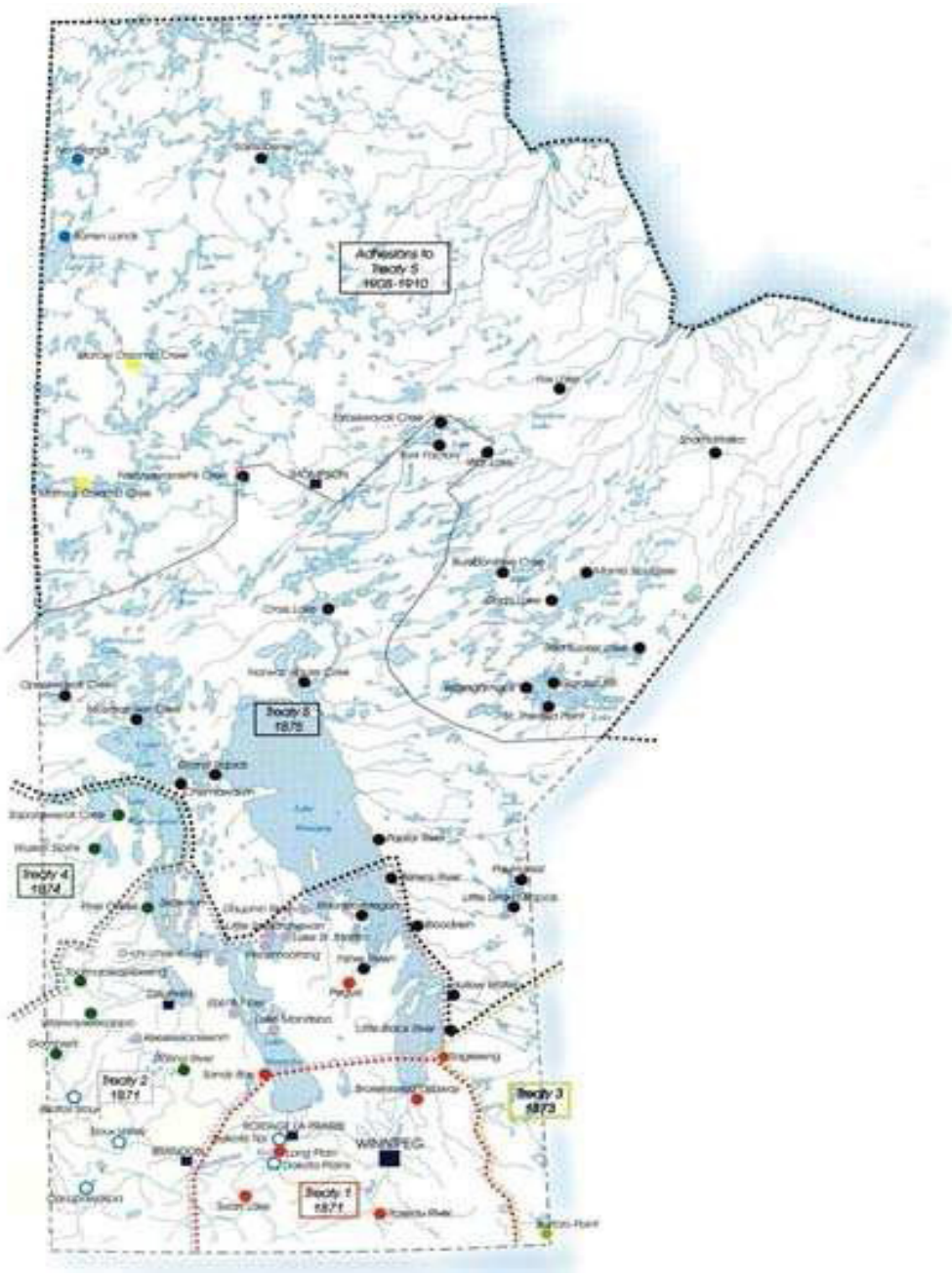
Conclusion

In conclusion, the proposed independent living facility would provide much needed services for adults with Special Needs in NHCN. It would work to fill one of the many gaps that currently exist between Aboriginals and non-Aboriginals in Canada. The creation of an independent living facility that offered additional programming for non-residents would ultimately improve overall quality of life and encourage individuals to live healthy, happy, and independent lives.

Today there is a gap in services for adults with Special Needs living on-reserve in Canada. This gap has worked to further exclude, isolate, and neglect these individuals and limits their opportunities to flourish. This facility would identify best practices for care for adults with Special Needs. This would work to set a new standard of care and inclusion for this previously neglected group.

Finally, the success of this initiative would provide a blueprint for addressing Special Needs individuals' requirements in First Nation communities across Canada. In doing so, it would incorporate the voices of a population that is largely excluded from the privileges that are enjoyed by most Canadians.

Appendix 1



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Chapter 8

Extension and advisory service delivery for women's groups in Jordan: assessing competencies and building social capital

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Abstract

Numerous studies show that gendered constraints often prevent female farmers from having equal access, control and ownership of agricultural resources which ultimately restrict women's access to extension and advisory services (EAS). In Jordan, this is also exacerbated by cultural norms which prevent women from attending meetings with men. Last summer during our field work in Jordan we observed one woman's cooperative with strong social capital and network that enabled them to leverage their agency capacity to organize themselves and enhance their access to external services, including agricultural extension. Based on the results of this observation, in November 2012 we launched a new project funded by USAID's Modernizing Extension and Advisory Services (MEAS) program that allows us to continue our research with rural women in Jordan. We are collaborating with the socio-economic division of Jordan's National Center for Agricultural Research and Extension as they work toward building the capacity of women's cooperatives in water-scarce areas of the country. Female participants from three rural communities are attending trainings designed to build their capacity in successfully organizing a women's cooperative, incorporating the five skill sets identified by Catholic Relief Services as best practices for successful rural farmer groups. During this intervention we are focusing on identifying strategies to develop and strengthen social capital, such as enhancing personal bonds among the group members and providing opportunities for women to develop their leadership skills. We are also examining how strengthening women's social capital and networks can help women better utilize and share information, including agricultural extension information. Our findings will result in identifying best practices on how to effectively deliver information to rural women in the Middle East and North Africa region in order to improve livelihood strategies, agricultural production, natural resource management, and food security.

Introduction

Throughout the world, rural women provide vital contributions to agriculture and food security. Studies have revealed that women provide up to 70% of the agricultural labor in Arab countries. A 2003 field survey conducted in Jordan found that women do the majority of work related to livestock which includes feeding/watering, milking, supervision of calving, and shearing. In agriculture, it is women that primarily to do weeding while also contributing to land preparation, planting, harvesting, and packing produce while in some households they also provide labor for fertilization, irrigation, pesticide spraying and marketing (Al-Rousan, 2005). Despite their importance though, women in the Middle East are often excluded from agricultural extension and advisory services due to a number of gendered and cultural constraints. With USAID funding through the Modernizing Extension and Advisory Services (MEAS) program, our project endeavors to ascertain if working through women's cooperatives, and developing and building on social capital and networsks, can help women to overcome these typically prohibitive barriers allowing them to improve their access to resources.

The year-long project, titled: *Extension and Advisory Service Delivery for Women's Groups in Jordan: Assessing Competencies and Building Social Capital*, began in November of 2012 in collaboration with Jordan's National Center for Agricultural Research and Extension (NCARE) and will wrap up in December of 2013. This partnership allows us to research how participatory teaching methodologies may build on women's social

capital while strengthening their network connections. This research is taking place as rural women undergo a series of trainings facilitated by NCARE that are designed to build the capacity of three participating women's cooperatives of which the participants are members. Changes in social capital and networks are being tracked through the use of qualitative and quantitative tools including focus group discussions, questionnaires, social network analysis, and direct observation.

Background/Study Issues

Despite their critically important roles, female farmers often lack access to extension and advisory services (EAS) that could assist them in increasing agricultural and livestock productivity. There are a multitude of reasons that extension agents overlook women, both throughout the world and in the Middle East where our research takes place. These typically result from cultural, legal and gender norms that prevent women from having equal access, control, and ownership of agricultural resources that could be leveraged to purchase necessary inputs or otherwise invest in the productivity of the land. These constraints can include laws and traditions governing property and inheritance that serve to preclude women's ownership of land. Without title to the land, women often lack collateral and thus bank credit, which can be essential for funding improvements in agricultural production. In Jordan, women comprise only 10% of land and property owners (Gender Equality and Social Institutions: Jordan, 2012). It is a common problem that, in the absence of land title, women are not considered the Head of Household which is the typical qualification for being viewed as farmer. Women's roles in agriculture therefore go unseen by extension agents who typically engage only with 'farmers' leaving women relegated to the invisible role of 'household laborer'. Additionally, women may also grow their own crops for home consumption as opposed to the cash crops that men are more likely to produce. This also contributes to an erroneous perception by extension agents that women's crops are less important and less worthy of attention (Manfre, et al., Reducing the gender gap in agricultural extension and advisory services: How to find the best fit for men and women farmers, 2012). In 1989, the FAO's global survey revealed that, in Africa, the impact of these perceptions resulted in women only receiving 7% of extension resources -only 1% of which was directed at home economics (Al-Rousan, 2005).

Another common constraint affecting women in more culturally conservative areas, like many in the Middle East, is that of mobility and restrictions on their public interactions. Al-Rousan (2005) explains, "We in Jordan have inherited a strict paternalistic system from our ancestors, which seeks "with the best of intentions" to overprotect woman…this state of affairs has resulted in creating a totally dependent woman; she must refer to her male guardian with regard to even the simplest of matters – those relating to her own life and of her children." In some areas, this paternalistic system limits possible interactions in that it is not acceptable for women to interact with male non-relatives which is a barrier to their attending mixed-sex trainings. It also restricts their involvement in various aspects of the value chain, including the market, where they would have to converse and even negotiate with men. Female extension agents may be able to help overcome this problem. There is still a mobility issue wherein with the availability of women to participate in trainings is dictated by their household and childcare duties. Women also typically have less formal education than their men. This is certainly the case in Jordan where 88.6% of adult women are considered illiterate (Jordan Human Development Report, 2011). This can create a problem for extension agents as they may have to adjust training methods so that reading and arithmetic skills are not a prohibitive factor.

These constraints have resulted in a dearth of extension and advisory services targeted toward women producers. In the early 1990s, the FAO conducted a survey on extension in 115 countries that found that women, worldwide, receive only 5% of extension services (Meinzen-Dick, et al., Engendering Agricultural Research, Development, and Extension, 2011). Recent studies reveal that in Ethiopia and India women's access to EAS were 20% and 18% respectively, but were as low as 2% in Ghana (Manfre, et al., Reducing the gender gap in agricultural extension and advisory services: How to find the best fit for men and women farmers, 2012). It is likely that women's access in the Middle East and North Africa (MENA) is similarly low, if not lower. FAO's research reveals that women farmers are 20-30% less productive than men due in large part to their exclusion from the same resources that their male counterparts enjoy including the benefits of EAS. If both sexes had

equal access to productive resources and extension and advisory services, food output in developing countries would increase 2.5-4% and have a large impact on food security (Food and Agriculture Organization, 2011, p. 4).

It is therefore necessary to consider ways of overcoming or circumventing these gender constraints to get extension and advisory services to women. One promising approach is to work through women's groups such as cooperatives or charitable associations that can both mitigate stigma related to their activities, as well as provide leverage within the community and with service providers through collective action and the pooling of resources. For this approach to succeed however, two things are necessary: strong cooperatives and capable, confident women to make them function and succeed. Our research seeks to identify ways that these strengths can be developed through building social capital and strengthening networks for collective action, as well as the dissemination of practical skills and knowledge.

Social networks are able to function more constructively when people "act collectively" towards a certain outcome (Woolcock & Narayan, 2000). A key underlying component of this theory is that social capital facilitates action. In development literature particularly, social capital has been a useful framework for evaluating micro-finance programs (Lions & Snoxell, 2005). These studies have found that building social capital enhances trust and reciprocity, which further enhances the success of group projects. In many regions, women already have the social capacity in their communities to come together (e.g., cooperatives, charitable groups, community meetings). Furthermore, these forums allow women to work collectively toward goals, such as creating a revolving savings program; thus social capital is a "by-product" of an already standing relationship (Lions and Snoxell, 2005; Woolcock & Narayan, 2000). In other words, the social capital foundations are already in place and are ready to be developed further into action.

Description of the study sites/cases

Our research is being carried out alongside a training program that is being facilitated by our field partner, the National Center of Agricultural Research and Extension (NCARE) in Jordan. This training program spans the course of a year and focuses on a number of training topics that fall under five categories:

1. Group Management
2. Natural Resource Management
3. Savings and Financial
4. Business and Marketing
5. Technology and Innovation

The categories encompass five skill sets that were identified as being necessary for building a cooperative's agency capacity, helping to overcome coordination failures, and contributing to the empowerment of the rural poor to enter markets These skill set categories were identified by Catholic Relief Services (CRS) after conducting research on farmers groups in India, Uganda and Bolivia (Ashby, et al., 2011). The training program itself is funded by the Middle East Partnership Initiative (MEPI) with funds from the U.S. Department of State and uses a peer-to-peer mentoring model. A well established, successful women's cooperative, *Ngera Cooperative for Social and Charitable Causes*, is paired with two women's cooperatives that are newer and less developed: *Al-Khudair Women Cooperative for Social Development and; Mawakeb Al-Noor Women Cooperative for Charitable Causes*; each of which identified 6-7 of their members who agreed to commit themselves to attending the full training program.

Research on how adults learn has concluded that it is most effective when participants are involved in determining their own learning objectives, when the training is focused on actual problems faced by the trainees, and when the training is carried out in a varied environment using participatory techniques. David Kolb, an educational theorist, developed the Experiential Learning Cycle based on this thinking (ARC Resource Pack: Facilitiator's Toolkit, 2009). The methods being used in the MEPI training program enlist both inductive and

deductive learning that allows participants to learn new information and then build on that with reflection and to draw their own conclusions about its application. Participatory methods, such as small group discussions and activities, open debate and discourse, and sharing their own conclusions with the group helps build women's confidence in their ability to learn new skills and articulate their ideas and conclusions in front of others. In this way, women are learning to be leaders and building their personal skills while developing capabilities that will serve to strengthen and advance the goals their respective cooperatives.

Methods

Using the format and questions utilized in an earlier focus group discussion with members of the Ngera cooperative, researchers from NCARE and UF repeated the process. Women from the two newer cooperatives, who were not personally participating in the trainings, volunteered for the focus group discussions. These discussions revolved around the topics of: women's access to information; leadership and participation in the cooperative; daily activities; water resources and climate change; and basic demographic information.

Questions for a third focus group, comprised of MEPI participants from each of the three cooperatives, were designed to discover the opinions and experiences of the women on a number of issues. Broadly, these included: their involvement in the MEPI trainings and how it has, or has not, changed them; feelings toward themselves, their future, and the future of their daughters; their ambitions related to leadership roles; their social networks and social capital; and lastly, the strengths and weaknesses of their communities and cooperatives.

Data was also collected through a baseline questionnaire that was constructed and administered with the MEPI participants comprised of questions in the following nine sections:

- Demographics
- Participation in cooperatives/voluntary associations
- Communication skills
- Community dynamics
- Organizational management
- Savings and financial skills
- Business and marketing skills
- Technology and innovation skills
- Sustainable production and natural resource management

This questionnaire revealed that half of the participants in the trainings from the newly-established cooperatives have held responsibilities within their respective cooperatives for less than one year with an additional 27 percent having no responsibilities as yet in the cooperative; the remainder have had responsibilities only for the past 1-3 years. The majority of MEPI participants from the two newer cooperatives are voluntary members of their respective cooperatives, receiving no income from the cooperatives at this time. There are a number of participants with leadership positions within their cooperatives. The president and vice president of both of the two new cooperatives are taking part in the trainings as are two board members from Ngera – the well-established cooperative. One third of the participants from the newer cooperatives have never received any type of training before while 100% of the participants from Ngera have received training in past.

In order to assess potential changes within the MEPI trainees' social networks and capital, a Social Network Analysis (SNA) survey was designed. The survey asked about relationships and communications that respondents from each cooperative had with the MEPI participants from their cooperative. The survey was administered to the MEPI participants asking about the fellow cooperative members in the trainings. The same survey was administered to women that where not participating in the trainings that asked about the MEPI participants from their cooperative. In total, six sets of surveys were collected as a baseline with a plan to follow

up in late September of 2013 to compare changes.

The goal of utilizing this method is to capture potential changes in social capital and networks of the women undergoing the training program. In order to capture a snapshot of the existing social capital of the individual participants, in relation to each other, they were asked how similar they feel they are to each other; if they share personal information; if they have given or received a favor; and who they have gone to for information about the cooperative. Before we can give a weight to any changes in the answers we receive later this year it was also necessary to determine if there were familial relationships within the groups as they are likely to be strong already and therefore not reflect a change later. Similarly, we asked if the respondents held a position, such as board member, within the cooperative as these individuals would likely already have high social capital within the group.

Results

Focus group responses from cooperative members that were not participating in the trainings reflected their understanding that being a cooperative can provide ways to develop their own social capital. For instance, as the idea of a cooperative is relatively new to the women of the Al-Khudair cooperative, they noted, more women are (albeit slowly) beginning to understand the benefits that cooperative membership provides for their personal livelihoods. They stated that prior to the establishment of the cooperative, women often did not or could not attend training sessions due to cultural restrictions on their movement and out of a fear of the potential repercussions that their families may face. However, when trainings are provided within the cooperative, women feel less of a stigma to attend and participate. They also acknowledged the benefits that membership in the cooperative offered them: greater knowledge and awareness from trainings and lectures; care and support that they receive from and give to each other; and a spirit of service to provide moral and financial support for women in their community. Furthermore, women in both of the new cooperatives commented that they found working in this peer-to-peer setting in which they are learning alongside, and from, Ngera has been useful due to the opportunity to socialize, interact, and learn from each other's experiences and views.

In terms of fundamental communication skills, the questionnaire results showed that only half of the participants from the two newer cooperatives felt somewhat confident about solving problems. The same amount indicated that they felt somewhat confident at getting their point across and 67 percent felt comfortable being the spokesperson for a group. Furthermore, only 73 percent from the newer cooperatives stated they expressed their opinions or asked questions during cooperative meetings. These communication skill confidence level indicators were all significantly lower within the two newly-established cooperative participants than those of the Ngera, established cooperative. The newly-established cooperative participants indicated only 27 percent of them had their own money for which they controlled spending decisions, while of the established cooperative participants, 75 percent of them had their own money and made decisions on how to spend it. Also 30 percent less of the newer cooperative participants held money or assets in savings than the other participants. Finally, twice as many of the newer cooperative participants indicated that they have not traveled outside their community within the past three months than the participants of the more established cooperative.

Regarding social capital within these communities, of the newly-established cooperative participants, 67 percent stated that the feeling of togetherness or closeness in their community was somewhat strong and one participant stated it was weak. Of the established cooperative, 100 percent of the participants stated the community togetherness was strong, with 63 percent finding it very strong. Half of the newly established cooperative participants indicated that people in their community were only somewhat likely to cooperate to solve a problem together and they also indicated they were currently less involved in communitywide matters, with 41 percent participating contributing time or money sometimes or not at all to addressing community problems, while 100 percent of the established cooperative participants contributed time or money towards addressing communitywide problems. Congruently, these newer cooperative participants indicated they felt

that had less influence in making their community a better place to live than those in the more established cooperative.

Researchers' direct observations of the training sessions to date, show that members of the new cooperatives were actively participating together in the trainings' new community project ideas generation, new project planning, communitywide market analysis and research, and extensive group presentation and public speaking. Participants were debating and discussing in great detail the positive and negative aspects of each participant's project ideas while offering advice and varying opinions in a group setting. Participants were required to work together in small groups to create and present power point presentations delineating details of developing project proposals while defending to the group the benefits of funding their projects. The group dynamics appeared to be comfortable and open as participants were regularly sharing opinions and asking questions. Participants from all three cooperatives were observed equally discussing and planning tangible ways in which the cooperatives can positively impact and improve local communities as well as generate income or improve resources for at-large cooperative members. During a focus group discussion with the newer cooperative MEPI participants that was held in May of 2013, participants indicated increased comfort participating in a group or public setting, one stating, "Yes, we have become more confident as we have more courage to share our opinion." Direct observations by the professional, contracted trainers conducting the training indicated an increase in communication and planning skills on the part of the participants. The financial skills trainer stated after several weeks of training was completed that he believed the project proposals being generated by the MEPI participants were of high quality and were likely to receive funding and be successful in the competitive market. He also commented on the participants' enthusiasm and high level of engagement in the trainings and discussions.

To date, the social network analysis of the MEPI participants has yielded interesting information about the women and how they relate to each other. The data revealed that specific women in the cooperatives seemed to carry much more weight and be in possession of more social capital than others. When compared with other data collected on the participants, we found that these women were already formal leaders in their cooperative or, interestingly, had been identified as a potential leader in a Training of Trainers that will evolve from the MEPI trainings. One of the questions asked, "Who have you talked to, outside of activities/trainings, about an issue related to the cooperative?" was formed to determine who may have stronger social capital, personal bonds, and higher credibility within the group (see Figures 1 and 2 below). Our follow-up social network analysis at the end of the trainings will track changes in this and the other questions regarding social capital within each cooperative, to see if communication and sharing of information has increased and improved or not, if comfort-level in asking for favors and discussing personal matters has increased or not.

Challenges

During the course of this year-long project there have been a number of challenges. The MEPI training program started on schedule, alongside our own MEAS project, but it soon faced the problem of losing two of the three cooperatives. The cause was noted as lack of commitment to stick with the trainings over the course of a year but it was noted that, for at least one of the cooperatives, there was not support for teaching women leadership skills. Efforts to replace these two cooperatives took several months as it was necessary to find two relatively new cooperatives in nearby communities with women who, in addition to having the time and commitment to participate, also possessed the literacy and education required to fully engage with the training materials. The MEPI project was extended an additional year, which changed the training schedule and impacted the ability for qualitative and quantitative assessments of both the participants and non-participant groups at specific points in time throughout the training progression. The delay created a misalignment in the two projects (MEPI training and MEAS research) that has resulted in our inability to capture and track changes from the entire training program which is now scheduled to end roughly four months after the MEAS project.

Who have you talked to, outside of activities/trainings, about an issue related to the cooperative?

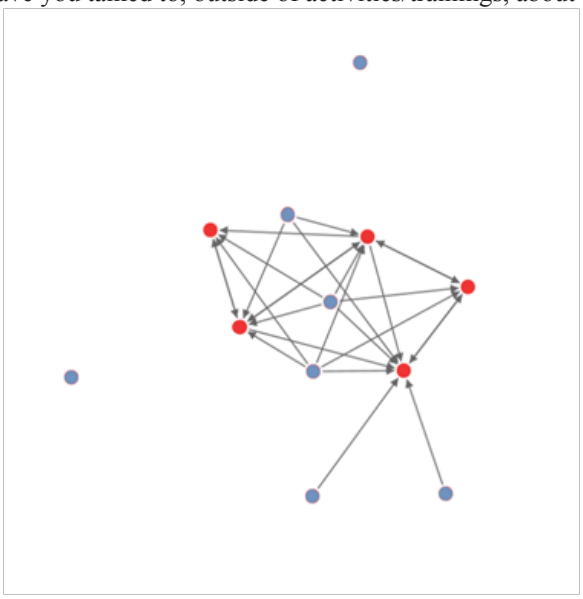

Figure 1. Sociogram of Ngera Cooperative
Red: MEPI Participants
Blue: Non-participants from the same cooperative

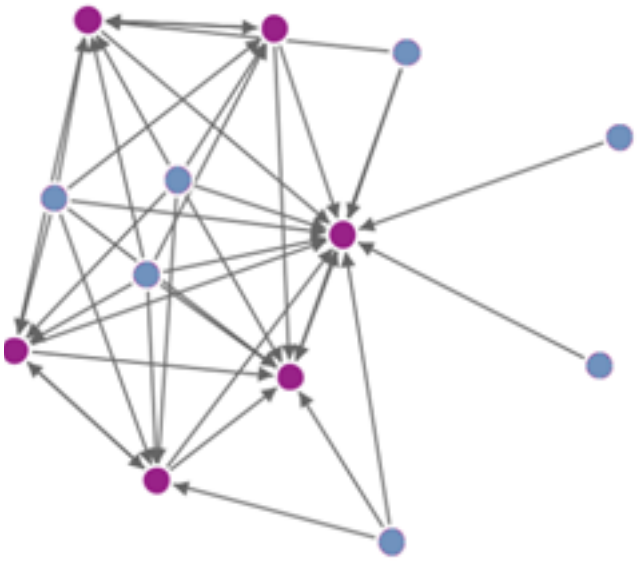

Figure 2. Sociogram of Mawakeb Cooperative
Purple: MEPI Participants
Blue: Non-participants from the same cooperative

These figures are sociograms that were created with the Socilyzer platform depicting which MEPI participants are sought out by other members when information about the cooperative is needed.[1] Each circle, called a node, represents an individual in the network. A line between two nodes details the communication between them with the arrow pointing to the person being sought out.

Another challenge was created when a small number (4) of MEPI participants left the training program. While some were replaced with other women committed to the program, the change made it impossible to track changes in the social networks for these individuals which further limited our study size for the social network analysis.

Conclusion

Working with women in cooperative groups appears to overcome cultural barriers to participation and access to extension information. Utilizing a peer-to-peer mentoring approach, pairing well-established cooperatives with less developed cooperatives in order to train and strengthening capital of both individuals and cooperatives as a group, builds on this foundation of utilizing cooperatives in a way that appears to facilitate social capital improvements in communication skills, sense of community and sharing of problems and issues. Networking and greater adaptation of extension information also appear to be positive results of using this model. When this model was coupled with successful, participatory extension training focusing on the five skills sets groups need to become successful, individual participation in the group and the community at large increased, as evidenced in the effective generation of community project proposals.

Further analysis of post-training changes via follow-up focus groups, questionnaires and social network analysis are required and pending in order to further validate direct observations in the field; however, comments from the newer-cooperative MEPI participants themselves clearly indicate increased confidence, increased

[1] Socilyzer.com

networking, and group cohesiveness.

Utilizing participatory, targeted skill-set training and peer-to-peer mentoring in order to increase social capital within women's cooperatives is an effective way for extension planners and educators to facilitate the strong groups and social cohesion necessary to successfully implement extension information and projects in the MENA region. Increased training of extensionists in these gender-specific methods as well as scheduling trainings and meetings at times when women can best participate are simple and efficient methods for improving outcomes in these areas where women's participation can often be culturally constrained.

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Chapter 9

Using Efficiency to build Equity: The Case for Global Social Protection

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Abstract

Most conceptualisations of extreme poverty assume that 'the poor' are a minority group in a state of dependency identifiable by region and demographic. Such an assumption cannot account for the fact that the vast majority of people in the developing world are vulnerable to extreme poverty and lack access to government run social protection institutions, including social security systems. External shocks, including economic and environmental shifts, and risks such as ill-health, can affect any individual, household, or population in a non-predictable way, and can lead to loss of livelihood and a decent into poverty. This type of transitional poverty is an experience of the wider population. Using a flow analysis (inflow and outflow) of poverty, rather than a stock analysis, we explain why poverty is more appropriately understood as a dynamic, with some people flowing in and out of poverty for short durations, and others flowing or born into poverty for longer durations. Distinguishing between structural and transitory poverty gives rise to a focus on the identification of multiple constituencies in the wider population (permanently poor; sometimes poor; and non-poor). We argue that a social security system is an efficient way to prevent and cure transitory poverty. To protect against shared risks and mutual vulnerabilities, this paper argues that global insurance instruments, regulated through domestic institutions, would provide an efficient solution to transitory poverty, and also that they would basis for investment in more equitable and extensive social protection measures to ensure that on-one is left behind in structural poverty.

Introduction

According to the World Bank, it is expected that eight-four countries will achieve the first Millennium Development Goal (MDG) to half poverty and hunger by 2015, where poverty is measured as the proportion of the population living below $1.25 purchasing power parity (PPP) per day. However 1.2 billion people remain below the poverty line in 2012.[1] Headcounts are growing even if poverty rates are declining. The numbers of people living in extreme poverty is growing and remains a pressing problem and a focus of concern as negotiations continue on what should follow the MDGs.

According the 2013 report from the UN High Level Panel of Eminent Persons developed to inform the post-MDG / 2015 discussions, *A New Global Partnership*,

> *'The next development agenda must ensure that in the future neither income nor gender, nor ethnicity, nor disability, nor geography, will determine whether people live or die, whether a mother can give birth safely, or whether her child has a fair chance in life'* (2013: 7).

This report calls on world leaders and international organisations to embrace a 'transformative shift' that sets a shared global obligation to 'leave no one behind' (ibid). This is a bold and ambitious requirement. It sets a strong ethical requirement to reject basic utilitarian principles that seek to maximise the interests or utility of the greatest number of people, instead setting the requirement that all should benefit from future development

interventions, and no-one should be left behind.

The problem we highlight in this paper is that poverty is not as structural and identifiable as the policy analysis suggests. The majority of the people living in the developing have very weak social protection systems provided by their governments. This exposures broad populations to non-predictable external shocks, including economic and environmental shifts, and risks such as ill-health, that can lead to loss of livelihood and a decent into poverty for various durations of time. In what follows we show that transitory poverty is a dominant feature, not accounted for in the process of head counting. Such temporary spells are experienced by a broad cross section of society. In addition, there is structural or long term poverty present in the headcounts that all too often ends in mortality rather than am outflow into the state of non-poor.

In what follows, we argue that social protection institutions are required to prevent and cure transitory inflows into poverty. These are efficient social security schemes based on a contributory model by households and companies, underwritten by governments. Exposure to common risks, variance in risk aversions, and assessments and differences in incomes provide a market for social security products that can lead to a Pareto efficient model which would protect households and prevent the flow of the non-poor into poverty. Further, we argue that such social protection funds and systems could then provide the basis for increasing equity through extensive non-contributory social transfers to excluded groups and those experiencing structural poverty, thereby ensuring that on-one is left behind. This paper gives expression to the moral requirement that one ought to prevent and cure all forms of poverty through development interventions whilst ensuring that no-one should be left behind.

Of course this approach is subject to the fundamental axiom of logic, that *ought* implies *can*. States must have sufficient capacities to meet this requirement if the obligation is to hold. Rather than focusing on 'floors' as per the proposals of the International Labour Office (2008, 2011), in what follows, we argue that systems should simultaneously offer protection to those at risk of descent into poverty. Offering the opportunity for insurance against risk can generate a sustainable solution as those in a position to contribute can do so, and funds can be made available to support those in need, recognising that all persons will face similar needs over the course of their lives. Thus, we propose harnessing 'natural' inequalities (in age, capacities, ability to contribute, preference for insurance, exposure to risk) to reduce social inequalities (gender, resources, and opportunities) thereby prioritising the protection of all those at risk and vulnerable to descent into poverty, and at the same time ensuring that no one is left behind. In terms of poverty dynamics we propose using social security systems to prevent and ensure short durations in the inflows of people that transition from the state of non-poor. The social transfers and programs that target outflows and coping of the structurally poor will be different but funded by the overall social protection fund. This paper proposes a social protection solution that blends financial engineering and social responsibility, using Pareto efficiency to achieve socially optimal outcomes in the population of the non-poor and harness what might be term 'natural inequalities' to reduce social inequalities, with a particular focus on inclusion and ensuring 'no one is left behind'.

The paper begins with an introduction to the problem – contemporary conceptualisations of poverty as a stock rather than flow. Using a flow analysis, we explain how stock analysis can fail to capture the dynamic and fluid nature of transitory poverty, and the risks and vulnerabilities that reach over 5.1 billion uninsured, unprotected, insecure human beings. Section II examines the idea of social protection, what this is, how it can be justified, and why this is an appropriate, and indeed essential instrument to stem fresh inflows into poverty. It also argues that such instruments are both the *right* and the *smart* solution to pursue.[2] In section III we explain how such a model might work, both in terms of the demands of Pareto efficiency and in generating the conditions whereby greater equity can be achieved and the most vulnerable can be protected. We argue

[1] See http://www.thelancet.com Vol 382, accessed 3 August 2013

[2] The phase 'right and smart' is borrowed from the UN HLP report, 2013.

that this model can create financial space for investment in the social and human capital requirements of the most vulnerable individuals, households, and groups. Finally, we examine a number of potential objections and explain how these can be resolved.

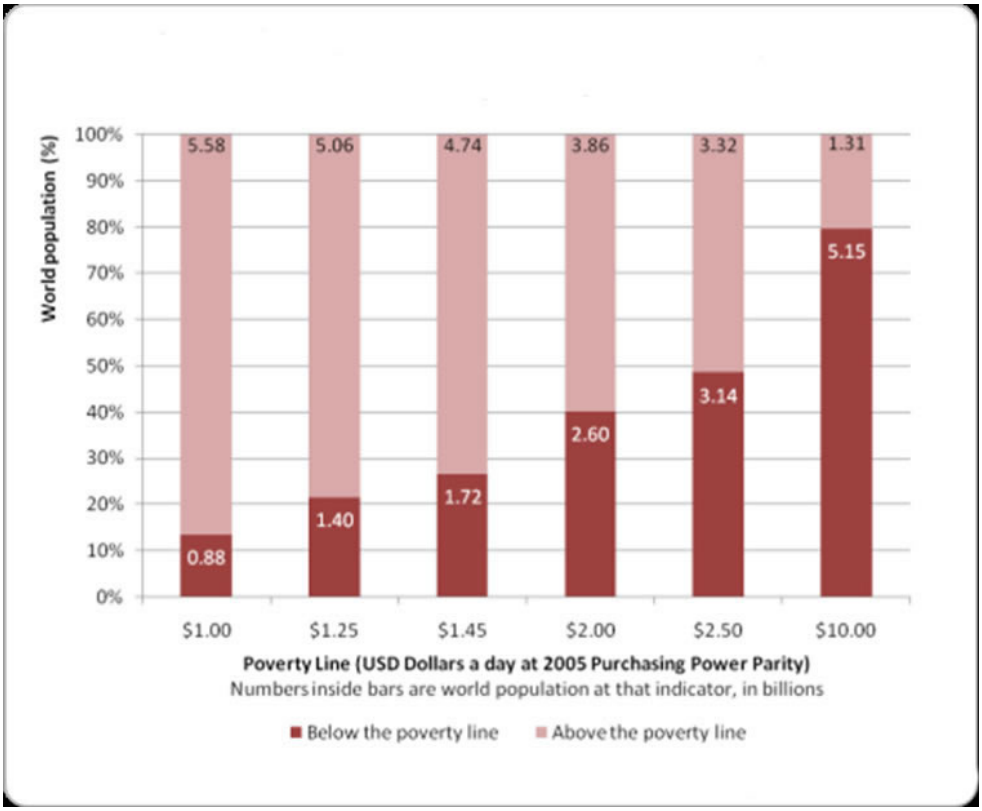
In examining the dynamics of poverty, and proposing solutions to stem the flow into poverty whilst simultaneously investing in equitable social transfers and social protection mechanisms, this paper is relevant to policy makers, government and international organisations, those engaged in systems' changes, and private enterprises with the capacity to deliver trans-state multi-national social insurance products.

(I) The Problem – contemporary conceptualisations of poverty as a stock

As Amartya Sen has observed, 'the most common and traditional measure of poverty has tended to concentrate on head counting' (1999: 362). Poverty is most widely measured as a stock. As Krishna explains, this entails 'considering the numbers of poor people at a particular moment in time. Such stocks can be compared across two points in time and the net change calculated. [However] such analysis does not [indeed cannot] reveal how this change was derived: how many people fell into poverty within the specified timeframe and how many others concurrently escaped' (2007: 1).

Chen and Ravallion (2008), explain that the numbers in poverty, at any point in time, are highly sensitive to the thresholds that define "extreme poverty". As outlined in Figure 1, when the threshold is set at as $1.25 (PPP) per day the numbers in income poverty in 2005 are 1.4 billion individuals. However, this figure jumps to half of the global population when we use a threshold of $2 (PPP) per day. The reality is that eighty per cent of the global population live on less than of $10 (PPP) per day. The margins that define people as poor and non-poor are very narrow. This raises the range of questions such as, should the focus on extreme poverty be on the bottom twenty or the bottom fifty per cent; and what are the drivers pushing fresh inflows of individuals into extreme poverty?

Figure 1. Percent of people in the world at different poverty levels, 2005



Source: World Bank Development indicators 2008

Contemporary conceptualisations and measures of poverty typically define 'the poor' and 'the non-poor' as static groups, identifiable by region and demographic. Debates in both academic and policy literature widely assume that such groups are socially constructed, and not a natural outcome of differing levels of productivity and ability, or indeed, a stochastic outcome. In reality extreme poverty is not experienced by the same bottom twenty per cent of the population. Rather there is ongoing mobility between income groups where extreme poverty, for various durations, is a risk for the vast majority of the population in the developing world.

Typical analysis that informs the contemporary debates focuses on growth in the stock of 'the poor'. Firstly, it is argued that the inflow into poverty is driven by high birth rates in low-income locations and households, combined with improved maternal health and lower infant mortality. Secondly, that these inflow rates exceed the outflow rate from poverty which would include mortality rates. Thus, absolute levels of poverty in identifiable groups increase, even if poverty rates in terms of the total population declines. However, evidence suggests that poverty inflows, duration, and outflows are far less structural and identifiable by group. In fact, the dynamics of poverty involve a far greater reach of households across the population, the implications of which are not well understood, and we argue should lead to a radically change in policy that addresses poverty dynamics.

The distinction, between poverty, understood as a permanent stock, and poverty understood as a dynamic with inflows and outflows (of different durations), is critical to understanding the fundamental nature of poverty. The stock can reflect both transitory and structural elements of poverty. Inflows can reflect the levels of vulnerability and risk associated with livelihoods across a broad cross section of the population. Outflows can reflect spells in poverty that are more transitory than structural. Overall a flow analysis of poverty allows one to distinguish between structural and transitory poverty, and determine varying levels of vulnerability to descent into poverty and varying ability to exit within the general population. The following equation identifies the change in the stock of poverty, ΔSt , in any time frame as the difference between the number of inflows, It, over the outflows, Ot, over the defined period.

$$\Delta St = It - Ot$$

Annual flows dictate the change in the level and composition of poverty. In theory the change in the stock can be generated by an infinite number of turnover rates. A change in the stock by positive ten can be due to ten people entering and zero exits, over a year. It is also consistent with one billion and ten entrants and one billion exits over the same period. The former has long durations of a year while the later would have the vast majority of spells less than year. The former are spells without an exit, which appear more structural, while the later has finite spells that are more transitory.

There are important questions regarding the source of these inflows. Are inflows reflecting structural or transitory issues? Does the spell itself create a path dependency that turns what should have been transitory into a structural problem? If inflows are coming from the general population, and the stock is made up of people that are more transitory in their state than structural, then this would undermine the conventional way of understanding poverty and would require a different policy focus. In practice the stock will consist of various inflow histories of various durations. Stock is likely to have a bias towards long term durations, however short term incomplete durations can account for a large percentage of the stock when transitory poverty is a feature of the general population experience. From a policy perspective,

1. Preventing inflows, or inducing outflows of various durations, can target very different problems and groups of households.

2. Different groups may require different forms of social protection that both prevents and helps exit poverty.

This suggests that poverty is not only a problem for the 1.4 billion people living below $1.25 PPP per day. It is a possible outcome for 5.1 billion people who lack basic insurance (access to the institutions that run social protection) against defined risks.

The following table, although representative of a stock, gives some indication of the dynamic nature of poverty through the structure of questions:

Table 1.1 Percentage of households who are: always poor, sometimes poor, never poor

Coutries	Years	Always poor	Sometimes	Never poor
China	1985-90	6.2	47.8	46.0
Côte d'Ivoire	1987-88	25.0	22.0	53.0
Ethiopia	1994-97	24.8	30.1	45.1
India	1975/76 - 1983/84	21.9	65.9	12.4
Indonesia	1997-98	8.6	19.8	71.6
Pakistan	1986-91	3.8	55.3	41.7
Russia Federation	1992-93	12.6	30.2	57.2
South Africa	1993-98	22.7	31.5	45.8
Viet Nam	1992/93 - 1997/98	28.7	32.1	39.2
Zimbabwe	1992/93-1995/96	10.6	59.6	29.8
Source: Cited by Subbarao 2002. While The data for this study was collected some time ago, the essential point that this table comweys is unchange - that a large proportion of people fall in and out of powerty.				

From this table it is possible to identify large numbers of people who would claim that they are 'sometimes poor', that is, that for one reason or another, they experience finite spells of income poverty.

The distinction between structural and transitory poverty is critical when selecting appropriate instruments, interventions, and policies. As Grootaert, Kanbur, and Oh (1995) note, those experiencing permanent exclusion from the formal workforce may need targeted programmes to enhance their human and physical capital endowments; those excluded from the workforce on a permanent basis due to disability or old age may require permanent cash transfers in to form of pensions and disability allowances; while those who are unable to find employment or unable to work due to a short term illness, for example, may only require temporary assistance.

Analysis of poverty that focuses on head counts, with an underlying assumption that 'the poor' are a homogenous, static group, identifiable by region and demographic profile, cannot account for the inherently non-predictable and transitory nature of poverty. As Krishna's research indicates, 'not everyone who is poor was born into poverty..... [rather] poverty is constantly being refreshed with two concurrent streams flowing in parallel' (2007: 1), with different people moving into and out of poverty at the same time.

Conceptualising poverty as an identifiable stock does not extend any consideration to the stochastic events that occur over the duration of a human life. For all human beings, life is precarious and uncertain. Accidents happen, ill-health hits, and natural shocks occur. These are matters of sheer brute luck to which every human being, as a finite and vulnerable entity, is exposed. External shocks, including economic and environmental shifts, and risks such as ill-health, can affect any individual, household, or population in a non-predictable way, and can lead to loss of livelihood and decent in to poverty. From an economic perspective, formal market economies cannot function if individuals do not have capacities to insure their assets and protect their investments and livelihoods. From a moral perspective, an individual's life-opportunities should not be determined by morally arbitrary factors such as an unlucky flood.

Distinguishing between structural and transitory drivers of poverty gives rise to a focus on the identification of different constituencies (permanently poor; sometimes poor; and never poor); characterised by different vulnerabilities (causes of inflow); characterised by different structural problems (deterrents to outflow);and which require different instruments and coping strategies.

So what are the implications of this, and what is the link with persistently high levels of poverty and social protection? In what follows, we argue that a person born in Malawi shares a similar need for social protection as

a person born in Malmo or Madrid. When poverty is analysed as a flow rather than a stock, we argue that fresh in-flows below the poverty threshold are most likely to come from the broad group of unprotected individuals (of 5.1 billion people), rather than a definitive fixed group, such as 'the bottom billion'[3] . Thus, if development interventions are to achieve their objectives of reducing poverty, then they ought to give consideration to this wider group, with its different constituencies, requirements, and vulnerabilities.

(II) The Idea of Social Protection

According to Gentilini, Ugo, Omamo, and Were, the idea of social protection 'captures how members in societies support each other in times of distress' (2011: 329). This idea entails two distinct components – social security or insurance, defined as a reciprocal, contributory fund that people pay into to protect their assets, and receive benefits, from as the need arises; and social protection measures, defined as a non-contributory social transfers distributed to those excluded from the formal workforce due to age (in the form of pensions and child benefits); ability (disability allowances; maternity cover), and public goods and services. Different individuals, households, and groups, will require different instruments and interventions, depending on the context of their needs.

In response to shared risks and mutual vulnerabilities countries in the Global North have all moved towards varying models of social protection that create safety-nets around their communities, and support their social, political, and market systems. Social protection, including contributory and non-contributory instruments, within these locations is typically justified on the basis of solidarity and reciprocity. Solidarity here refers to the recognition of shared human risks and vulnerabilities, and ultimately rests on recognition of the equal moral status of all individuals. Reciprocity here refers to systems of mutual cooperation and engagement that all contribute towards, and where the benefits and burdens of such cooperation can be shared across all members of the community. However, such systems are not in place in developing locations. In 2011, there were 5.1 billion people, or 75 percent of the global population, live without social security and social protection supports.[4] Yet, they share similar exposure to risk and vulnerability. Further, such risks and vulnerabilities are generated by factors endogenous to a community, but also exogenous factors such as global market fluctuations, climate change and so on.

More recently, empirical literature has linked the concept of social protection not only with responsibility, but also with opportunity. For example, Gentilini et al. have found that the concept is now linked with a wider range of motivations and justifications including 'macroeconomic stabilizer, humanitarian responses, from risk management, to promoting social justice' (2011: 329). Further, they note that many risks are predictable, and so 'a corresponding predictable level of support is required to address needs ex-ante, rather than ex-post emergency assistance' (2011: 334).

In high-income locations, elaborate social protection infrastructures have evolved to insure people against shocks and periods of poverty (income and asset loss). However, in less developed countries and regions, exposure to shocks, even minor shocks such as an illness or a temporary loss of employment, leave the majority of the global population in a state of material insecurity and vulnerable, to varying degrees, to a descent below the poverty threshold. Even those within employment may not be fully protected. As the ILO argue, 'not all forms of employment guarantee an escape from poverty, and indeed, having a job certainly does not mean

[3] Phrase borrowed from Paul Collier (2007)

[4] See http://www.ilo.org/global/publications/books/WCMS_165750/lang--en/index.htm *Social Protection Floor for a fair and inclusive globalisation* (2011), accessed 27 August 2013

[5] United Nations High Level Panel of Eminent Persons, *A new global partnership: eradicate poverty and transform economies through sustainable development* (New York, 2013), 33 (hereafter cited as UN HLP, *New global partnership*), http://www.un.org/sg/management/pdf/HLP_P2015_Report.pdf (01 July 2013).

that one cannot be poor' (2009: 4). Income security is an essential, instrumental factor in enabling individuals and households move out of poverty, but it is not sufficient to protect them against descent below the poverty threshold.

Yet, protection and confidence is critical to a well functioning economy. According to a recent MDG review report, 'people are more likely to make long-term investments when they feel secure on their property'.[5] Evidence from European welfare states indicates that people are more likely to spend, rather than save, to invest in their families (through education), and their futures, and this contributes directly to sustained economic growth. Such growth then generates a platform for further investment in social institutions and protection instruments to ensure that no constituencies are excluded.

The reasons for establishing such frameworks are multiple and varied, but underlying all such models is a general acknowledgement that life is precarious and uncertain. Accidents happen and natural events occur. These are matters of sheer brute luck to which every human being, as a finite and vulnerable entity, is exposed. Rather than adapting to such uncertainty and exposure to such risks through deepening patterns of self-reliance, general practices of insurance, risk–management strategies, welfare bureaucracies, and critical infrastructure supports evolved, engaging private and public entities, to pool the risks and resources, and distribute to participants of schemes as needs arose.[6] Thus, there are strong moral and economic reasons for investing in the development of robust social protection systems that can support the global population, and not only those born in the North.

(III) Stemming the inflow

On the one hand, it might seem implausible to suggest that the lowest income locations and populations could afford social protection instruments. It is widely documented that the poorest countries have greatest barriers to implementing these instruments for a range of reasons including lack of resources, social cohesion, political will, and historical practices. For example, in a number of countries in Sub-Saharan Africa over half of the population survive on less than $1.25 PPP per day, economies are predominantly informal, state infrastructure to facilitate taxation, trade, and employment regulations are weak, and social trust in state institutions is low. As such, there can be substantial economic, social, and political barriers to establishing sustainable and state-financed social protection systems. However, on the other hand, the demographic profiles of such locations, with young populations, increasing levels of education, improving health and life expectancies, suggest that the capacity exists for such populations to contribute to a social protection fund, should the opportunity to do so arise.

Although efficient instruments to address transitory poverty will not address the multi-dimensional manifestations of structural poverty, they have the potential to generate a surplus and institutional structure that can redistribute funds through non-contributory instruments, thereby targeting the most vulnerable and excluded populations. Efficient outcomes for the non-poor can lead to more equity in society.

Pareto efficiency and the case for global risk-spreads

Since the 1990s, the ILO has been developing an analytical and policy framework to support individual states to implement what they have termed 'social protection floors'. It includes guarantees of:

1. Basic income security, in the form of various social transfers (in cash or in kind), such as pensions for the elderly and persons with disabilities, child benefits, income support

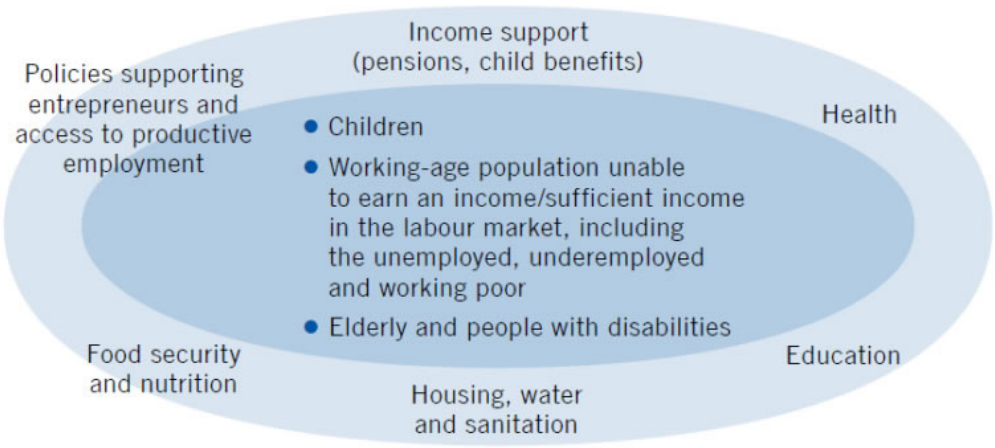
[6] See Duffield, 2010 for a critical examination of the 'global life-chance divide'.

benefits and/or employment guarantees and services for the unemployed and working poor;

2. Universal access to essential affordable social services in the areas of health, water and sanitation, education, food security, housing, and others defined according to national priorities (ILO, 2011: xxii).

The ILO is working directly with states to develop national adaption strategies, to select and introduce the most appropriate floors on a phased basis – 'The term "social protection floors", in the plural, refers to national adaptations of the global approach to country-specific circumstances.' (ILO, 2011: xxiii).

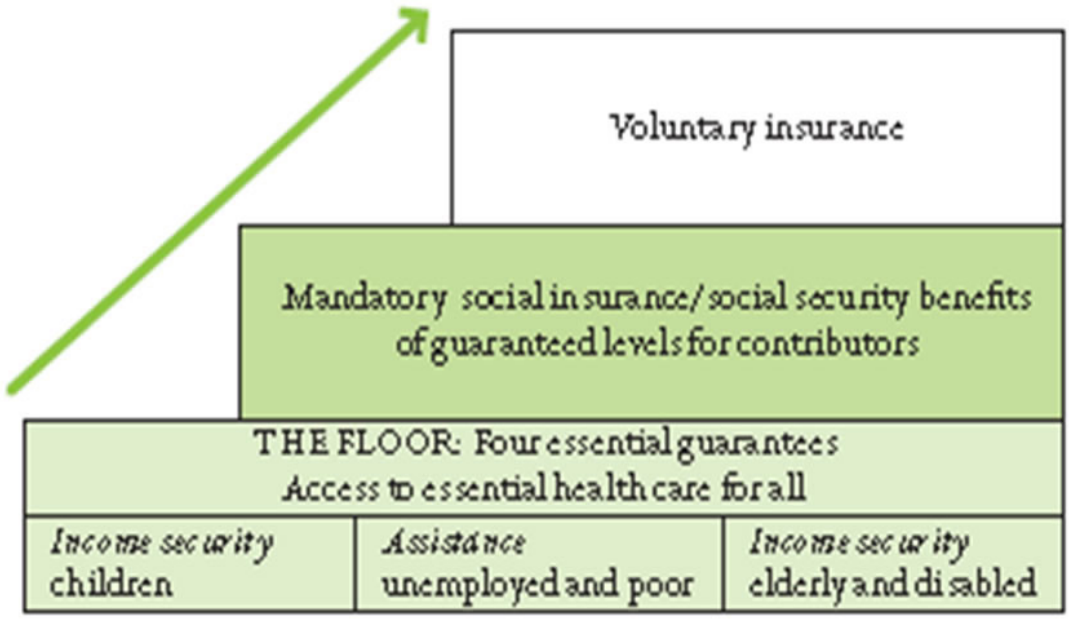
Figure 2. The social protection floor: Integrated social policies to protect and empower people across the life cycle



(ILO 2011: 11).

According to the ILO, there are two steps to the extension of their social protection framework that includes both social security and social protection dimensions. Firstly, they recommend the extension of a 'basic set of social guarantees for all (horizontal)' and secondly, 'the gradual implementation of higher standards (vertical dimension).

Figure 2.2. The social security staircase



Thus, although they do not prescribe to states the precise steps and content of this model, they do advocate a bottom up approach, starting off with non-contributory social protection instruments.

However, it is possible to identify two potential problems with this approach – firstly, beginning with non-contributory mechanisms prioritises equity over efficiency, and risks fiscal unsustainability; and secondly, the state-based nature of this approach gives rise to new risks and missed opportunities. There is increased potential for inter-state problems where bad neighbours can undermine good policies. There are also missed opportunities where greater efficiencies can be gained by capitalising on the cross state demographic structures, incomes, and their different exposures to common risks.

On the first potential problem, the proposed extension of this solution, through graduated sequencing from bottom to top, may be problematical in a number of low-income states in particular. There is a potential problem of fiscal sustainability. It assumes states have the resource capacity to engage in large-scale redistribution on an ongoing basis. [7]

Fundamentally, this prioritises equity over efficiency. It also fails to acknowledge the vulnerability of the non-poor who are at risk of descent below the poverty line. Such a sequencing of steps fails to stem the tide of fresh inflows below the poverty threshold.

Although it is often assumed that there are tensions between the efficiency and equity such that the most equitable solutions may be less efficient, and the most efficient solutions may lack any consideration of equity and matters of distribution, an examination of the first and second welfare economics theorems would suggest that this need not be the case.

The first theorem of welfare economics sets the criterion of efficiency as its evaluative framework, where a state of affairs is defined as 'Pareto Efficient' if it is the case that compared with it, no one's utility can be raised without reducing someone else's utility' (Sen 1993: 520). As Sen observes, using a Pareto comparison to measure efficiency is only concerned with the matter of efficiency. 'This criterion takes no interest whatsoever in distributional issues, which cannot be addressed without considering conflicts of interest and of preferences. Some further criterion is clearly needed for making social welfare judgements with a greater reach.' (1999: 352). We are free to design a 'Pareto Efficient' system of social security for the non-poor to mitigate the risks of falling into poverty in the presence of uncertain external shocks.

The second theorem of welfare economics, on the other hand, is concerned with matters of distribution and equity. This states that 'every Pareto efficient outcome is a competitive equilibrium at some set of prices and with respect to some initial distribution of a given resource. That is, no matter which Pareto efficient state we specify, it is possible to have a competitive market equilibrium yielding precisely that state, by choosing the initial distribution of resources appropriately.' (Sen 1993: 520). So, under ideal conditions, this theorem would require a radical egalitarian redistribution of resources across the entire population. However, given our contemporary non-ideal circumstances, and the distinct absence of political or social consensus to build towards the first best option, that is, to redistribute assets fairly across the population (land, jobs, company ownership and resource ownership), a second best possible alternative is then to invest in public goods and redistribution via taxation and social protection. Thus, according to these fundamental theorems, although equity is not necessary for Pareto efficiency, Pareto efficiency is necessary for social optimality (Sen, 1993: 520).

[7] It is important to note that the 2011 report does acknowledge the requirement for additional fiscal supports through targeted ODA for countries with the highest dependent populations for a defined period of time. However, how countries would sustain such transfers after this defined period of time is unclea.

This approach seeks to exploit existing inequalities in the distribution of assets and unequal risk exposures to generate an insurance market that mitigates asset loss with Pareto efficient outcomes thereby creating asset security. The institutions required to protect assets/incomes with insurance creates a basis for further social transfers. This suggests building the system from the top and the bottom of stairs simultaneously, thereby using natural inequalities and social advantages to reduce social inequality and increase equity across a much wider population.

An approach to social protection that is solely based on social transfers and not on sustainable contributory funds by households and companies of various forms has the potential to be plagued by inter-state problemswhere the work of what Collier might term 'good states', is undermined by 'bad neighbours'. If the facilities and services in one location are significantly better than another, the possibility of increasing migration could render the instrument unsustainable and unaffordable. Thus, a coordinated approach may be a practical necessity in certain regions.

Further, increased capacity building within states is also required to enable states to underwrite and run sustainable contributory and non-contributorymodels. Moreover, this would present anopportunity for global enterprise and governments to run and support global social protection for all.

There are at least four reasons to explain why a blended global solution would be more appropriate and efficient than a purely domestic solution. (i) There are significant problems for states to sustain social protection and security systems if they have too many young people or too many old people. The global demographic structure provides an opportunity to balance out this inequality to the benefit of all participants. (ii) Given the nature of external and internal shocks, exposure to certain forms of vulnerability is highly concentrated in particular locations. As such, a global solution would fragment the concentration of vulnerabilities and spread the risks across a wider region; (iii) Differentiated global income structures - While an analysis of markets and risk inside countries may lead to partial coverage creating bigger social returns to household income for richer constituencies, the global picture would allow a greater opportunity of full coverage.

Finally, (iv), there are strong political reasons for supporting such an approach. According to research conducted the ILO income inequality, insecurity, and a lack of social insurance and protection mechanisms correlate with higher levels of social and political instability. Such instability has both intra- and inter-state consequences in an interconnected, interdependent world. As such, in the interests of what might be termed the 'enlightened self interest of states', such a solution offers a pathway out of transitory poverty through shared social insurance and towards a sustainable basis for non-contributory social transfers and distributions at the individual and household levels.

On this basis, it can be argued that the opportunity for Pareto efficiencyrequired for socially optimal arrangements is more likely to be achieved in a globalrather than domestic population base. Beginning with contributory instruments, generated through employer and employee social insurance contributions, one can potentially build a system of sustainable social transfers across a global population. Rather than promote a model of Tobin taxes on company profits to fund a global social protection fund, such a fund can be generated by direct contributions from employers and employees. This basic "human" infrastructure coulddrive economic and social development in the same upward direction.

To provide basic social protection for the global population, estimates suggest that this fund would cost approximately 10 per cent of global GDP. This is clearly more ambitious than 0.7 of 1 per cent of GDP which is the target of ODA. However, this is feasible through financial engineering of a social insurance market underwritten by governments. This would represent a substantial shift away from 'business as usual' development solutions that seek to relyon domestic governments to fund social transfers with limited domestic taxation. Rather, the solution proposed here blends public and private sector partnership to protect financial capital and human capital, and develop markets for products in companies and households to invest and save, confident that they are insured against unlucky events.

(IV) Potential objections:

Such a solution immediately gives rise to a range of potential objections such as firstly, that it would reinforce existing inequalities and unequal power structures; secondly, that it would deepen vertical benefits from social security, benefiting the most advantaged; and thirdly, related to these points, that it would lie in conflict with emerging development principles to target the least advantaged and ensure no-one is left behind.

There is insufficient space in this short paper to examine each of these potential objections in the manner required. However, it is important to clarify that the central thesis of the argument presented here is that tackling transitory poverty would provide a basis for investment in more equitable and extensive social protection measures. It is proposed as a solution to the problem of transitory poverty. Additional policies and interventions are then required tackle structural poverty and exclusion, to secure the fair distribution of benefits across a community, and to ensure that no one is left behind. Thus solution need not be inconsistent with the moral principles emerging from the post MDG political dialogue. If the benefits of such a system are appropriated by cooperating states and redistributed to the wider community through appropriate non-contributory schemes targeted at those in structural poverty, then the guiding principle to leave no-one behindcan be achieved and sustained over time.

Conclusion

Internal and external shocks, including economic and environmental shifts, and risks such as ill-health, can affect any individual, household, or population in a non-predictable way, and can lead to loss of livelihood and a decent into poverty. These natural facts of human life give rise to the requirement to develop robust social protection and insurance mechanisms to mitigate the risks of a descent into poverty. Using flow analysis rather than stock analysis, it is clear that attempts to tackle poverty that ignore the dynamic nature of the concept and the exposure of a large proportion of the global population to transitory poverty are likely to fail.

As a solution to the problem of transitory poverty we have argued that a global social insurance framework would produce the most efficient solution to the current status of 5.1 billion people living in conditions of uncertainty and insecurity. By distinguishing between transitory and structural poverty, this solution firstly, seeks to stem fresh inflows from the 'non-poor' into extreme poverty by providing protections against stochastic risks to which all human beings are exposed; secondly it seeks to use efficient outcomes to increase equity through a wider distribution of the gains of this mutual cooperation. This solution uses the power and reach of market-mechanisms to expand the reach of social cooperation and mutual, reciprocal gain through shared arrangements.

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Section 4

Early Childhood Development, Education and Transition to Work

GLOBAL ASSOCIATION
Master's in Development Practice Programs

Sustainable Development Practices: Advancing Evidence-Based Solutions for the Post-2015 Agenda.

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Chapter 10

Project Labdoo.org: Humanitarian Social Networks and Positive Sum Development[1]

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Abstract

With the advent of ubiquitous wireless access to the Internet, computers take an essential role in the fight against global education inequalities. The objective of Labdoo is simple: to provide laptops for every school on the planet so that children can gain free access to sources of education. While this is not a new concept, what differentiates Labdoo from a traditional NGO or other well-known efforts like the One Laptop per Child Program is the approach taken. A key concept behind Labdoo resides on the notion of solving a mission without incurring additional costs, neither economic nor environmental, because the acquisition of such costs implies by definition a disinvestment in other crucial humanitarian aid programs such as the provisioning of food and health care. Three current factors make this idea viable: (1) the massive amounts of excess capacity generated in the developed world; (2) the maturity of our information systems; and (3) the "wealth of networks" or our new capability to break down a very large task into millions of smaller sub-tasks and execute them ad hoc from different parts of the globe [1]. To maximize the gains from each of these factors, the Labdoo Project is built on the notion of a *fully distributed* NGO: instead of building a centralized organization, our effort focuses on building the "social network" tools needed so that every laptop owner on the planet can take upon the "minimission" of bringing his or her own unused laptop to a child. Labdoo is a *humanitarian social network* that operates similarly to other well-known projects such as the Wikipedia except that its objective—instead of being the construction of an encyclopedia—is to help resolve the *education and digital divide* problem. The tasks of bringing well-conditioned but unused laptops to a school are first divided into atomic, indivisible mini-tasks; these mini-tasks or mini-missions are then distributed and implemented by participants around the globe; their result is then organized and coordinated into a global logistical system implemented by the Labdoo humanitarian social network, coalescing each of the mini-tasks together to help deliver a common overall mission. Further, by focusing on *organizing information* and mobilizing excess capacity with *zero opportunity costs*, the Labdoo system can deliver its primary objective without incurring any environmental cost to the Planet (CO2-neutral). In less than three years and from its first seed planted in California, project Labdoo has organically grown to currently support more than 150 schools in more than 60 countries in 5 continents.

Introduction

With the advent of ubiquitous high quality online educational content, computers become an essential tool for reducing global education inequalities. The objective of Labdoo is simple: to provide laptops for every school on the planet so that children can gain free access to sources of education. While this is not a new concept, what differentiates Labdoo from a traditional NGO or other wellknown efforts like the One Laptop per Child Project is the approach taken. A key concept behind Labdoo resides on the notion of solving a global problem without incurring additional costs, neither economic nor environmental, because the acquisition of such costs

[1] Acknowledgments—This work would not have been possible without all the labdooers around the world who carry out all the Labdoo minimissions, whether from home, from work, from school or anywhere. To find out more about each of these small but meaningfully connected stories, go to www.labdoo.org.

implies by definition a disinvestment in other crucial humanitarian aid programs such as the provision of food and health care, or the preservation of the Planet. Three factors make this "nocost approach" viable today: (1) the massive amounts of excess capacity generated in the developed world; (2) the maturity of our information systems; and (3) the "wealth of networks" or our new capability to break down a very large task into millions of smaller subtasks and execute them ad hoc from different parts of the globe. To maximize the gains from each of these factors, the Labdoo Project is built on the notion of a *fully distributed development project*: instead of building a centralized organization, our effort focuses on building the "social network" tools needed so that every laptop owner on the planet can take upon the "minimission" of bringing his or her own unused laptop to a child.

Labdoo is a *humanitarian social network*, sharing some similarities with other wellknown collaborative projects such as the Wikipedia except that its objective is to help reduce the *digital divide* by bringing laptops loaded with educational freesoftware to schools in need. Towards this goal, the task of bringing wellconditioned but unused laptops to schools is divided into smaller minitasks; these minitasks or minimissions are then distributed and implemented by participants around the globe according to their skills and availability. The result is an organized and coordinated global logistical system that delivers laptops to children around the world. By focusing on o*rganizing information* and mobilizing excess capacity with *zero opportunity costs*, the Labdoo system can complete its primary objective without incurring any economic or environmental costs to the Earth (CO2neutral). As a result of this approach, in less than three years Labdoo has supported more than 150 schools in 70 countries found on 5 different continents.

This paper describes the socioeconomic factors that make the Labdoo Project possible and how its implementation can be a model for a new breed of international aid organizations capable of solving global problems using global means in a sustainable manner.

International Aid: Escaping the Zero Sum Game

A core idea central to the Labdoo project is that global problems may be resolved or addressed without incurring any economic or environmental cost. In this paper, we argue that this is a crucial concept in the design of scalable and sustainable aid projects. In the world of international cooperation, an implicit assumption has often been that players (e.g., volunteers, decision makers, investors, beneficiaries, etc.) operate under a *zero sum game* regime; that is to say, that to provide aid to a certain project p^*, one needs to invest a certain amount of resources and, as a consequence, that the same amount of resources need to be disinvested from other projects *p1, p2, …, pn*. For instance, if we invest x dollars in buying a new laptop for a school, then we are implicitly disinvesting x dollars from all other possible aid projects, such as provisioning of food, clean water or medicines. This leads us to what can be referred as the *opportunity cost dilemma*: in international cooperation, what is the optimal basket of aid investments? E.g., what is more important, health care, food provisioning or education? And by what fraction? Do we really need to make such tough choices?

A similar type of argument has been part of a broader debate within the community when assessing the pros and cons of other very wellknown projects that have focused on a traditional, topdown, centralized approach such as the One Laptop per Child Project. While the world continues to retire tens of millions of powerful and wellconditioned laptops every year [1], is allocating a budget of tens of millions of dollars to create a new computer—with all the environmental costs that such approach generates—an optimal strategy?

In Labdoo, we argue that current technological advances can liberate us from having to make such tough choices. Today it is possible to create global organizations that operate under a positivesum game regime—i.e., a regime in which no one of the players are worseoff and at least one player is better off. It is important to note that by players we here mean the set of all benefactors and beneficiaries that are part of all international aid programs, which includes the *Planet Earth player*, as we will elaborate in this paper.

A key design parameter towards the building of a sustainable organization is its degree of decentralization. We argue that *decentralization* is a concept intimately related to the notion of *positivesum game organizations*. We use this design parameter to create a comparative framework between two types of models: the *centralized model*, which for the most part has been the traditional approach to international aid; and the *distributed model*, which we believe is an emerging type of organization that will play a key role toward the design of a new breed of sustainable aid programs. Distributed organizations are in fact not new; for instance, the Wikipedia Project [2] serves as a wellknown example of how a decentralized approach has allowed our society to solve the problem of building and efficiently maintaining a massively large encyclopedia. In this context, the Labdoo Project can be understood as a collaborative framework using the same type of distributed tools, albeit applied to help bring computers to schools around the world without incurring additional costs to the planet or a disinvestment in other crucial aid programs.

Three Pillars for Enabling Sustainable International Projects

The idea of building aid organizations that avoid both economic and environmental costs finds its foundation on the following three factors which, for the first time, hold true:

Affluent Societies. We live in a world in which certain regions are accumulating very large quantities of excess capacity—goods that can still be productive to society but which are left unused. These ever increasing levels of excess capacity are driven by a Schumpeterian process of creative destruction [3], which explains how technology replacement is not driven by the rate of depreciation of the existing technological stock, but rather the creation of new technology that displaces ("destroys") the existing one—for instance, we do not often replace a computer because it is broken but rather because a new product has appeared in the market that is superior in some way to our current one. While not specific to it, the process of creative destruction is especially acute in the case of computers because of Moore's Law's exponential effect, which notes that computing capacity doubles every 18 months [4]. In this paper, we will say that a resource that becomes unused through this process has an opportunity cost equal to zero—equivalently, we will say that it is a *zero opportunity cost (ZOC) resource*—because there is currently no second best alternative to leaving the resource unused.

Information age and timespace constraint resources. Our current stateoftheart technology—e.g. Internet, search engines, geographic information systems (GIS), etc.—allows us to know at practically no marginal cost where the sources of supply and demand are located, and organize such knowledge to make better informed decisions, lowering the economic and environmental costs of our mission. This concept relates to the capability that we as a community have to manage information and, specifically, to pin down the precise location and time where a given ZOC resource appears. We also observe that a large number of resources have an opportunity cost equal to zero not because our technologies are not mature enough to enable their reutilization back into the production system but rather because we do not know with precision their location and time availability. Consider the following example. A volunteer located in a country c1 would love to perform some volunteering work for a humanitarian cause in any other country, offering to carry out a certain task w at time t; an NGO is involved in a humanitarian mission in a country c_2 requiring the implementation of a certain set of tasks which includes w; if the NGO cannot pin down the location of the volunteer before time t, then such potential resource will remain unused. In our work, we will say that a resource is *time space constrained* if its activation depends on our capability to know with precision the time and location at which such resource is available.

Wealth of networks. In his work about *com monsbased peer production systems* [5], the economist Yochai Benkler explains how the current stateoftheart technology allows us for the first time to resolve large problems by dividing them into millions of very small tasks. In some cases these tasks are so small that their opportunity cost becomes negligible. As argued by Luis von Ahn [6], before the information age era, none of humanity's largescale achievements—such as the construction of the pyramids of Egypt, building the Panama Canal, or putting a man on the moon—employed more than 100,000 people. With the arrival of the Internet, we have managed to overcome that limit. Projects like von Ahn's reCAPTCHA (the distorted text images used to enable a secure login access used today in more than 200,000 websites) help digitize at no additional cost about 2.5

million books a year and employ about 750 million people from around the word, each contributing 10 seconds of work at a time to help digitize a single word—See [6]. Because the primary function of the reCAPTCHA system is to provide a secure login mechanism, the opportunity cost of each of the word digitization tasks is zero.

Next we will see how each of these three factors can be combined towards the implementation of a sustainable international aid project.

Applying the Wealth of a Network to Bridge the Digital Divide

We argue that from an operational perspective, the problem of reducing the digital divide is very similar to that of writing an encyclopedia such as Wikipedia. While the approach taken by traditional publishers is based on a centralized model—employing a small group of experts each one dedicated to the writing of a large portion of the encyclopedia—, the approach taken by Wikipedia.org can be understood as the reverse to this *centralized model*, relying on a large number of authors each making small contributions (a single article or small adjustments to an article) [2].

This new way of approaching a problem has revolutionized in three dimensions the intrinsic nature of the solutions we are now capable of articulating: projects can be executed faster, at a higher quality, and at a much lower cost. This and other examples [2] demonstrate that there is a class of problems which are better solved by employing a very large number of very small and highly distributed resources, rather than a set of few, large and concentrated resources. In the sections that follow, we will argue that the digital divide belongs to such class of problems.

Building Metagoods, Rather than the Goods Themselves

Suppose that we have a task *t* to carry out. Such task produces an outcome or good *g* which depends on the amount of resources *r* that are available. We observe that there are two ways to carry out task *t*:

- Approach A: We can employ resources r to directly produce *g* or

- Approach B: We can employ resources r to produce first an "intermediary good" that others can use to produce *g*.

There are many examples of projects that have migrated from approach A to approach B; in fact, means of production tend to be in a constant path of migration from A to B, what could also be referred as a process of virtualization of the means of production. For instance, in the automobile industry, cars were first assembled manually, with each worker building one car at a time. With the invention of Ford's assembly line, cars were then produced using tools (or intermediary goods) that made the production system so efficient that for the first time they could be sold at affordable prices to middle class people. In programming languages, computer scientists use the concept of functions and application programming interfaces (API) to implement certain components of a program in a way that others can reuse them without the need to reimplement the whole program.

Concepts like Ford's assembly line, the Internet, or programming APIs, can be considered as goods of special kind, because their function is not to fulfill a final need, but rather to provide the means to produce other goods that fulfill such needs in a much more efficient way. We can call them intermediary goods or metagoods.

If metagoods are helping us unlock the true potential of our society, we could ask ourselves "what meta-goods are needed to solve the digital divide problem?"

The Wealth of Networks, MiniMissions and Drops of Goodwill

Ideas and technologies have the peculiarity of being cumulative—they build on previous ones, and once invented, they cannot be uninvented. This macrotrend is a conduit of other smaller and equally irreversible drivers, one of which has revolutionized the twentyfirst century production systems: as we invent more technologies, our capability to divide tasks into smaller and smaller subtasks increases. Wikipedia, reCAPTCHA or the Linux projects [2] provide examples of such phenomenon. While in the past the capability of writing an encyclopedia or an operating system was only in the hands of large governments and corporations, now thanks to technology we can carry out such large projects by dividing them into a very large number of small subtasks, each carried out by a very small resource.

The extent to which a community or society can divide projects into smaller tasks defines in good degree its capability to undertake and resolve certain problems. This is because of the following simple principle: a resource *r* cannot resolve any task that requires more than *r* resources, but it can resolve tasks requiring up to *r* resources. For instance, suppose that a volunteer can offer one hour of his or her time to help a humanitarian cause. Among all the potential causes, the volunteer would be able to contribute in those projects that have subtasks requiring up to one hour of volunteering work, but not in those for which all subtasks require more than one hour of work. If there is no humanitarian cause with subtasks smaller or equal to one hour, then that volunteer (the resource) will go underutilized. We can say that such resource is l*ocked or wasted* due to our inability to divide a large task into small enough subtasks. Based on this principle, we can then argue that throughout history, to the extent that we have not been able to divide tasks into small enough subtasks, many potential resources have been wasted, deadlocking the real intrinsic

potential that we as a society have to solve problems. As technology evolves, our capability to divide tasks into smaller and smaller subtasks increases, and this allows us to unlock massive amounts of potential resources that otherwise would have remained dormant.

Metagoods such as real time communication and distributed computing have empowered us with an unprecedented capability to divide tasks into nearly arbitrarily small subtasks, allowing us to solve large and challenging projects—such as the writing of the Wikipedia, the development of the Linux operating system or the digitization of books using reCAPTCHA—in a very costeffective manner. As demonstrated by these powerful examples, if the key to unlock the true potential of our community in resolving large problems is the size of the smallest indivisible subtask, then when designing an efficient solution for the digital divide problem we ought to ask ourselves: what are the *smallest, atomic and indivisible sub-tasks* that need to be carried out to overcome our challenge?

We apply this basic framework to the problem of bringing a large quantity of laptops to children and argue that the following four atomic and indivisible subtasks or elements are required to bring a laptop to a child:

(AT1) *Unused laptop*. An unused laptop has to be first donated.

(AT2) *Sanitization*. The laptop has to be sanitized and loaded with the education software.

(AT3) *Storage/inventory*. Because supply and demand are not perfectly synchronized, storage is needed to keep the laptop while it waits for demand.

(AT4) *Shipment*. The laptop has to be shipped to a school.

A traditional approach would implement all the tasks above in a centralized manner, preventing us from unlocking the real potential of our community. The wealth of networks principle [5], instead, says that network effect gains can be maximized by (1) identifying first the smallest indivisible subtasks (in our case, AT1 through AT4) and (2) carrying them out in a distributed manner, unlocking small resources wherever and whenever they

are available. From this perspective, Labdoo can be understood as a distributed platform to efficiently resolve the problem of sanitizing and bringing large amounts of laptops from one place to another leveraging a very large number of "drops of goodwill" (small volunteering actions performed asynchronously from anywhere and coordinated through the network) and without imposing any additional costs to the planet. We will elaborate more on the issue of cost in the following section.

Zero Opportunity Cost Resources and Sustainable Organizations

How can we most efficiently execute tasks AT1, AT2, AT3 and AT4 at a large scale? A traditional approach would typically work as follows: we would first create a nonprofit organization to set the legal and operational ground of our project; next, we would collect funds from investors and friends to pay for its operational costs; with the funding, we would recruit volunteers and employees to execute the project logistics; for the transportation of the laptops, we would probably purchase services from an international shipping company and ship the laptops in large batches using containers; finally, the laptops would be deployed in their final destination.

The traditional approach leads us to the question of the opportunity cost. As argued earlier, if we invest money and new resources from the Planet to carry out our mission, then by definition we are implicitly disinvesting the same amount of resources in all other possible aid projects, taking us to the zerosum regime.

The key to enabling *positive sum development* is to focus on a new generation of innovative ideas and

technologies that allow us to leverage the three factors—excess capacity, information systems, and the wealth of networks. When applied to our mission, this is how each of the atomic tasks can be resolved:

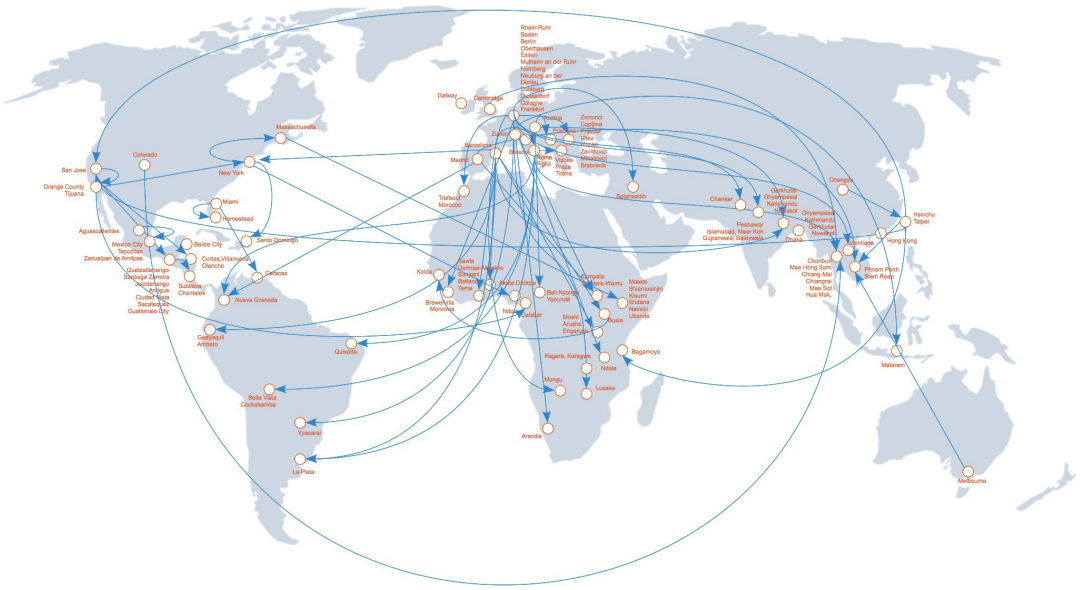
AT1: Instead of buying or building new laptops (which would lead to both an economic and environmental cost), Labdoo relies on unused but wellconditioned laptops. The world currently produces and sells more than 200 million laptops a year [1], which implies that every year tens of millions of laptops are replaced by new ones and left unused, becoming a resource with a zero opportunity cost.

AT2: The process of sanitizing a laptop leverages the "wealth of networks" to decompose the problem into small actions, small enough to be carried out in an ad hoc unsynchronized manner from any place and at any time, at no cost, and out of goodwill. For that, Labdoo provides the tools so that each laptop owner can sanitize his or her own laptop. (It takes about 45 minutes to sanitize a laptop.) We consider this task to be so small that it is costfree; in fact, we argue that it actually brings a net benefit to laptop owners participating in the program as they earn the experience of being part of the solution to a global problem.

AT3: Since supply and demand are not perfectly synchronized, a centralized NGO would require a large warehouse to store all the laptops in stock. Instead, Labdoo uses social networking tools to coordinate a distributed network of very small inventories provided by drawers and closets located at the homes and work offices of each participating laptop owner. In this way, laptops remain in people's homes until demand kicks in, minimizing the need for large centralized inventories.

AT4: The transportation of a large number of laptops following a traditional approach imposes also both an economic cost (the cost of the shipment) and an environmental cost (since the shipment generates new CO2 emissions to the atmosphere). To avoid such costs, Labdoo has developed another social networkbased tool called *dootrips* designed to help pin down and coordinate *time space constrained* traveling resources. In a dootrip, volunteers traveling to remote locations first register their trip in the Labdoo social network. The dootrip engine makes optimal routing calculations and assigns laptops to travellers. Travellers then carry the laptops in their own luggage. Since travellers need to carry out such trips regardless of project Labdoo, dootrips allow us to effectively transport computers internationally without incurring any additional costs to the Planet. See Figure 1 for an illustration of some of the CO2neutral routes used within the Labdoo social network.

Figure 1. CO2neutral routes used by Labdoo to bring laptops to schools using the Dootrip system



Gains From the Humanitarian Social Network

A recurring question at Labdoo is the value that the new distributed approach brings to the global community. In a centralized approach, it can be easier to quantify the impact of a project because each contribution is carried out within a confined team of volunteers. Measuring the value created by Labdoo can be more complex because being a fully distributed, networked project, it is more likely to impact the global community in ways that may be less obvious. For instance, does the global approach taken by Labdoo helps us gain a higher level of global awareness and hence make our world more or less efficient, sustainable or safe in a certain way? In the next two sections, we explain two types of gains that can be attributed to the distributed approach.

Helping Organize the Planet's Information

Labdoo is contributing in one practical area in which a traditional centralized approach would have little or no impact with: organizing the "planet's information". In particular, thanks to its highly distributed and networked approach, Labdoo allows us to know in a finegrained precision:

- The location of the sources of demand for laptops. What schools need laptops?
- The location of the sources of supply for laptops. Who has unused laptops that can be mobilized?
- The location and time availability of the distributed inventory. What rooms, drawers and closets are available to store laptops while they wait for demand to kick in?
- The location and time availability of the volunteers. Who has 45 minutes to sanitize a laptop?
- The location and time availability of dootrips. Which travellers can bring laptops in their luggage?

The task of organizing the world's information, while seemingly abstract, is no different than many of the common tasks we usually do on a daytoday basis. Consider for instance a family spending Saturday morning tidying up their home. Besides making home a prettier and more pleasant place to live, the main economic value of organizing one's place is efficiency. A home that is wellorganized will allow us to find things in a much faster way, helping us to carry out our tasks more efficiently. Similarly, at a global level, knowing with precision where our needs and resources are located ultimately helps us make better informed decisions and, as a result, it helps us deliver our mission in a more sustainable way.

From Crisis to Opportunity: The Destination or the Path

Let p be a social problem that our community aims at resolving and let a be an approach that guarantees the solution of p. Assume that γp corresponds to the gains our society derives from solving problem p. Because the approach itself can bring other indirect benefits—for instance, the learning of certain skills that are useful to address other future problems—we will use the term γa to refer to the collateral gains derived from taking approach a. We first observe that there exists a certain class of problems for which $\gamma a >> \gamma p$. Consider a project like bringing the first man to the moon. Since there is little benefit one can gain from traveling to a place where humans cannot breathe, with no water and with barely any practical energy resources, the social benefits of the objective are limited, so γp is small. On the other hand, by striving to attain a challenging objective, some of the most important inventions of the twentieth century were made, such as new hardware and software components that were later key for the invention of the Internet or space technology that helped launch the international satellite system. Even more important may be other more intangible gains derived from the project, such as an increase in society's optimism and the strengthening of communitybased collaboration, which contributed to stability and prosperity.

We argue that there exists a set of global problems that satisfy this property too ($\gamma a >> \gamma p$). Consider the problem of bringing education opportunities globally by deploying laptops to schools, and assume two approaches: a' is a traditional, centralized, topdown approach; and a" is a decentralized, grassrootsbased approach. We argue that the centralized approach, based on a reduced group of people performing all the necessary tasks in a confined geographical space, leads to low spillover community effects, and therefore enjoys a relatively low $\gamma_{a'}$. On the other hand, by allowing every person on the planet to be part of the solution, sharing information, culture, skills and united by a common global objective, approach a_2 helps unlock largescale community gains. Consider the case of Labdoo, the diversity of people collaborating towards a common global objective includes:

- *Diversity across nations and races*. People from the United States, Mexico, Taiwan, Germany, Italy, Guatemala, Kenya, Switzerland, Nepal, Spain and a large list including more than 70 countries, from all possible races and religions, all connected using a common communication platform and united by the same goal of bringing education to children in other countries, sharing experiences, learning about the global challenges we face, jointly coordinating the logistics of sanitizing and bringing laptops loaded with education software to schools in need in a sustainable manner, and building a community that centers around the values of mutual respect amongst each other and towards the planet that sustains us.

- *Diversity across gender and age groups*. Because the shared global mission is decomposed into a diverse set of a very large number of minimissions, there exists a Labdoo task that fits practically every person on the planet. Labdoo hubs—nodes within the Labdoo humanitarian network where people group together to carry out minimissions—are being created at homes, at universities, at work office spaces (both forprofit and nonprofit organizations), and even at high schools, with volunteers coming from the four age groups (teenagers, adults, middle age and the elderly) and including both genders.

We argue that the benefits derived from "how the problem is solved" (γ_a) surpass those of "what is being solved" (γ_p). That is, the *how* becomes more important than the *what*. As in many things in life, it is the path we choose that helps us grow, more than reaching a destination. Using our notation, we have that $\gamma_{a"} >> \gamma_{a'}$ and $\gamma a" >> \gamma_p$.

Approaching a global problem using a decentralized, grassroots approach generates collateral social gains that are intimately connected to the problems of long term stability and peace amongst nations and the sustainability of our Planet. From this perspective, because there may be no other global challenges capable of inducing such largescale social gains γ_a , one can make the argument that taking a topdown centralized

approach monopolizing the logistical means of the solution leads to an outcome with a very large opportunity cost: the cost of solving the challenge without inducing any collateral social gains γ_a .

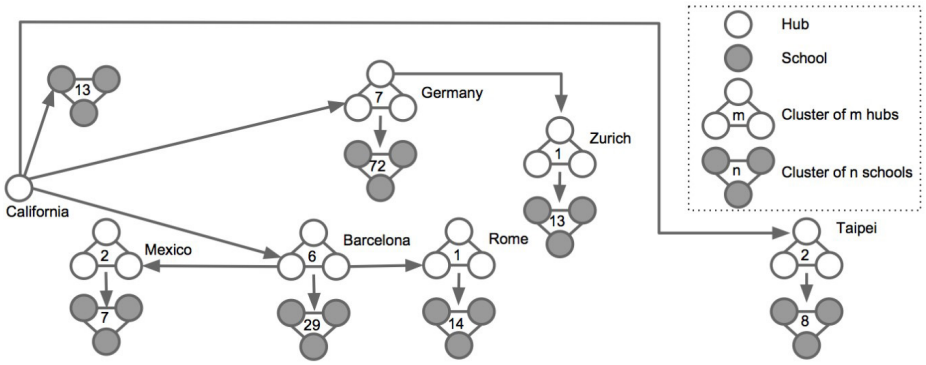
A Grassroots 2.0 Movement: Brief StudyCase Stories

A description of how project Labdoo was created and unfolded in its early stages can help explain how the humanitarian social network operates and how community collaboration can be constructed when it is aligned towards a common objective.

Labdoo has its initial roots at the University of California, where the idea of creating a humanitarian social network that would use techniques similar to those employed by projects like Wikipedia or reCAPTCHA—albeit applied to the problem of bringing education to children—first emerged. The first steps involved the programming of the social network itself (while already operational, the Labdoo.org social network is still being heavily programmed) and the planting of the first seed at the university. Being literate in the field of computer science, programming was performed by the founders themselves. The Labdoo social network consists mainly of an online dashboard space which allows users to carry out their mini-missions. Among other functions, the dashboard describes each of the steps that users need to do,

provides the tools to tag each laptop with a unique 9-digit ID and QR code (which are used to help organize global information and track the laptop as it makes progress to a school) and to manage each user's inventory, provides Google maps to help visualize the status of each of the projects and mini-missions, allows users to communicate with each other to help coordinate the mini-missions via wall-like or chat-based interfaces, and provides tools to check deployed inventories and rescue broken laptops for their future recycling to help minimize electronic waste.

Figure 2. Examples of some of the connectivity paths within the Labdoo humanitarian network leading to the creation of operational hubs and school projects



From that first operational seed planted in California (what today we call a Labdoo hub), the first laptops were sanitized and transported to schools in need using the first dootrips. Today this first hub is servicing laptops to 13 schools in 7 different countries. Word of mouth amongst friends lead to the creation of two hubs abroad, one in Taipei in collaborations with Engineers Without Borders Taiwan and another in Barcelona at the university. These hubs replicated the work done in the California hub by using the tools in the social network and by pulling from their local resources. The Barcelona hub went on to create five more local hubs, one at another university and four more at various local high schools where students at the ages of 14 through 17 help to carry out the mini-missions. Today these hubs are providing laptops to 29 schools in 11 different countries. The Taipei hub went on to spun off a second hub in Hsinchu, and together the two hubs are today servicing 8 schools in 4 different countries. In a technology venue, the California hub was interviewed by a German journalist, who published an article in a local newspaper in the town of Muelheim. A retired man with a background

in business picked up the article and decided to create his own hub. Besides translating Labdoo to German, using his connections, he started mobilizing unused laptops in his local area and deploying them to schools using the dootrip system. That first hub in Muelheim was followed by 6 other hubs (Berlin, Frankfurt, Baden, Nuremberg, Emsland and Neuburg) and today the 7 hubs in Germany are servicing 72 schools in 21 countries. In parallel, a good friend of the founder of the German hub decided to create his own hub in Zurich. After a year of operations, this hub has now multiple branches around the city of Zurich and is servicing 14 schools in 10 different countries. Word of mouth also spread from Barcelona, and a friend of a friend living in Rome decided to create her own hub. She works for an international development organization and her coworkers are constantly traveling to the developing world; hence she is leveraging her network to generate her own CO-2 neutral dootrips. Her hub is currently supporting 14 schools in 10 different countries. In parallel, a university professor who volunteers for Labdoo in Barcelona, explained the story to his students. One of his students was from Mexico who, upon completing his Master's degree in Barcelona and returning back home, started his own hub in Mexico City by teaming up with two former collage friends. With time, a second hub spun off in the town of Tepoztlán. Together the two hubs are currently servicing 7 schools in the country of Mexico.

These are only some of the stories that illustrate the unfolding of project Labdoo. At the time of this writing, there exist 38 hubs spread in five continents (America, Africa, Asia, Europe and Australia), servicing a total of 168 schools with Labdoo mini-missions taking place in 77 different countries. The social network has been translated to eight different languages (Catalan, traditional and simplified Chinese, English, French, German, Italian, and Spanish) and is currently being translated to three more languages (Arabic, Japanese and Russian). All this collaborative work has been done using CO2-neutral actions and with zero funding.

Conclusions

New technological advances are empowering us with an unprecedented capability to take on global challenges. The key resides in our new capacity to divide very large tasks into a very large number of very small subtasks. This allows us to unlock resources around the globe that up until now had been dormant, effectively elevating the capacity that we as a society have to undertake such challenges.

We use these new technological advances to the design and implementation of a new type of humanitarian social network (HSN) organization. Unlike the traditional NGOs which are based on a centralized model, we use a fully decentralized model unlocking volunteers from all around the globe and enabling them to make ad hoc contributions by carrying out well-defined mini-tasks. We apply this model to the challenge of bridging the digital divide and take on the mission of providing a laptop for every child on the planet. The distributed framework tells us that the key to deliver such large mission resides in identifying the smallest indivisible tasks that can be executed in parallel (atomic tasks). In our simplified model, we identify four atomic tasks required to accomplish the global mission: (AT1) laptop donation, (AT2) laptop sanitation, (AT3) inventory management and (AT4) laptop transportation.

Our proposal to fight the digital divide works as follows. Instead of building centralized NGOs, we can use a humanitarian social network to enable every person on the planet to participate by making a small hands-on contribution leveraging large amounts of available excess capacity while avoiding any damaging to the Planet. The contribution consists in using the Labdoo tools and spend one hour of our time to help condition and bring our unused laptop to a child. At Labdoo, every laptop has a story. In fact, chances are good that you are reading this article from a laptop; so what will be your laptop's story?

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Section 5

Health for All

GLOBAL ASSOCIATION
Master's in Development Practice Programs

Sustainable Development Practices: Advancing Evidence-Based Solutions for the Post-2015 Agenda.

Proceedings of the 2013 International Conference on Sustainable Development Practice

Chapter 11

Sustainable solutions to control Typhoid: development and production of affordable and effective conjugate vaccines

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Abstract

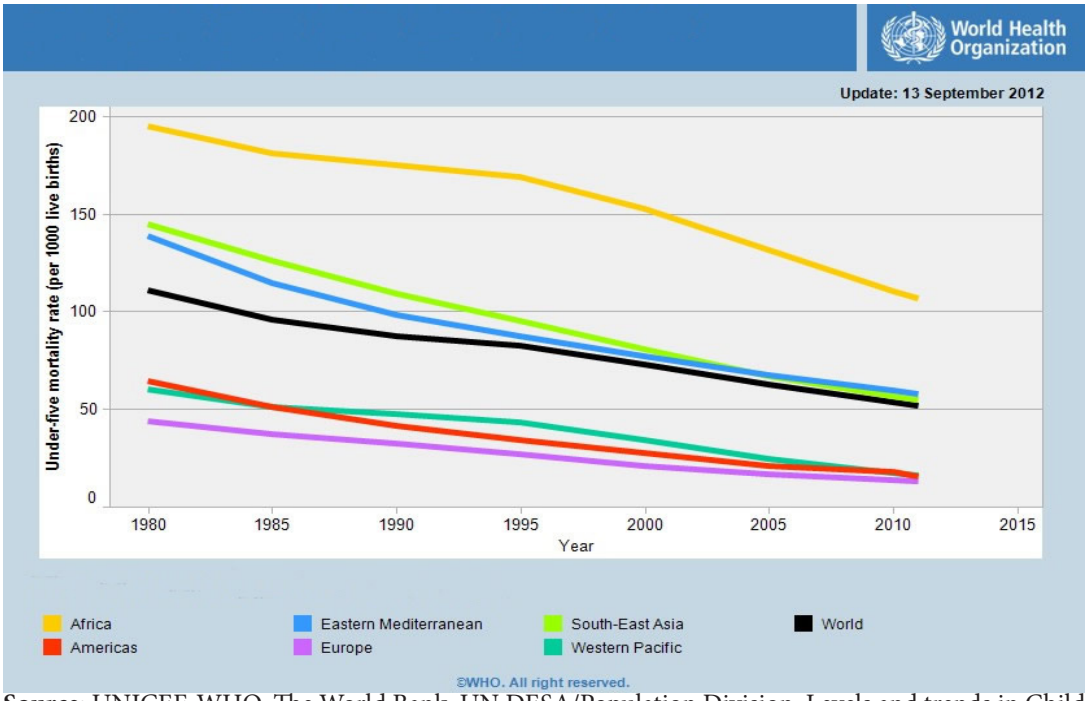
The incidence of childhood infectious diseases has declined over the past two decades thanks to public health interventions supported by WHO, GAVI, the Bill & Melinda Gates Foundation and the UN. However, infant mortality due to Enteric and Diarrheal Diseases (EDD), accounting for 25% of deaths in children under five, remains unacceptable. Typhoid is an issue predominant in low-income countries (LICs) where this neglected disease support the cycle of poverty due to acute attacks, sequellae and malnutrition, hindering a child's physical and mental growth. In a recent report from the Lancet (V:380), Murray et al showed how in the two major infectious disease areas killing 50% of children less than 5 (EDD and LRI), Typhoid fever is the only one to have increased by 40% in the last 20 years (in the Global Burden of Disease all Mortality data) and the cause of at least 200,000 deaths per year worldwide. The disease, caused by increasingly multi-drug resistant Salmonella Typhi, has become widespread in Africa and Southeast Asia. Unfortunately, there are no adequate and simple diagnostic tools for Typhi, leading to poor diagnosis and underestimates of the burden of disease. In highly endemic areas such as the slums of Dhaka, the peak age of death is children under two. This age class has remained unprotected by the two (live oral and injectable unconjugated polysaccharide) vaccines available, which are not effective or indicated for use in young children and have only modest efficacy and longevity in older children and adults. These shortcomings can be overcome through the manufacturing process of conjugation, making vaccines effective in this vulnerable population. Conjugated vaccines are in principle expensive and hard to manufacture in LICs and therefore not viable for large-scale production and elimination of the disease. However, the NVGH has introduced cost-saving, innovative technical and sustainable processes, both in the fermentation of the polysaccharide and in the conjugation technology applied to a new Typhoid vaccine. The vaccine has just finished the Phase II studies in endemic countries (India, Pakistan and the Philippines), and results indicate that it is safe and immunogenic in young children generating a significantly higher antibody response in older children and adults that the currently available unconjugated polysaccharide vaccine. The vision is to transfer the development process to endemic country manufacturers making it a concrete and viable solution to eliminate Typhoid, in all age groups in LICs. These collaboration and innovative approaches will allow for the first time in history the production and manufacturing of an innovative vaccine directly in those countries where burden of disease is highest. This evidence-based solution can be affordable and sustainable for introduction into the EPI schedule, in time for GAVI's 2017 objective to initiate the global fight against Typhi. With this aim in mind, the Fondazione Sclavo commits to the procurement of resources needed for the last effort: correct technology transfer, Phase III studies and Advanced Market Commitment through GAVI and other donors, necessary to achieve adequate production capacity for the needed doses at an affordable cost.

Rationale

According to the WHO in 2011 6.9 million children died before reaching their fifth birthday; almost all (99%) of these deaths occurred in low- and middle-income countries (LICs and MICs). Sub-Saharan Africa and Southern Asia accounted for 5.7 million of the 6.9 million deaths in children under five worldwide: 83% of the global total in 2011, up from 69% in 1990 (1).

Therefore, despite the overall decrease, children's mortality in developing countries remains at unacceptable levels (Fig.1).

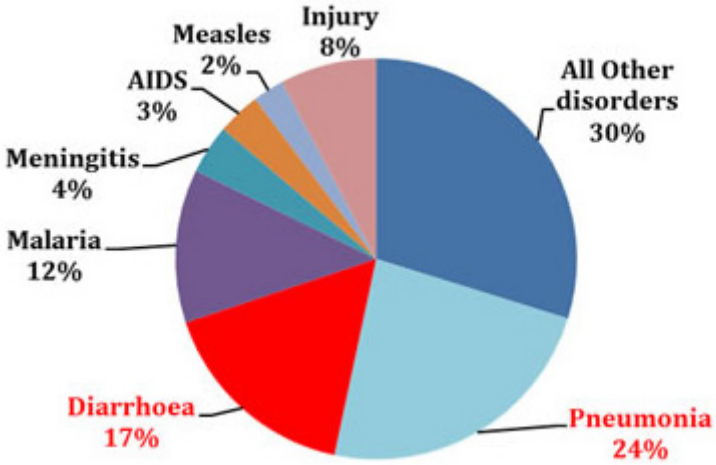
Figure 1. Trend in under-five mortality rate (per 1000 live birth). Globally and by WHO region, 1980-2011 (2).



Source: UNICEF, WHO, The World Bank, UN DESA/Population Division. Levels and trends in Child Mortality - Report 2012. UNICEF, 2012

Infant mortality due to lower respiratory infections and diarrheal diseases in developing countries have been estimated to make up to 29% of the total number of deaths in children under age 5 and at 41% of deaths in children 1 to 59 months of age (3,4).

Figure 2. Enteric and diarrheal diseases account for 17% of deaths in children aged 1 -59 months (3,4).

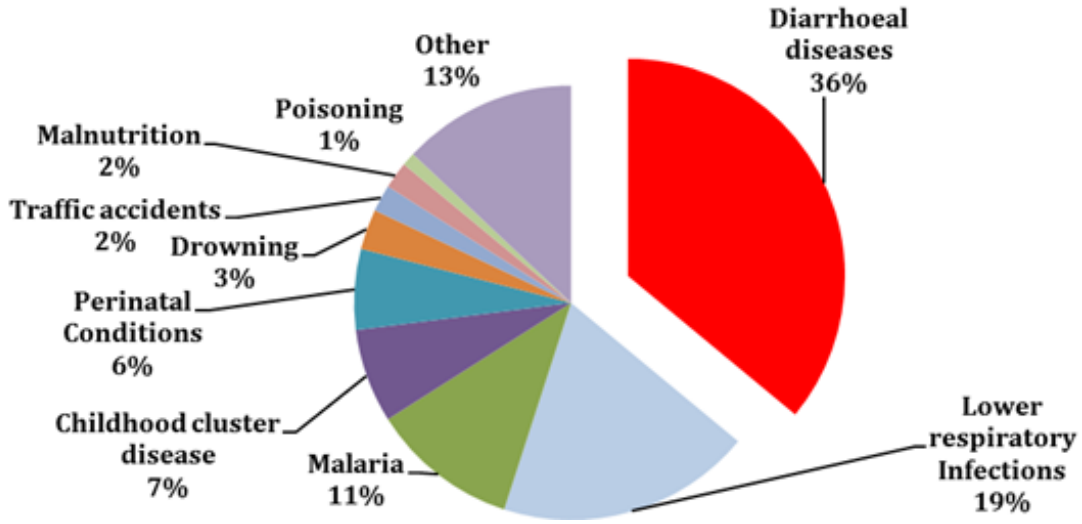


The reduction of mortality in children less than five years of age (5) will require key effective and affordable interventions such as: care for newborns and their mothers, infant and young child feeding, vaccines, prevention and case management of infectious diseases (pneumonia, diarrhea sepsis, malaria, and HIV/AIDS).

In countries with high infant mortality, these interventions could reduce the number of deaths by more than half (6).

Thanks to public health interventions supported by WHO, GAVI, the Bill & Melinda Gates Foundation and the UN's Millennium Development Goals (MDG), the incidence of childhood infectious diseases has declined over the past two decades; however the number of vaccine- preventable deaths in infants remains unacceptable. Enteric and diarrheal diseases rank first for environmental burden of disease mainly for infants and children which may be protected effectively through vaccination. An estimated 94% of the diarrheal burden of disease is attributable to environmental factors (Fig. 3) (7,8).

Figure 3. Main diseases contributing to the environmental burden of disease among children o-14 years in DALYs (7,8).



According to the Bill and Melinda Gates Foundation, enteric and diarrheal diseases are a major cause of childhood death in the developing world, killing nearly 1 million children under age 5 each year. For those who survive these illnesses including rotavirus, typhoid and cholera, repeated episodes of severe diarrhea in the early years of life can lead to serious, lifelong health problems: malnutrition, stunted growth and impaired cognitive development. This means diminished work opportunities and productivity over a lifetime for millions of people (9). The fact that infections with specific enteropathogens lead to malnutrition by causing intestinal inflammation and/or by altering the barrier and adsorptive functions of the gut has also currently been substantiated by Interactions of Malnutrition & Enteric Infections: Consequences for Child Health and Development project (MAL-ED).

Enteric fever is a systemic disease caused by *Salmonella enterica* serotype Typhi; other *Salmonella enterica* serovars cause similar diseases. In 2000, Crump et al estimated the burden of disease of typhoid fever to be approximately 22 million cases and 216,000 related deaths per year (10). In reality the burden of typhoid fever is most likely underestimated due to the difficulty of diagnosing it from other febrile illnesses, the infrequency of appropriate confirmatory laboratory testing, the reliance in many countries on private health care providers or on self-treatment with antibiotics, and the sporadic disease-reporting systems in many developing countries. (11)

More recently, a report from the Lancet by Murray *et al* provided epidemiological evidence that two major classes of infectious diseases, enteric and diarrheal diseases and lower respiratory infections are killing 50% of children less than 5 years of age. Within these two major classes, typhoid fever is the only disease to have increased by 40% in the last 20 years as measured by Global Burden of Disease, all Mortality data (Table 1) (12,13).

Table 1. Typhoid is the only disease among the two major categories of lower respiratory infections and enteric and diarrheal diseases increasing over the past 20 years (12,13).

Global Burd.of Dis.	Mortality, all causes ('000)[13]				All ages DALYs (MM)[12]			
	1990	2010	trend	Δ	1990	2010	trend	Δ
Total L.R.I.	3.415	2.814	↓	-18%	206	115	↓↓	-44%
Pneumococcus	858	827	↓	-4%	43	27	↓↓	-37%
Hib	607	380	↓↓	-37%	44	21	↓↓	-52%
RSV	534	253	↓↓	-53%	45	20	↓↓	-55%
Total E.D.D.	2.623	1.636	↓↓	-38%	193	102	↓↓	-47%
Typhoid	136	190	↑↑	+40%	9	12	↑↑	+32%
Rotavirus	523	250	↓↓	-52%	42	19	↓↓	-56%
Shighellosis	194	123	↓↓	-37%	14	7	↓↓	-48%

In developing countries the incidence of typhoid is highest in infants and children below 2 years of age, pointing to the fact that typhoid causes serious disease in these age groups for which there was no specific vaccine available for active immunization: children 5 years or younger have a case-fatality rate ten times higher than older children (4.0% vs. 0.4%) making specifically typhoid one of the major contributors to mortality of children under 5 years of age (14).

Several studies have shown high incidence of typhoid in infants and children below 2 years of age, pointing to the fact that typhoid causes serious disease in infants for which there was no specific vaccine available for active immunization:

- Sinha, A. *et al.*(1999) reported in the Delhi area, the highest number of typhoid cases in children below 5 years (27.3%) compared to 11.7% in 5-19 years and 1.1% in 14-40 years age group.
- Saha, M.R. *et al.*(2003) in the Kolkata area reported that children between 2-3 years age group are the most susceptible(35.6%).
- Saha, S.K., Baqui, A.H. *et al.*(2001) reported in Bangladesh that the majority (54.5%) of culture positive typhoid cases were from children younger than 5 years. Out of these 27% were in the first two years of life (0-5 months=0.8%, 6-12 months=8.7%, 13-24 months=17.5%) .

The death rate and burden of disease for typhoid are comparable or higher to the estimated number of deaths or burden of disease in terms of DALYs caused by other infections (12,13). Typhoid fever has largely been neglected (11) while there has been considerable international consensus, for example, on introducing worldwide vaccines against pneumococcal and meningococcal A meningitis, Japanese Encephalitis and HPV causing cervical cancer.

Vaccination with available polysaccharide vaccines has not gained wide support, most likely because they appear not to confer significant protection to children under 5 years of age, who carry the brunt of the disease in LICs (15).

More importantly and differently from the diseases mentioned above, there was no conjugate vaccine against typhoid effective under 5 years of age developed for use in western countries that could be used in all age classes in LICs. In fact the burden of typhoid fever has virtually been eliminated in industrialized countries

after over a century of improvements in sanitation and water systems, and therefore such a vaccine would have limited market potential in these territories.

Another cause may have been the introduction, several decades ago, of relatively inexpensive antibiotics that were important in the initial reduction of typhoid-related deaths. (16) However, these drugs have become ineffective, due to increasingly multi-drug resistant S. Typhi, in South/Southeast Asia and Africa (17).

Therefore, new collaboration models and public health interventions were necessary to bypass this market failure.

Objective

The objective of this project has been to create a new business model for the development, production and implementation of a new typhoid conjugate vaccine which will be made available immediately to countries with the majority of disease burden, representing a new major solution to fight this neglected disease and children's morbidity and mortality .

Several disease in the past years have declined due to a series of public health interventions targeted to stop the transmission of the pathogen by altering the conditions favorable to its growth or treating the disease itself. These interventions can be classified as:

i) environmental,
ii) nutrition,
iii) vaccines,
iv) treatment (18).

Integrated strategies such as these, with all four interventions, should be implemented in order to eliminate diseases that are largely present in the environment like typhoid (7,8). However, needed improvements in sanitation and water systems in LICs, although necessary, will require very large investments and will be unlikely to reach slums and other high-risk areas in developing countries for many years to come (11).

Various international organizations and expert groups have defined vaccines as the most effective tools to reduce child mortality and save over 2.5 M lives every year (19). Vaccines are an important component of an integrated strategy against diseases that afflict communities in LICs. In 2008 the WHO stated that "*Vaccination makes good economic sense, and meets the need to care for the weakest members of societies. Reducing global child mortality by facilitating universal access to safe vaccines of proven efficacy is a moral obligation for the international community as it is a human right for every individual to have the opportunity to live a healthier and fuller life.*" (20).

The solution beyond typhoid vaccines not efficacious in infants (15) are conjugate vaccines that have been proven to stimulate a robust immune response also in infants. Conjugation technology allows the linkage of purified polysaccharides from bacteria to a strongly immunogenic "carrier" protein. These conjugate vaccines are designed to protect infants by stimulating the immune response and creating immunological memory in the antigen. The vaccine induced immunity can thus be boosted by subsequent vaccination or by exposure to the pathogen itself (21).

Additionally, conjugate vaccines have been shown to provide "herd immunity" which occurs when the vaccination of a significant portion of a population (or herd) provides a measure of protection for individuals who have not developed immunity. For example, the introduction of pneumococcal conjugate vaccines has

dramatically reduced the incidence of invasive pneumococcal disease both in the USA (22) and in developing countries through the efforts of GAVI (23). Conjugate vaccines are therefore a solution to reduce infant mortality, as stated by GAVI : "*The November 2011 Board confirmed its earlier decision to not open support for a typhoid vaccine until an appropriate conjugate vaccine has been developed. The Board also noted that the Alliance looks forward to the development of an appropriate conjugate vaccine. A polysaccharide typhoid vaccine does exist. But its duration of protection is not clear*" (24).

In September 2011, GAVI reiterated its support for typhoid Vi conjugate vaccines at the Program and Planning Committee (PPC) meeting.

It is generally believed that conjugate vaccines are in principle expensive and difficult to manufacture and therefore are not viable for large-scale production and prevention of the disease especially in LIC. Historically, it takes 15-20 years for new vaccines to be introduced and likely even longer to be made available to children in developing countries (25).

In the case of the pneumococcal conjugate vaccine, with the intervention of the PneumoADIP (*Pneumococcal vaccines Accelerated Development and Introduction Plan*) initiative funded with a USD 30M GAVI grant, the time needed to introduce the vaccine was reduced to 9-10 years. The product was first launched in the US in 2000 and then in other western countries, in order to partially recover the initial investment, and finally introduced in LICs starting in 2009-2010.

As typhoid conjugate vaccines have very limited market potential in developed countries, the solution used for pneumococcal conjugate vaccines was not viable, and therefore they have received minimal attention and little R&D funding worldwide. According to the 2012 G-Finder Report, total R&D expenditure for all *Salmonella* infections in 2011 (including basic research, drugs, diagnostics and vaccines) amounted to USD 44M, accounting for 1.5% of the annual funding for neglected disease R&D (USD 3.2 B). Given that almost all of children's deaths and burden of disease takes place in LICs, efforts have been made to develop and manufacture typhoid vaccines in emerging countries; however timelines and results have not been always satisfying, in part due to the complexity of the technology involved. Therefore, a new public/private collaboration PDP model was needed to make the conjugate typhoid vaccine available at an affordable and sustainable cost to MICs and LICs encompassing:

- advanced vaccine technology able to efficiently create and develop an affordable typhoid conjugate vaccine;
- intervention of non-profit organizations to support development of a product otherwise not viable at market standards and its subsequent adoption by international organizations;
- technology transfer and production at WHO standards in an emerging country, possibly with high burden of disease.

Aims

In order to develop an affordable conjugate vaccine against typhoid fever available for LICs a new model of PDP is being created, which has developed and will eventually produce and introduce this new vaccine directly in LICs. The model leverages existing "state-of-the-art" industrial vaccine technology within a partnership that includes private companies, not-for-profit entities and public institutions involved in global health. The project was initiated by Novartis Vaccines Institute for Global Health (NVGH) in Italy where research and development began and the model was conceived. NVGH resides in a scientific park where vaccines have been developed for over a century. Novartis Vaccines and Diagnostics, also located in the scientific park, has the tradition of introducing worldwide innovative pediatric vaccines in collaboration with international and local public health authorities. This network of scientific excellence allows the use of existing novel vaccine technology, industrial

manufacturing know-how and the input of key opinion leaders.

The NVGH is part of the Novartis Institutes for Biomedical Research, and started its work in Siena in 2008 with the mission to develop effective and affordable vaccines for neglected infectious diseases of impoverished communities. The aim is to reduce development risks and costs of new vaccines so that manufacturers will be able to produce and distribute these vaccines for the public health sector of the developing world. NVGH's role is to undertake the translational research required to take a laboratory concept through development, to the human proof of concept (PoC), and then to transfer the process to a manufacturer (preferably in the country of interest). This vision allows NVGH to apply new technologies and industrial expertise in the design, development, and manufacturing of vaccines. NVGH receives its "base" funding from Novartis for its core staff, infrastructure costs, exploratory studies, and early development work. As a project reaches the full development stage, additional funding from external sources brings the project through the optimization and scale-up, clinical product manufacture, and early clinical trials (26, 27).

The Siena center of excellence in vaccine development is also home of two non-profit institutions named after Achille Sclavo, the researcher who in 1904 founded the company (Istituto Sieroterapico e Vaccinogeno Sclavo). The first institution, the Sclavo Vaccines Association, is a technology-based non-profit entity with 10 European members that has supported development of the conjugate typhoid vaccine over the past 5 years. The phase I and II clinical trials were supported by grants from the Regione Toscana and the Fondazione Monte dei Paschi di Siena. The second institution, the Fondazione Achille Sclavo, is currently involved in creating the necessary support for the largest possible use of this vaccine in poor countries and the procurement of resources needed for additional development efforts including large Phase III field studies, WHO pre-qualification and vaccine introduction in poor countries. By employing the most appropriate financial tools and involving international organizations and donors, Fondazione Achille Sclavo aims to achieve adequate production capacity for the needed doses at an affordable cost (28).

In order to vaccinate also against other *Salmonella enterica* serogroups, often confused with Salmonella Typhi and to avoid emergence of other serogroups of *Salmonella enterica* due to the introduction of the vaccine, development of a bivalent conjugated vaccine against both S. Typhi and S. Paratyphi A infection was also envisioned. Thanks to a €5.15 million (£4.5m) Strategic Award from the Wellcome Trust, the preclinical development of the S. Paratyphi component and the clinical activities for the bivalent vaccine have been funded and have started (29).

While technological development, product formulation and pre-clinical studies of Typhoid Vi conjugate was performed in Siena, Phase I and dose-ranging studies were conducted at the Center for the Evaluation of Vaccination in Antwerp (Belgium) (30). Phase II age de-escalating studies were done in countries endemic for S. Typhi: India, Pakistan and the Philippines. These studies were carried out with the cooperation of local institutions with expertise in pediatric diseases, such as the King Edward Memorial Hospital in India, the Aga Khan University in Pakistan and the Research Institute for Tropical Medicine in Manila.

Using this model, the development of a new vaccine against *Salmonella* Typhi, an indirect contributor of poverty, was successfully implemented from pre-clinical to PoC in less than 5 years. This was done through the collaborative efforts of existing industrial expertise, non-profit funding, public institutions in developed and the involvement of players in typhoid endemic countries, which will be the final beneficiaries of this vaccine.

The final component of the model is the involvement of a WHO pre-qualified vaccine producer from an emerging country, Biological E Limited, based in India. The agreement between Novartis and Biological E foresees conjugation technology transfer to allow production of the vaccine in India allowing to move one step closer to delivering an affordable and sustainable typhoid conjugate vaccine globally (31).

Preliminary Results

This innovative Collaborative Development Model has allowed development of a new vaccine against a neglected disease of poverty in collaboration between western and LICs directly for those countries where burden of disease is the highest.

Technical development in Italy allowed for the efficient application of cost-saving, innovative sustainable processes, using lower-risk bacterial isolates for the production of an immunogenic polysaccharide and conjugation technology, establishing the correct basis for a streamlined production process and therefore low cost. Phase II studies performed in endemic countries (India, Pakistan and the Philippines), were sponsored by vaccine experts based in Italy as well. Clinical results indicated that the vaccine is safe and immunogenic in all ages, including infants. A significantly higher antibody response in older children and adults was obtained with the conjugate when compared to the currently available unconjugated polysaccharide vaccine (clinical results under review for publication). Vaccination with the conjugate vaccine was carried out in the younger age groups concomitantly with EPI immunizations in order to provide the needed indications for its introduction in this program as well. The technology transfer to Biological E for production of this vaccine and licensure in an emerging country will give the final contribution for the availability of a much-needed vaccine at an affordable cost.

Relevance of the solution and implications for Global Health policymakers and Stakeholders

Typhoid fever, despite its huge burden in terms of morbidity and mortality, especially in children, is truly a neglected disease of neglected populations, because are the poorest, those living in the slums and in developing countries who carry all the weight of this disease (32).

A truly a neglected disease that now may have an affordable solution.

The Collaborative Development Model presented has allowed the rapid progress of this important public health tool needed to prevent one of the most deadly diseases of children with the goal of increasing health and reducing poverty.

The relevance of the solution provided by this model of development has important implications for Global Health Policymakers and Stakeholders representing:

A. An evidence-based vaccination, with immediate health-related implications, that can be affordable and sustainable for introduction into the EPI schedule, and
B. A model for sustainable development of future needed vaccines against neglected diseases.

Resources and energies need now to be mobilized to make conjugate typhoid vaccines available to those who need them in LICs and MICs.

Global health implications once these vaccines will be made available, include:

1. The introduction of a typhoid conjugate vaccine in endemic countries in South/ South East Asia accounting for 90% of the disease, particularly in Pakistan, India and Bangladesh, will offer the opportunity for:

- a highly targeted vaccination campaign using the EPI schedule,
- an immediate impact in reducing children's mortality,
- the possibility to measure mid-term vaccination impact by following trends in very few countries.

2. Reduction of under-5 child mortality, in line with UN MDG #4 and Sustainable Development Solutions Network's Thematic group 5 - *Health for all*, and Thematic group 2 - *Reducing poverty and peace building in fragile regions*, addressing the immediate causative relationship between the life-long debilitating nature of typhoid disease and poverty (33).

3. Contribution to reaching UN's Universal Goal 4 of the post-2015 Development Agenda, especially:

4a. end preventable infant and under-5 deaths, and 4b. increase the proportion of children adolescents, at-risk adults and older people that are fully vaccinated (34).
4. Offering a tool to support the Bill & Melinda Gates' Enteric and Diarrheal Disease Goal:
"*to eliminate the gap in mortality from enteric and diarrheal diseases between developed and developing countries and to significantly reduce impaired development associated with these diseases in children under age 5*" (35).

5. Becoming a component of WHO/UNICEF's "Integrated Global Action Plan Against Deaths from Pneumonia and Diarrhea", calling for "*New vaccines aimed at reducing Pneumonia and Diarrhea that can be integrated into existing immunization programs*" (3).

6. Meet GAVI's 2017 objective to include typhoid in the Vaccine Investment Strategy outlined in 2008, with typhoid vaccines becoming part of GAVI's programs once appropriate conjugate vaccines will be pre-qualified by the World Health Organization(36).

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Chapter 12

Drugs for Neglected Diseases as a Sustainable Global Public Good

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Abstract

Neglected tropical diseases often afflict the poorest populations of the world. This observation suggests that while demands for new drugs against NTDs continue to grow, there is still a low profit margin for any innovation produced. As a result, there are few incentives for pharmaceutical companies to invest in drugs for neglected diseases. Hence, there is urgent need for a new set of mechanisms to drive research forward for these often "forgotten" issues. One possible solution comes in the form of a product development partnership (PDP) where drugs for neglected disease are seen by public, private and philanthropic organs as global public goods. In this scenario, multilateral actors come together through the Drugs for Neglected Diseases initiative (DNDi) to create an artificial market where there are fewer risks for innovators and more results for benefactors. Coupled with policy-based push-pull mechanisms, PDPs like DNDi work to mitigate challenges of a failed market and represents a paradigm for other potential sustainable development collaborations.

I. Introduction

Global health has undergone a transformation in the past two decades, as a result of new drug regulations and bitter disputes over the distribution of patented HIV/AIDS medications in developing countries. Furthermore, given that this struggle manifests in the midst of a globalized world in which epidemics continue to transcend national boundaries, as in the case of Poliomyelitis, the battle against infectious diseases requires collaboration between both medical practitioners and policymakers. Although this realization suggests that disease treatment and prevention today has become a major concern for foreign policy, numerous diseases known as Neglected Tropical Diseases (NTDs) remain disregarded and overlooked until recently.

Often described as "forgotten" maladies, NTDs are a subset of infectious tropical diseases rarely discussed in developed countries until recently due to their lack of prevalence in those regions. Typically parasitic or bacterial in origin, NTDs are among the most common diseases for the 2.7 billion people living under $2 per day (Hotez, et al. 2007). They have posed as a health challenge since ancient time, and even today, about one sixth of the world's population suffer from one or more NTDs. In regards to location, WHO data show that NTDs remain especially endemic in middle and low-income countries mainly in the tropical belts of Africa, Asia and Latin America (WHO 2011). These are the same countries often classified as "developing" and with a Gini coefficient[1] greater than 0.5 (The World Bank 2013). Hence, NTDs afflict populations that are not only impoverished but also living in areas with high, recurring inequality. For these communities, neglected diseases represent a source of largely avoidable morbidity and mortality and an additional burden for already struggling

[1] A statistical measure of inequality where 0 corresponds to complete equality and 1 corresponds to complete inequality

health systems.

In their first report on the global impact of neglected diseases published in 2010, the WHO noted evidence that the "health and quality of life" of populations in 149 countries afflicted by neglected diseases have continuously improved through implementing simple and effective interventions between 2003 and 2010 (WHO 2011). The follow-up, published in early 2013, reemphasizes this urgency to address NTDs by acknowledging the impressive progress made towards eradicating these diseases while stressing a stronger strategy that is currently underdevelopment to address others (WHO 2013). It is clear that there is momentum driving public interest towards addressing NTDs as a modern-day global health challenge.

The fact remains, nevertheless, that neglected diseases is still a global health challenge. Current treatment regimens for NTDs are often out of date and come with many toxic side effects. Consequently, there is need for modern drugs that are both safer and more effective. Since NTDs are most prominent among the world's poorest populations, little attention is paid towards NTDs because high demand by people with minimal resources, in theory, generates very little profit potential. Likewise, the high cost of research and the potential risks involved should a product fail to obtain government approval further discourages product development for NTDs. The fundamental solution therefore is to find a mechanism that encourages pharmaceutical companies to invest resources and continue developing effective treatments for NTDs despite the dearth of incentives. By adopting this public-good strategy, drugs for neglected diseases will come through means of a more sustainable, more collaborative approach.

II. Evaluating Neglected Diseases Today

A. Drug Development

The objective for any pharmaceutical company conducting research and product development is to produce novel drugs or new chemical entities (NCEs). Before they reach consumers in the market, NCEs must be approved by a regulatory agency such as the US Food and Drug Administration (FDA) or the European Medicines Agency (EMA). Hence, the approval rates for NCEs can be taken as an indicator of progress or measurement of success in the field of research and development for new drugs.

In a landmark study conducted by the World Bank, WHO, MSF and other academic institutions in 2002, researchers discovered a market deficiency of drug innovation for NTDs between 1975 and 1999 (Trouiller, Olliaro, et al. 2002). Of the 1393 new chemical entities marketed during that period, only 16 were designed for what was considered neglected "tropical diseases." Of this 16, only 10 or 11 could truly be considered as NCEs. The results suggest a lack of progress during this time period in terms of producing new drugs against NTDs in the years leading toward the end of the 20th century.

An updated version of the study carried out by a separate group using a comparable methodology noted similar trends. Between 2000 and 2009, despite much greater funding improvements, only 26 new drugs and vaccines for neglected diseases were marketed (Cohen, Dibner and Wilson 2010). A third analysis, from Brazil, this time using a completely different methodology, suggested looking just at drugs approved by the Food and Drug Administration (FDA) between 2007 and 2011 (de Brito 2013). This data show that out of the 119 NCEs approved for human use in the United States, only five or 4.2% of all drugs approved can be classified as antimicrobial. Rather, the focus for pharmaceutical companies in the American market, has been in developing anticancer drugs, which make up almost 15% of all new chemical entities approved during the same 5-year range. Even before honing in to see if these antimicrobials would have effects on NTDs, there is evidence that NCEs for non-communicable diseases, such as oncological drugs and cardiovascular medication, receive much more attention than drugs treating infectious diseases.

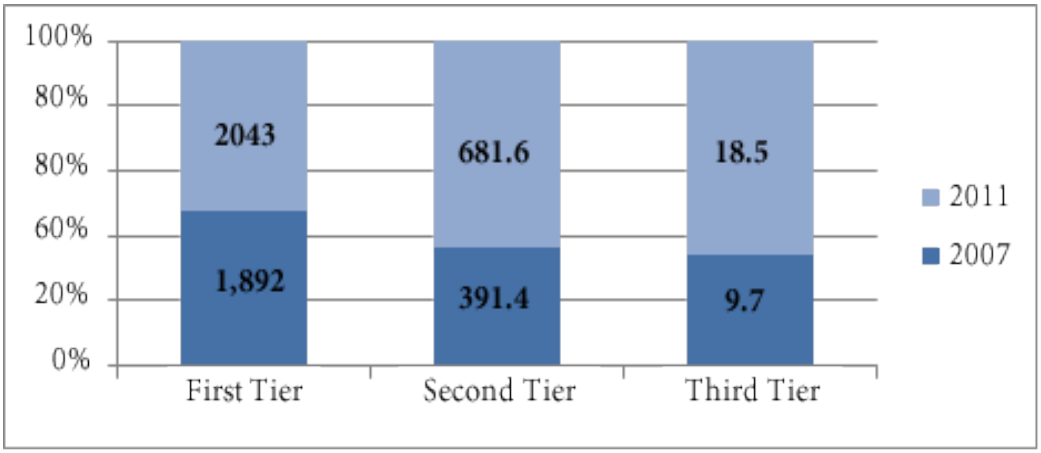
For all three studies, the teams ultimately arrived at the same conclusion: it is too costly and too risky for the private, profit-driven pharmaceutical industry to invest in products with low marginal returns. Noncommunicable diseases and diseases more common in high-income countries receive much more attention, ergo, a more significant amount of NCEs. Conversely, the rate of drug approval for new compounds to treat neglected diseases over the past decade is roughly the same as those of two decades prior.

B. Funding for Research

Paradoxically, while new drug development is on a decline, investment flows for neglected tropical diseases appear to be "a rags-to-riches story," according to WHO Director- General, Margaret Chan. There have been ongoing commitments by pharmaceutical companies to step up contributions to combatting diseases like schistosomiasis by ten-fold (Chan 2012). Not surprisingly, data collected by observatory groups support this claim by suggesting a scenario where often overlooked diseases like Chagas', dengue, and leishmaniasis have received more funding in recent years.

Statistical analysis conducted using G-FINDER, a public search tool tracking global funding for innovation for neglected diseases, show that between 2007 and 2011, funding has shifted away from "first tier" diseases such as HIV/AIDS, malaria and tuberculosis to innovation for the "second tier" diseases (G-FINDER 2012). It is in this latter category that one would find many infectious diseases including most major NTDs (dengue, diarrhoeal diseases, kinetoplastids, helminth infections, etc) whose global share of investments has increased from 16.2% to 24.1%. The same report does note, however, that certain NTDs falling into the "third tier," namely Buruli ulcers, leprosy, and trachoma, remains poorly funded throughout the five years. Nevertheless, when considering research for NTDs holistically, global investment in research and development for neglected diseases has increased by approximately $443.7 million USD since 2007 for an overall investment of $3.05 billion USD in 2011 as shown in Figure 1. Judging simply by numbers, it is evident that funding for NTD research exhibits a positive trend.

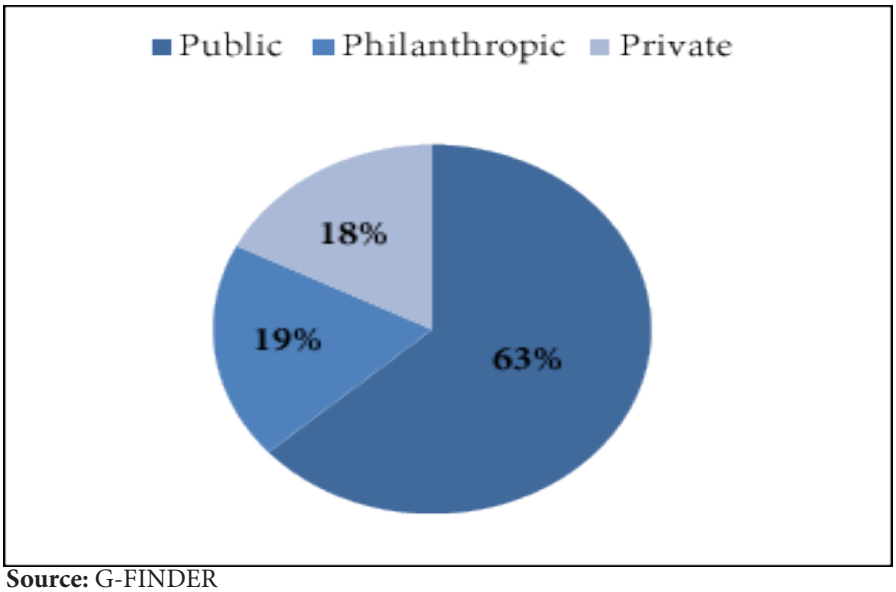
Figure 1: Investments in Innovation for Neglected Diseases by "Tier" Category of Disease, (expressed as millions, in 2007 USD)



Source: G-FINDER

Concurrently, there has also been a shift in types of funders. Although the public sector continues to play an import role, providing the majority of investments towards innovation and product development, the amount of contribution has been decreasing (G-FINDER 2012). In 2011, only $1.9 billion USD came from the public sector compared to $2.0 billion USD in 2009, as indicated in Figure 2. Likewise, philanthropic funding from organizations such as the Gates Foundation has also declined ever since the global financial crisis. Conversely, however, private funding (e.g. from multinational corporations or MNCs) has risen steadily, almost doubling between 2008 and 2011. Therefore, despite initial fears, the global financial crisis did not have significant impact on overall funding for research and development for NTDs. Decreasing investments by the public and philanthropic sectors has been largely offset by private industry funding.

Figure 2: Investments in Innovation for Neglected Diseases by types of Funders, 2011 (expressed as millions, in 2007 USD)



Source: G-FINDER

III. Assessing the Discrepancies

A. The Paradox

Undoubtedly, there is some discrepancy at play. While financial flows towards research and development remain constant, if not increasing, there are far too few new drugs for neglected diseases being introduced into the market. One possible explanation could be that while there may be funding for innovation in NTD research, there is still a lack in financial resources to support product development once discovery is made. Using G-FINDER data, researchers have noted that public funders direct more funding towards basic research for NTDs in 2011 than in the past (Willyard 2013). This scenario suggests that because of recent financial crisis and new mandates, public funding move towards a less risky comfort zone to simply increase scientific knowledge behind NTDs rather than producing new NCEs.

However, this is a claim that has also been refuted. For many, basic research sets a foundation for product development. For example, investments by the US National Institutes of Health (NIH) in basic research have economically and statistically significant effects on the entry of new drugs into the market. Applying an econometric approach, this study by researchers at the USDA show that a 1% increase in funding of public basic research is associated with a 1.8% increase in product development (Toole 2011). The results also show that both research investment and the potential market size are both economically and statistically significant determinants of innovation. By applying this rationale to NCE development for neglected diseases, one could expect to see more drugs coming out in the near future after a short hiatus since not only has funding increased, but also the call for new drugs against NTDs.

Regardless of which position ends up holding true, what is most clear in the meantime is that drugs for neglected diseases can be seen as a public-health policy failure. Public policies ensuring that safe, effective and easy-to-administer products are developed and adopted by health systems are lacking, and the drugs produced right now are either unaffordable, inaccessible not profitable enough to justify their manufacture. Furthermore, research for NTDs heavily relies on public funding and investments from donor and development agencies which are both susceptible to shocks in the economy. The current drug market is thus severely confined and controlled mainly by private firms located in more developed countries catering to higher income-generating markets.

B. Market Failures at Play

There is little doubt that the majority of global and national policies today support a free-market world order, but this preference comes with a catch—actors in the international arena are more profit-driven and financial gains take precedence over global health needs (Trouiller, Torreele, et al. 2002). Source of funding, as a driving factor, may seem to determine where research is headed, but the market, which provides the financial incentives to conduct research, continues to dominate the scene.

In the current market, the highest returns for the pharmaceutical sector come from drugs taken life-long for chronic conditions as opposed to medicines that treat infectious and parasitic diseases (IMS 2012). Drugs for infectious diseases are short-lived. They may bring money in the short-run, but once a patient is cured or if the pathogen is eradicated, there will not be further need for that drug. In this context, since the consumers of NCEs that address neglected diseases come primarily from LMICs, private value, e.g. profit, takes precedent over social value, e.g. poverty alleviation.

Likewise, the pharmaceutical market currently has a strict regulatory system to ensure quality. Although promoting high standards of care and reducing sales of false medicine is ideal, strict regulation by the agencies in developed countries is a double-edge sword that leaves room for adverse revenue shocks. For example, if a high-profile product is withdrawn from the market for whatever reason, this could potentially lead to rapid falls in revenues and share prices, not to mention litigation and other complexities for the company. As a result, pharmaceutical industries tend to stray away from high-risk projects with low-profit margins that have already been "neglected" in the first place.

Additionally, this market failure could be a consequence of a globalized world, namely the free-rider effect. It is a situation where an innovator bears full costs of any failures that may arise while at the same time unable to profit fully from any success because of copy-caters free riding on any successful discovery. Ultimately, competition drive down prices to marginal production costs and the original innovators find themselves to make ends meet. At the moment, it is very difficult, if not impossible to apply a global patent on a drug while at the same time keeping sale prices affordable. And in the case that a patent is granted to a product, such as the classic solution prescribed by the World Trade Organization through the TRIPS agreement, another consequence would arise: monopolies that will drive prices upwards and eventually render drugs for NTDs unaffordable for those who need treatment the most.

IV. Discussion: DNDi as a possible solution

A. Push and Pull Factors

According to Nobel laureate Joseph Stiglitz, the health care market is no ordinary market since it is one that must rely on people to judge what they should consume, independent of prices (Stiglitz 2007). Therefore, a market rifled with distortions is a failure and policy makers must look for a new means of facilitating research and development, such as a medical prize or recognition as incentives to counterbalance the profit-driven model. In spite of paradoxical data and the difficult reality, there is still hope for the future. Multilateral partnerships consisting of academic institutes, philanthropic organizations, governments and private industries have emerged to form product development partnerships with well-defined goals. These product development partnerships or PDPs work together to mitigate the challenges of a failed market for drugs for neglected diseases by employing a public-good strategy.

Product development partnerships may potentially fulfill a counterbalancing role against market failures by creating an artificial "push" mechanism to encourage investments which are then "pulled" along by financial commitments of public and philanthropic funds. This push-pull strategy supplies both the resources that drive

research forward and the promise of remuneration and great success that draws further investments. As a collaboration between private and public sectors, PDPs share the cost and risk between private industries which have the technology and resources to carry out the R&D project and the public entities and foundations that have the will to finance and foster the project.

B. Drugs for Neglected Diseases Initiative (DNDi)

One recent realization of such model is the Drugs for Neglected Diseases initiative which aims at implementing a sustainable mechanism to correct the lack of a profitable market and promote mechanisms that relate to public health policy of and financing for drug innovation (Chatelain and Ioset 2011). A collaboration between seven organizations from around the world,[2] DNDi finances research and development up front and offers the results of its drug discovery process on a non-exclusive basis to generic producer, thus allowing any chemical entities created through the initiative to be available at low costs. The pooling of resources by global health partners provided the needed impetus to incentivize pharmaceutical industries, leading to relative success for NTDs.

As shown in Table 3, data from G-FINDER shows that the bulk of funding for DNDi , comes from multilateral aid agencies such as the UK Department for International Development (DFID) and the French Development Agency (AFD) but also foundations like the Bill & Melinda Gates Foundation.

Table 3: DNDI Source of Funding

Funder name	Type of Funder	Country
Anonymous Donor	Philanthropic	United States of America
Medecins Sans Frontieres (MSF)	Philanthropic	Switzerland
Spanish Ministry of Foreign Affairs and Cooperation for Development (MAEC) and/or Agency of International Cooperation for Development (AECID)	Public Sector - Governments	Spain
Swiss Agency for Development and Cooperation (SDC)	Public Sector - Governments	Switzerland
Bill & Melinda Gates Foundation	Philanthropic	United States of America
Canton of Geneva	Public Sector - Governments	Switzerland
Dutch Ministry of Foreign Affairs - Directorate General of Development Cooperation (DGIS)	Public Sector - Governments	Netherlands
European Commission: Research Directorate-General	Public Sector - Governments	European Commission
French Ministry of Foreign and European Affairs, Ministere des Affaires Etrangeres et Europeennes (MAEE)	Public Sector - Governments	France
German Agency for Technical Cooperation (GTZ) Deutsche Gesellschaft fÃ¼r Technische Zusammenarbeit GmbH	Public Sector - Governments	Germany
Medicor Foundation	Philanthropic	Liechtenstein
Multiple funders	Unspecified	
Sandoz Family Foundation	Philanthropic	Switzerland
Sasakawa Peace Foundation	Philanthropic	Japan
Starr International Foundation	Philanthropic	Switzerland
UBS Optimus Foundation	Philanthropic	Switzerland
UK Department for International Development (DFID)	Public Sector - Governments	United Kingdom
US National Institutes of Health (NIH)	Public Sector - Governments	United States of America
French Development Agency, Agence Francaise de Development (AFD)	Public Sector - Governments	France
Global Fund to Fight AIDS, TB and Malaria (GFATM)	Philanthropic	Switzerland

Source: G-FINDER

As a needs-driven initiative, DNDi have firsthand knowledge of needs via the organization that make up the initiative. It is able to take this information and match it up with opportunities in research and development, and push the most relevant, most important projects through the pipeline to ultimately reach a specific target (Pecoul 2004). At the same time, through funding provided by multilateral support via aid agencies and

[2] The Indian Council for Medical Research (ICMR), the Kenya Medical Research Institute (KEMRI), the Malaysian Ministry of Health, the Oswaldo Cruz Foundation in Brazil, Médecins Sans Frontieres (MSF), the Institut Pasteur in France, and the Special Programme for Research and Training in Tropical Diseases (TDR)

philanthropic foundations, the new drug treatment created is affordable and accessible by rich and poor, urban and rural. There is thus this image of the push and pull mechanism outlined earlier to address a deficient market.

Furthermore, the artificial market created through support from the public in the form of global health partnerships is founded on the basis that drugs for neglected diseases and their research and development are global public goods. The medical knowledge produced benefits not just one particular country or population but rather the entire global community. It is non- rival in the sense that disclosing such knowledge does not reduce the amount available for others to enjoy. It is non-excludable by reasoning that no person can be excluded from benefitting from or being affected by the public good (Nordhaus 2005). Once an NTD is eliminated, no person could be excluded from the associated benefits, which in this case is a healthier world.

In short, DNDi considers itself the best medium or multilateral multi-donor support because it streamlines the entire research and development process through a mediating role. It standardizes the PDP relationship and assures some form of quality and impact evaluation. While multilateral aid agencies provide funding, the private sector provides the technology and industry. By funding product development projects, governments—such as the UK through DFID and its other organizations like TB Alliance and TDR—show real commitment to its policy to make global health a priority, thus fulfilling goals set during the G8 in 2005 (DNDi 2009). As a result, it brings donors, managers, scientists and implementers all to the same table in a joint collaboration between public and private sectors. Through these public-private partnerships, the pharmaceutical market can be properly incentivized to motivate private providers to contribute their technology and expertise.

V. Conclusion

Research from the WHO suggests a need for pull and push intervention: an economic incentive is required to draw private industry towards addressing the needs of developing countries which then must be followed up with a reduction in the costs and risks to the industry manufacturing or delivering the product. Actors work together not necessarily because of altruism or idealism but rather because everyone benefits from the cooperative endeavors: a win- win situation. In the field of international development, aid is moving away from the traditional binary model of donor-recipient and direct transfer of goods towards multilateral teamwork. Through this model, international organizations, public and private, pursue a goal and end up providing a high-quality, reliable product—in the case of NTDs, it manifests through better sharing and implementation of technical, medical information via DNDi.

Global health partnerships significantly rely on contribution and cooperation and, therefore, some sort of collective action, from both private and public partners in order to create a new product. Collective action fall subject to the major obstacles of uncertainty and feasibility, but these can be resolved if properly handled by public policy-making.

The lack of new NECs for neglected diseases is due to a market failure and any progress to the field is not market driven. There have been signs of progress coming from partnerships originating outside of the private sector but still dependent on them in one way or another. PDPs have shown great progress for (re)-discovering new treatments for neglected diseases and, therefore, represent a model that can be applied to research and development for other public goods such as clean water and sustainable environments. These initiatives create public health policies and facilitate projects that attempt to address neglected tropical diseases in an already deficient market. Their accomplishments represent international cooperation in an already globalized world for the creation of a global public good.

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Chapter 13

Bringing the State back in to Development: A Study of Food Security in India

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Abstract

Since the 1970s, the role of the state has diminished in the field of development while a focus on community participation and locally grounded, bottom-up approaches has gradually gained ground. The non-governmental sector now plays a central role in the delivery of social services, including the provision of health care and nutrition. Concurrently, the state is commonly viewed as a key obstacle to development, leaving communities worse off through its interventions. Within this framework, one may ask what the role of states and centralised government policies should be; and further, whether large-scale top-down programmes can facilitate sustainable development that reflects local needs on the ground. The topic is discussed through a case study of India's Targeted Public Distribution System (TPDS), a nationwide policy intervention to enhance food security among India's poorest households through food subsidies. TPDS is the largest welfare programme within India and has a high degree of government control. Hence, it provides an interesting case for the study of the role of the state in development. Qualitative fieldwork was conducted in two districts in Odisha, India and consulted beneficiaries, project implementers and government officials. By exploring local perceptions and experiences of TPDS among a range of stakeholders, the research sought to understand the food security impact at the household level and thereby shed light on the developmental capacity of the Indian state. The findings suggest that TPDS – despite its top-down structure and inherent issues of corruption and targeting errors – is bringing a certain level of food security to beneficiary households in the study context. The programme increases availability and access to food, enhances energy and nutrient intake and ensures households against risk. The paper finds that these encouraging outcomes can be ascribed to certain elements of state-society synergy in the delivery of TPDS. Hence, embedded relations between project implementers and beneficiaries contribute to a more responsive system, as implementers become links between the Government and its beneficiaries, blurring the boundaries between the state and society. The paper argues in favour of a central role for the state in development while also emphasising the need for society cooperation and involvement. It suggests a reconsideration of the mainstream view of the state as a main obstacle to development. Although TPDS is neither a concrete example of state-society synergy nor a sustainable development practice, the findings illustrate that barriers as well as potentials for development lie within the state. This is not exclusive to the case study context but is applicable to developmental projects of various characters all over the world. If results are to be sustainable and responsive to local needs, there is need for strong states with political will and openness to inputs from society. In achieving food security and adequate nutrition, states therefore have an important role to play, particularly if they recognise the value of cross-sectoral partnerships and local participation. Thus, the paper supports a reconciliation of top-down and bottom-up approaches while encouraging practitioners of development to reconsider the value and potential that lie within states.

Introduction

Since the 1970s, the role of the state has diminished in the field of development while a participatory approach has gradually gained ground, challenging orthodox ideas of capitalism and its emphasis on economic growth and industrial progress. These new ideas entered mainstream thinking in the 1990s, stressing the need for development to be decentralised, participatory and based on local needs (Tandon 2000:320-323). The rather top-down structure and centralised character of past development policy has thus, to a large extent, been replaced by a more people-centred approach. There is now a larger emphasis on community participation, small-scale development is preferred over large-scale approaches, and the margins of society have become a

central focus in many development interventions. In this way, the value of the bottom-up approach has become generally accepted, the role of the non- governmental sector has changed and community organisations have come to play an increasingly prominent role in the delivery of social services, including the provision of health care and nutrition (ibid). Meanwhile, the state is commonly viewed as a key obstacle to development, often leaving communities worse off through its interventions. Within this framework, it is appropriate to ask what the role of states and centralised government policies should be; and further, whether large-scale programmes implemented from above can facilitate sustainable development that reflects local needs on the ground. In this paper, I discuss this topic through a case study of India's Targeted Public Distribution System (TPDS), a nationwide policy intervention to enhance food security among India's poorest households through food subsidies. TPDS is the largest welfare programme within India and has a high degree of government control. Hence, it provides an interesting case for the study of the role of the state in development.

Drawing on two months of qualitative fieldwork in central and southern Odisha, East India, I seek to understand the food security impact of TPDS at the household level through exploration of local experiences and perceptions of the programme. By doing so, I show how TPDS – despite its top-down structure and inherent issues of corruption and targeting errors – brings a certain level of food security to beneficiary households in the study context. In order to understand why this is the case and how such encouraging results are brought about, I use the notion of state-society synergy to guide the discussion. My argument is that TPDS increases food security due to the existence of embedded relationships between project implementers and beneficiaries, which contribute to a more responsive system. As implementers become links between the Government and its beneficiaries, the boundaries between the state and society become blurred, wiping out the distinctions between public and private spheres. TPDS is not a solid example of state-society synergy, as serious issues remain in its delivery, but the case illustrates the developmental potential that lies within the Indian state.

The paper is organised into five sections. The first explores the debate on the appropriate role of the state in development and outlines the concept of state-society synergy; the second introduces TPDS and places the research within the context of food security in India. The third section outlines the empirical findings and the fourth provides an analytical discussion hereof while drawing on the state-society synergy literature. Finally, in the fifth section, the findings from India feed into the larger development debate and provide a foundation upon which to consider the place and responsibility of states within a field characterised by a multitude of other stakeholders with local knowledge and specialised capacities. The paper concludes by suggesting an increased focus on the potential of state intervention and cross-sectoral cooperation in development.

1. The Role of the State in Development

There are various opinions on how to best trigger local development and what the role of the state should be in this process. Some assert that emphasis should be on the internal structure of the state and the character of state-society relations; others believe that the main potential lies with society or the market alone. In the 1980s, the dominant paradigm in economics claimed that state intervention was strangling the economy and hindering the development of productive forces. It was based on the idea that the state should be "rolled back" through decentralisation and privatisation in order for economic growth and development to thrive. There was no role for the state in development and trust was put in the regulatory mechanisms of the market.

Some scholars, though, resisted this discourse and argued in favour of "bringing the state back in" as first proposed by Theda Skocpol in 1985. Among them was the sociologist Peter Evans, who argued that the state in fact is a key variable in reaching developmental ends (Evans 1996a). Evans went against the neoliberal views of the time by asserting that development is best achieved through collaboration between the state and society – an idea he coined state-society synergy. With it he claimed that the potential for developmental success as well as the barriers against it rest within the state. Through state-society synergy, strong governments and active communities enhance each other's efforts as mutually supportive relations between them become catalysts for development (Evans 1996a:1034). In order for such synergy to take place, a set of competent and engaged institutions must be in place which can support decentralisation and openness to community self-organisation

(Evans 1996b:1126). In this way, the two otherwise contrasting approaches of top-down and bottom- up are reconciled, and from their combination emerges prospects of greater overall achievements.

Central to the definition of state-society synergy are the notions of complementarity and embeddedness. The first refers to mutually supportive relations between the state and society, where governments deliver certain public or social goods, complementing inputs that are more efficiently delivered by private or community actors. This results in greater overall outputs than would have been achieved by either sector on its own (Evans 1996b:1120). Public institutions are not directly linked to community members and the contribution of the state is rather general and distanced. Embeddedness, on the other hand, refers to the relations that connect government officials with community members across the public-private divide. It is when the state and local communities become interlinked, and when networks of collaboration and trust are created, binding the state and society together. Synergy based on embeddedness thus transcends the boundaries between the public and private spheres, and, according to Evans, this is central to developmental success (ibid:1121-22).

The main barriers to synergy lie with governments rather than society and include the inflexible nature of government institutions, bureaucracy and conflicting political interests (ibid:1127). Although ascribing central importance to the state, Evans does thus not deny the potentially negative aspects of state intervention. Instead, he challenges the idea that such aspects necessarily constitute the norm and suggests that a large potential to achieve positive results lies within states as well (Evans 1996a:1034). Other scholars (including Ostrom 1996; Tendler 1997; Varda 2011) support this argument and it is upon this line of thought I build my analysis.

In academia, the debate has evolved since Evans first wrote about state-society synergy in the 1990s. Disagreement remains as to whether there is a need to strengthen the state or whether emphasis should be on decentralisation and reliance on non-state mechanisms. Today, these mechanisms refer to community-based organisations and social funds, rather than to markets, and state proponents caution against such alternatives removing the responsibility of the state in delivering basic services, including health care and education (Srivastava 2010:4). Yet, the focus on civil society and locally grounded, bottom-up development has gained momentum and community organisations play a central role in service delivery today. The state is perceived as "*…flabby, bureaucratic and corrupt*" whereas the value of civil society is highlighted and a main problem is "*… how to induce the state to get out of the way*" (Ferguson 2007:387). In this paper, I seek to go beyond this now dominant discourse by revisiting Evans and considering what the contribution of states can be in development and whether centralised policies, exemplified through TPDS in India, have the potential to facilitate change that is reflective of local needs.

2. Food Security and the Public Distribution System in India

With the prevalence of malnutrition in India being one of the highest in the world, the Government implements TPDS as a consequence of severe food security problems. In 2010- 2012, a staggering 217 million individuals were undernourished in India, equal to 18% of the entire population (FAO 2012). One in three of the world's malnourished children live in India, and the proportion of underweight children below the age of five is at 43% (Naandi Foundation 2011:8). As malnourished children are less likely to reach their full potential, both in terms of their mental and physical capacities, the current food situation in India will likely impact future generations and the human development of the country for years to come. Malnourished children are less likely to do well at school and more likely to become malnourished as adults, prone to diseases and with reduced work capacity and economic productivity. The food security situation is thus closely intertwined with other indicators of development, including health, education and economic growth. The estimated economic losses associated with such malnutrition are currently at 3% of India's annual GDP (ibid.).

The situation is not a recent development in India. Food security has for decades been a concern of the Government and current food policies, channelled through the so-called Public Distribution System (PDS), reach back to the food rationing mechanisms in major cities during World War II. Since then, the Government has employed PDS as a policy instrument for overcoming food shortages, stabilising food prices and securing

consumption among the country's poorest people through highly subsidised prices on basic food items (Srinivas & Thaha 2004:1). The system has undergone changes throughout the years and is today based on a targeted policy which differentiates between households below and above the poverty line while offering different quantities of commodities and different rates for members of the two categories (Swaminathan 2008:50-51). Accordingly, PDS has become TPDS. It is operated through a network of 477,000 fair price shops (FPSs) and Gram Panchayat offices which serve as distribution points across India. From here subsidised commodities, including rice, wheat, sugar and kerosene, are sold to entitled households by locally appointed shopkeepers. Reaching more than 160 million households, TPDS has become the largest welfare programme within India and is the largest of its kind in the world (IPCIG 2011).

Throughout the years, however, it has become evident that PDS and later TPDS have failed in reaching many intended beneficiaries. Particularly during the implementation of PDS, large proportions of the subsidies ended with the non-poor and problems of leakage due to widespread corruption and storage losses were also common (Srinivas & Thaha 2004:14). The targeting of PDS has proved to be a complicated matter, however, and the process of separating the poor from the non-poor has both been costly and inefficient while failing in addressing corruption issues. Leakages to the black market remain substantial, fuelled by officials using their positions for their own benefit as well as by FPS owners seeking to maximise their economic output (Nagavarapu & Sekhri 2011:2). Accordingly, take-up rates are low in many states, and the intended beneficiaries only receive a fraction of the Government's TPDS spending. Despite structural changes, issues of inefficiency and corruption thus remain, and genuinely deprived households are being excluded at large scale. A major criticism is that household eligibility in many states, including the study context of Odisha, has not been reassessed since 1997. This is part of the reason why TPDS is commonly viewed as an irreparably dysfunctional tool for increasing food security across India, as it paints a picture of a government which is removed from its people and not responsive to the reality on the ground.

Research indicates improvement in TPDS programme performance within recent years. However, as a response to exclusion errors and problems of corruption, most research has focused exactly on these issues while other questions of equally high importance, such as the nutritional impact of TPDS and its role in providing food security, have remained largely unexplored (Khera 2011:36). TPDS therefore remains the object of heavy criticism from many sides, while its food securing capacities are unknown. The findings of this paper contribute to filling this gap.

3. Experiences of TPDS in Odisha

With a population of 41.9 million, a low population density and a predominantly rural population (87%), the study context of Odisha is one of India's poorest states (DFPB 2011). An estimated 46% of the population lives below the poverty line , annual per capita income is estimated to be 33% less than the national average, and the state has been ranked among the bottom five on the Human Development Index for India's major states since 1981 (ESAF 2007:18). A very high proportion (90%) of the population is engaged in the informal sector and many people earn daily wages as casual or agricultural labourers. The literacy rate is low, particularly among women, while infant and maternal mortality is high, incidences of severe malnutrition are frequent and standards in both health and education are poor (ibid:27; Economic Times 2009). A combination of social, economic, institutional and ecological factors thus places Odisha in the category of severely food insecure regions (CES 2011:3).

Throughout the interviews and field observations, I gained insight into the lives of some of Odisha's deprived households and gained an understanding of the importance ascribed to food in their daily lives. Due to the nature of the research and its focus on perceptions and experiences of TPDS, I exclusively collected data through qualitative methods. My focus was specifically on local realities at the household level, and semi- structured interviews and focus group discussions with beneficiaries make up the main sources of data. In addition, project implementers, FPS owners and government officials were consulted, as they could offer interesting insights due to the nature of their jobs and their close interaction with beneficiaries.

My findings show that TPDS is fulfilling an important function across the study context by bringing a certain level of food security to beneficiary households. It increases availability and access to food, enhances food utilisation and strengthens resilience against outside shocks. Due to TPDS, people know that they will always have the minimum of food needed to survive, while money is released for a more varied diet, children's education and other necessities, such as medicine or rent. It constitutes a safety net on which people can rely, both when times are good and when sudden shocks occur, disrupting money and food flows. An elderly woman explained:

> "Yes, we have ups and downs in our life, but in that situation this contribution from PDS[1] is a lot and we are facing challenges positively. Because we feel that we won't have nothing to eat. We have something to eat. At least rice".

TPDS has become a main livelihood strategy: people manage their TPDS commodities in order to reduce overall risks and increase incomes and food intake, while in times of need they might solely rely on TPDS commodities. When asked what would happen if subsidies from TPDS were no longer available, all respondents conveyed deep concerns about the nutritional impact it would have on their livelihoods. A common response was that they would have to eat less every day, and that food would not be sufficient to keep everyone alive. Some people found it difficult to explain what would happen to them if TPDS was discontinued, but used words such as *hurting, horrible, distress, disaster, hazardous, difficult, suffering and scarcity*, all indicating the important function played by TPDS for them to face and manage risks in their daily lives. As TPDS has been implemented for decades, it has become an ingrained part of life, constituting a reliable and nutritious source of food. These findings support the very limited research conducted on the topic to date, which has established TPDS as an important source of food security for beneficiary households (Khera 2011).

However, significant issues remain as many households feel the consequences of government targeting errors: More than one third of respondents reported that they knew of excluded households in their local communities, while many others belonged to households where several families depended on one single entitlement due to the lack of continual reassessments of household eligibility. Hence, although the programme is largely successful in meeting food security needs at the household level, not everyone benefits from TPDS and those who are excluded become disadvantaged in relation to other poor households.

4. TPDS – A Case of State-Society Synergy?

The study of TPDS provides an interesting case for the discussion of the role for states in development. TPDS is a classic example of a centralised programme, implemented through a top-down approach. It is large-scale, government-driven and based on decisions made far from the communities in which it is implemented. Meanwhile frequent instances of corruption, grain diversion and targeting errors paint a picture of TPDS as inefficient and removed from the reality of its beneficiaries. And yet, the results indicate that TPDS contributes to food security. Drawing on the notion of state-society synergy, I will start this discussion by first considering the barriers limiting the developmental potential of the programme. I will then move on to the encouraging results found in the study and seek to understand how they are brought about.

First and foremost, corruption is a main barrier to synergy in TPDS. The fact that money and grain is diverted at large scale reflects the inefficiency and lack of transparency of the implementing state institutions. It is an indication that the state is not as solid and engaged as proposed by Evans. Through conversations with government officials it became clear that corrupt practices are an almost natural part of daily life. One official explained that corruption "*trickles down*" and happens at all levels of TPDS. Everyone manoeuvres around the

[1] In daily interaction, TPDS is still commonly referred to as PDS.

rules and ensures extra benefits for themselves. He explained:

> "You can say that there is a need for corruption in India. Everybody in power relies on it and are themselves not interested in creating a more transparent system, or empowering the poor, if it means that more questions will be asked."

This takes us to another issue inherent in TPDS – namely that of conflicting interests between those in power and the beneficiaries. Evans talks of the need for shared objectives across the state-society divide, but in the study context objectives appeared only to be shared among beneficiaries and FPS owners and some government field staff. Politicians and high-ranking government officials appeared to have their own, separate objectives. Greater levels of transparency would expose corruption and restrain such state actors from continuing their endeavours. As noted by the same official: "*If you see a spark, you will try to prevent a fire from arising. But the Government is not interested in stopping the fire*". The analogy refers to hunger and poverty in India and illustrates how the interests of state actors can be conflicting to those of society. According to Evans, "*…the degree to which interests are shared across the public-private divide /…/ plays a central role in determining the potential for synergy*" (1997:196). As corruption seems to be so ingrained in the internal structure of the state, and as it is accompanied by conflicting state-society interests, it seems that the potential for synergy in TPDS is limited.

The non-participatory structure of TPDS and the fact that little attention is paid by policy makers to its outcome and impact at the household level constitutes a third barrier to synergy. The programme is run at a distance from everyday life at the community level and beneficiaries and their experiences are not included in the design or implementation of the programme. The extensive problems of exclusion error and its impact on households in every village visited in the study can be ascribed to this top-down structure. There are no mechanisms for feedback between beneficiaries and policy makers or regular systems for programme improvement. The system is implemented from above and there is an extensive gap between the community and policy levels. Performance evaluations are irregular and focus on delivery mechanisms, consumer take-off rates, targeting errors, leakages and diversions (PEO 2005). They build on quantitative surveys and do not consider the role or impact of TPDS in ensuring food security among beneficiaries. This is another aspect of TPDS that is problematic when seen from the view of Evans as it obstructs any opportunity of involving local communities and opening up for local inputs in TPDS. Consequently, as long as beneficiaries are not seen as stakeholders and potential partners by the state, synergy will not occur.

Corruption, conflicting interests and non-participation thus constitute three main barriers to synergy in TPDS. When considered against the issues of grain diversion, leakages and targeting error – commonly discussed as the central problems of TPDS – a connection emerges. While corrupt practices among government officials and FPS owners lead to diversion and leakages of grain, conflicting interests between state and community actors hinder the problem from being solved, as those engaged in corruption have no incentive to stop their undertakings. Further, non-participation and the failure of the state in involving beneficiaries in programme design has led to continuous issues of targeting error, excluding genuinely poor households while including others less vulnerable. Had more responsive state- society mechanisms been in place, the Government's attention might have been brought to the need for regular reassessments of eligibility and the need to update the 1997 survey earlier.

Interestingly, despite these three heavy barriers, the results of this study show that TPDS is in fact contributing to increased food security and creating resilience at the household level for all respondents interviewed. They illustrate that this large government programme is managing to meet local needs at large scale, despite a broader adverse context. The question is how such positive results are brought about. TPDS is certainly not a concrete example of state-society synergy, but when viewed from the perspective of Evans, one finds that it does contain elements of complementarity and embeddedness which might be contributing to the encouraging outcomes. It is to these that we now turn.

In terms of complementarity, through TPDS, the state provides a service that would not otherwise be available to poor communities. It facilitates access to food, which becomes a social good in the relationship between the state and society. On the other hand, community members possess the capacity to transform the goods received through TPDS into other livelihood assets, whereby resilience is created and communities are strengthened. The programme is based on a clear division between the public and the community spheres and relies on mutually supporting relations between them. This was clearly observed in the study context through strong segregation between implementing government bodies and beneficiaries of TPDS. High-ranking government officials only occasionally visited distribution points, and when they did, interaction would be with FPS owners – not directly with beneficiaries. Thus, FPS owners become links between local communities and the Government and it is through them that feedback is provided.

FPS owners are locally appointed by their communities and although the financial benefits are limited, their position is respectable and based on the trust of the people. As a result, FPS owners constitute a link between the state and society and they view themselves as representatives of their communities. Here, Evans' notion of embeddedness is relevant, as FPS owners through engagement in networks of collaboration and trust with state as well as community actors transcend the divide between the two spheres. Through interviews with FPS owners it was evident that they had a deep understanding of local realities and perceived themselves as part of the communities they were serving. Their statements reflected those of beneficiaries well and their body language and tone of voice indicated that their work was close to their hearts. As put by one FPS owner who was also a farmer: "*I can make my livelihood through my agriculture. Why I am preferring this PDS is because I want to contribute my work, my dedication to the people /…/. It is because of the people I am here*". FPS owners commonly supplement incomes from their businesses with agricultural production as the profit margin on TPDS distribution is limited. Their lives are not very different from the lives of beneficiaries and they share many of the same hardships. As a result, FPS owners are good ambassadors for their communities and are able to convey important feedback to government officials. A parallel can be drawn here to the findings of Judith Tendler (1997) who through empirical studies of good government in Brazil has illustrated the importance of worker dedication in performance improvement. She found that when government workers were committed to their jobs, and particularly when they engaged in relationships of trust with the communities they served, the overall outcome would be significantly improved. Certainly, such worker dedication and trust was present among the FPS owners interviewed in this study and can be seen as one of the strengths of TPDS.

Another aspect of embeddedness lies in the relationships between government field staff and beneficiaries. The job of field officers is to oversee the entire supply chain in their administrative blocks, including visits to procurement sites, inspections at milling points and regular check-ups at FPSs to ensure that the delivery to beneficiaries is timely and correct. Although the officers primarily interact with FPS owners during such check-ups, they also meet the beneficiaries. It happened a number of times during field observations that beneficiaries directly addressed the field officers with their feedback. The study found that the nature of such relationships to a large extent depended on the personal attitude of the officers. While some saw it as a matter of personal pride to do the job "*with the heart*" and showed a great level of commitment as well as an understanding of the hardships endured by beneficiaries, others were less engaged with the local communities. Such officers appeared to only interact with FPS owners and other officials and when asked to define their job, they highlighted the importance of having a government job. The objective of providing food security to beneficiaries was not mentioned.

The personal attitudes of field officers towards beneficiaries are likely to be an important and defining factor for the way beneficiaries perceive the Government. Beneficiaries in blocks with engaged officers might experience a more supportive state- society relationship and have a bigger chance of strengthening their own communities in terms of engagement and participation. The chance of beneficiaries voicing their feedback would also be greater under such enabling circumstances as they would know that they have a chance of being heard. According to Evans, such responsive state-society contact constitutes an important foundation for development (Evans 1996b). This is supported by Elinor Ostrom, another supporter of the synergy perspective, who emphasises the importance of "*motivating both public officials and citizens to work effectively together*" in government interventions (1996:1081).

The elements of complementarity and embeddedness in TPDS can shed light on the encouraging results found through the field study and explain how the programme meets local needs, increases food security and strengthens resilience at the household level. As FPS owners are close to their communities and act as their representatives, they bring the state closer to the everyday life of beneficiaries. Visits from field officers further serve to put a face to the Government and, as we have seen, can be a forum for community feedback to the Government about TPDS. Such embedded relations between state and community actors ensure a smoother delivery of TPDS commodities and creates satisfaction with the Government at the community level. Just as important as these embedded relations is the simple complementarity of the Government providing basic food items to vulnerable people with limited access to livelihood assets. The subsidised rice, wheat, sugar and kerosene constitute main livelihood necessities for beneficiaries that they would not otherwise have access to. In return, communities become stronger, more resilient and positive towards the Government, which in turn benefits the state. It is a case of synergy on a limited scale, an example of what Evans terms a 'small scale success', which can be achieved even within broader adverse contexts (1996b:1130).

These elements constitute a good foundation for synergy and are leading to positive results. The set-up with distribution points in villages and FPS owners and field officers commonly engaging with beneficiaries is an important first step for crossing the divide between the state and society. By focusing on such positive elements, already in place, present barriers could be overcome and a higher degree of synergy achieved. This could make the delivery of TPDS more efficient and successful than it is today. According to Evans, "scaling up" such existing social capital is crucial for achieving synergy (ibid.).

5. The State as a Catalyst for Development

From the foregoing discussion, it appears likely that the increased levels of food security and resilience documented in Odisha can be ascribed to elements of state-society synergy in TPDS. Although TPDS is not a concrete example of such synergy due to substantial issues in its delivery, the programme does contain elements of complementarity and embeddedness upon which more sustainable results could be built. The research thus supports Evans' thinking by illustrating the developmental potential – as well as the barriers – that lie within the Indian state. It shows that large-scale development programmes can in fact facilitate development that reflects local needs. Based on the empirical findings, the solution I propose is therefore one that is centred on the potentials of state intervention. It aligns with the literature on state-society synergy and suggests that development practitioners, policy makers, businesses and community actors all direct their attention towards the opportunities embedded in stronger state-society relationships. Hence, my proposal does not deny a positive role for society but supports a reconciliation of top-down and bottom-up approaches. For this to happen there is need for a strong state with political will to acknowledge the value of inputs from society. The proposal is therefore, in short, a case for bringing the state back in to development.

Critics might say that TPDS creates dependency, that it is not a sustainable development practice, and that it does not lead to empowerment of local communities. The findings do not deny this. However, they illustrate a complex reality, where other pressing issues must be addressed before local capacities can be developed. The most basic needs, in this case related to food, must be met before beneficiaries can pursue higher-order needs like the security of health, employment and education (Maslow 1943; WFP 2013). Although critical of the issues of corruption and inefficiency, this analysis therefore supports the overall implementation of TPDS. Yet, in order for the Indian state to improve its performance, it is recommended that organisational changes are made towards stronger civil society cooperation. By opening up to a greater level of community involvement in policy drafting, implementation and evaluation while building on the existing set-up and its elements of complementarity and embeddedness, the Government of India would have much to gain. Measures could include training programmes for government officials as well as community meetings and workshops bringing together state and community actors. This would entail increased efficiency, accountability and sustainability of programmes such as TPDS, while also building trust and respect from millions of poor households across the country. In the case of TPDS, an important lesson to be drawn from the findings is that, as a minimum, household level impact should be included in government programme assessments. This would paint a more

adequate picture of TPDS and help adjust it to the reality on the ground.

The argument made here is not that state intervention is the answer to all challenges in development. On the contrary, the research recognises that significant limitations can lie within states and become hindrances to development. The intention is therefore rather to illustrate that under certain circumstances – such as in the case of TPDS – states can become catalysts for development, whether it be on a small or large scale. They can fulfil an important function and bring about positive outcomes at the community level, especially if they recognise the value of cross-sectoral partnerships and cooperation with society. Community organisations, on the other hand, have scattered and localised impact, but if such 'pocket efforts' were to be linked to the policy level and adapted on scale, there might be potential for achieving real change. This is not exclusive to the case study context but is applicable to development projects all over the world. If results are to be sustainable and responsive to local needs, there is need for strong state-society relationships. This is particularly relevant when combatting food insecurity and malnutrition, as concerted efforts across the public-private divide can help facilitate the provision of food assistance where it is most needed and in a manner that is reflective of local needs. States can bring the means and technical expertise while community actors can contribute with local knowledge and knowhow on how best to meet community needs. Rather than focus being exclusively on one sector or the other, attention should be directed towards the possibilities embedded in collaboration.

The realities of TPDS across southern and central Odisha tell a surprising, yet encouraging story that serves to challenge the mainstream view of the state as an obstacle to development. This paper therefore encourages development practitioners, policy makers and other stakeholders to reconsider the value and potential that lie within states and to be open to changes in the way development programmes are run. In terms of policy, this requires a shift in the roles and responsibilities of the state from that of provider to that of "co-producer" and facilitator. This change must, first and foremost, come from within the state. This is necessary because it demands political will to increase levels of transparency and accountability towards civil society while at the same time involving a larger degree of shared responsibilities with the private and non-profit sectors. If governments actively support and cooperate with social entrepreneurs, community organisations and social funds in the delivery of basic services, while simultaneously having stringent measures in place for quality assurance, the developmental outcome is likely to be more wide-reaching, successful and reflective of local needs. Private and community actors must also be open to engaging in partnerships with the state and recognise the developmental potential of such relationships. The policy environment created under such circumstances is likely to be conducive to a sustainable and inclusive development practice. Let this therefore be a call for all practitioners, policy makers, scholars and businesses involved with development to re-consider the value of the state and of collaborative efforts. As put by Evans: "*Synergy is too potent a developmental tool to be ignored by development theories*" (1996b:1130).

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Chapter 14

Reducing Health Risk from Contaminated Hotspots in Low- and Middle-Income Countries to Promote Sustainable Cities and a Sustainable Future

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Abstract

Toxic chemicals from industry and mining may affect the health of as many as 200 million people in low- and middle-income countries. Heavy metals, pesticides, radionuclides and other toxic substances can be found at dangerous levels in drinking water, soil, air and food at thousands of contaminated hotspots around the world. Potential health impacts include cancers, neurological damage, cognitive impairment and even death. Children are especially vulnerable. Emerging data indicates that the burden of disease from exposure to contaminated sites is a similar order of magnitude as that of malaria or outdoor air pollution in some countries. Successful, affordable interventions to mitigate toxic exposures while protecting livelihoods and reducing poverty are available. These can increase access to valuable resources, including previously-degraded urban land. Enacting solutions now can help avoid longer-term costs, such as cognitive impairment of children and rising health care costs from toxics-associated illness. The Global Alliance on Health and Pollution (GAHP) is a new international partnership offering technical expertise, guidance and resources to low- and middle-income countries to help clean up toxic sites, prevent re-contamination and guard against future pollution. Four projects involving GAHP members provide models of sustainable development practice. Clean Muthia, a multi-stakeholder-led project to clean up an Indian village contaminated with industrial waste using physical removal and vermi-remediation (*e.g.*, earthworms), succeeded in demonstrating the effectiveness of local technical solutions and providing new economic use for the land. A project investigating the feasibility of an artisanal Filipino method using non-toxic borax instead of mercury to extract gold in Indonesia provides a model for South-South technology transfer on an innovation economically ready for scale-up. Two projects initiated in response to the tragic deaths of hundreds of children from lead poisoning caused by artisanal gold mining in Zamfara, Nigeria and lead acid battery recycling in Dakar, Senegal show how local, national and international resources can be mobilized rapidly to address acute contamination events. These, and other projects, are important to show how toxic site cleanups not only protect human health but also help fuel virtuous cycles of growth and sustainable development.

Introduction – The Problem of Toxic Pollution

Toxic chemicals from industry and mining are estimated to affect the health of as many as 200 million people in low- and middle-income countries, according to emerging data from the Toxic Sites Identification Program (TSIP), a collaboration between Blacksmith Institute and the United Nations Industrial Development Organization (UNIDO). Supported by the World Bank, European Commission and Asian Development Bank, the program identifies and screens contaminated sites where heavy metals, pesticides, solvents, radionuclides and other toxic substances are found at highly elevated levels in drinking water, soil, air and food.

The TSIP is the first large-scale effort to better characterize the scope of toxic pollution and its impact on human health in low- and middle-income countries. Many high-income countries have developed inventories of contaminated sites that are used to prioritize interventions, often based on human health risk. The first such inventory was constructed by the U.S. Environmental Protection Agency (U.S. EPA) under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) of 1980, commonly known as the

Superfund Program[1]. Superfund assessments, and similar efforts elsewhere, provide extensive information on a contaminated site. These types of assessments, which often include exhaustive sampling and geospatial information, provide the basis for remediation or clean up efforts.

By contrast, few low- and middle-income countries have contaminated site inventories. At issue in most cases is cost—a Superfund site assessment can cost upwards of USD 100,000. With high numbers of sites to assess, such detailed assessments are unaf¬fordable for many low- and middle-income countries. The Initial Site Screening (ISS) protocol created under TSIP provides an alternative first step for governments[2]. The ISS is not an in-depth assessment, but rather a rapid evaluation of key criteria. The ISS identifies major elements of a contaminated site, including the estimated population at risk, information on the key pollutants present, human exposure pathway data and sampling data. The ISS can serve as the basis for comparing sites based on their estimated risk to human health, and prioritizing sites for further investigation or remediation. A typical ISS, including staffing, travel, sampling and overhead, costs about USD 1,000.

To date, the TSIP has characterized more than 3,000 toxic sites in 47 countries. These 3,000 sites represent a potential health risk to more than 80 million people, likely a fraction of the total number of people impacted worldwide[3]. By way of example, over the past twenty years, U.S. EPA has identified tens of thousands of sites in the United States alone that require remediation, and its National Priorities List of sites needing urgent remediation currently contains more than 1,300 sites[4]. TSIP data and trends indicate that as many as 200 million people may be affected[5].

Certain pollutants appear more often in the TSIP database than others. For instance, lead is identified as the key pollutant at nearly one quarter of TSIP sites[6]. Chromium, mercury and cadmium also occur frequently. These pollutants come from a range of industries. Contrary to popular belief, large or multinational companies are not always the main source of toxic pollution at these sites. TSIP data shows abandoned (*i.e.*, legacy) sites and active informal industry, especially artisanal and small-scale livelihood activities, responsible for a majority of contaminated sites and numbers of people potentially at risk[7]. At these sites, exposures are primarily due to a lack of environmental controls, and the knowledge and resources to implement them, and close proximity of the pollution or polluting activities to residential areas[8].

Impacts on Health and Poverty

Exposure to toxic contaminants is documented to harm human health. Women and children, particularly pregnant woman, women of childbearing age, unborn fetuses and children under age five, are especially vulnerable to the effects of contaminants such as lead, mercury, chromium, pesticides, persistent organic pollutants (POPs) and radionuclides[9]. Because they eat and drink more per unit body weight, and spend

[1] http://www.epa.gov/superfund/cleanup/index.htm and http://www.epa.gov/superfund/policy/cercla.htm.
[2] For more details about the ISS methodology and approach see: Caravanos J, et al. 2012. Rapid assessment of environmental health risks posed by mining operations in low-and middle-income countries: selected case studies. *Environmental Science and Pollution Research*. 1-8; and Ericson B, et al. 2013. Approaches to systematic assessment of environmental exposures posed at hazardous waste sites in the developing world: the Toxic Sites Identification Program. Envi*ronmental Monitoring and Assessment*. 185(2):1755-1766.
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more time in direct contact with soil and house dust, children can take in greater quantities of contaminants than adults[10]. A toxic intake during a critical period of development can have lasting adverse effects. Health effects vary by contaminant as well as exposure and intake characteristics, but can include physical and mental disabilities, organ dysfunction, neurological, reproductive, behavioral and other disorders, cancers and death[11]. In addition, contaminant exposures may weaken the body's immune system, rendering it more susceptible to illnesses such as respiratory infections, gastrointestinal disorders, and maternal health problems[12].

A large portion of the impact of toxic pollution falls on marginalized and vulnerable populations living in the poorest neighborhoods in low- and middle-income countries. For example, it is estimated that 98% of adults and 99% of children affected by lead exposure live in low- and middle-income countries[13]. Affected communities typically have limited or no health care infrastructure and suffer from poor nutrition, psychological stress, and other factors that can exacerbate the adverse health impacts of contaminant exposures, particularly for children[14].

In addition, toxic contamination of soil, air and water, can negatively impact biodiversity, poison or kill local wildlife and fish, and contaminate groundwater and crops. This can in turn exacerbate food and water shortages, and lead to accumulation of toxic chemicals in the food chain[15]. More specifically, soil contamination directly impacts agriculture production by damaging soil fertility and increasing contaminant concentrations in the edible portions of crops. Contaminant runoff and soil contamination can make both ground and surface water unsuitable for agricultural or domestic use[16]. This can increase family expenditures as a result of the need to purchase water, and can disrupt daily routines with the need to obtain water from remote areas. In urban areas, sites are often old, abandoned industrial estates that no longer support economic activities, or are unattractive for future investment precisely because of the risk to human health. Contamination can drive down perceptions of the value of land and prevent development of new business, employment and/or housing opportunities, thereby discouraging economic growth and job development in areas that need it most[17].

Health problems associated with toxic contamination can also negatively impact the productivity of communities, affecting their health, intellectual capacity, and physical and mental ability to work[18]. This compromises their capability to provide for their families' needs and can tip vulnerable populations into poverty, as well as reinforce the cycle of poverty. Occupational health is also a serious issue where workers are exposed directly to chemicals in the absence of knowledge about the risks, sound occupational and health safety

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regulations and practices, and mechanisms for their implementation[19]. Last, some pollutants, such as mercury and POPs, are trans-boundary, settling in distant regions and affecting public and ecosystem health globally[20].

Burden of Disease from Toxic Pollution

The health impacts of selected contaminants are well documented, but the extent of the problem worldwide, especially in terms of global burden of disease is not well understood[21]. Before the TSIP, data were lacking on the numbers of contaminated sites worldwide and the types of contaminants present. Thus, prior calculations of the burden of disease from toxic exposures did not include estimates of the burden from exposure to contaminated sites.

Global burden of disease estimates are regularly expressed in Disability Adjusted Life Years (DALYs). DALYs are the sum of two prior calculations, Years of Life Lost (YLL) and Years Lived with Disease (YLD). By combining these, the DALY effectively captures both mortality and morbidity effects. By analyzing TSIP data and calculating associated DALYs, researchers are beginning to quantify the health impacts of contaminated sites in low- and middle-income countries. Results from two recent publications are presented below.

Using TSIP data, Chatham-Stevens *et al*. (2013) conducted a detailed analysis of 373 contaminated sites in India, Indonesia and the Philippines[22]. They estimated that, in 2010, 8,629,750 people were potentially at risk of exposure to one of eight contaminants with established dose-response relationships (aldrin, asbestos, cadmium, hexavalent chromium, DDT, lead, lindane, and mercury). This translates to 828,722 DALYs, with an estimated range of 814,934-1,557,121 DALYs, depending on the weighting factors used. This disease burden is comparable to that from outdoor air pollution (1,448,612 DALYs) and malaria (725,000 DALYs) in the countries studied. Exposure to lead and hexavalent chromium accounted for 99.2% of the total DALYs. This work likely underestimates the disease burden from contaminated sites, since not all sites in these countries were identified and characterized. The authors concluded that contaminated sites are a major, under-recognized, global health problem.

Caravanos *et al.* (2013) quantified the burden of disease in Asia resulting from lead exposure and cognitive impairment in communities living near contaminated sites[23]. Using TSIP data on soil and water lead concentrations at 82 sites in 7 countries, the U.S. EPA's IEUBK model which translates soil and water lead concentrations to blood lead concentrations, and the Lanphear et al. (2005)[24] and Schwartz (1994)[25] meta-analyses of blood lead levels and IQ (intelligence quotient) point loss, they estimated that 189,725 children age 0-48 months were at risk of IQ decrements, from 4.94 IQ points lost on average at lower blood lead levels (e.g., < 10 ug/dL) to 14.96 IQ points lost on average at higher blood lead levels. Given the restricted scope of the study and the conservative assumptions used in the analyses, these numbers almost certainly underestimate the burden of disease from lead exposure at contaminated sites in Asia.

[19] https://www.osha.gov/SLTC/hazardoustoxicsubstances/.
[20] http://www.epa.gov/airquality/peg_caa/toxics.html; Schafer and Kegley 2002.
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Implications for Economic Growth and Sustainable Development

While the health effects of toxic exposures are direct (though their scale is under-recognized), the economic consequences are indirect, but no less real. Some economic impacts, such as increased healthcare costs and losses in productivity owing to IQ decrements, can be readily hypothesized. Landrigan *et al*. (2002) estimated the increase in pediatric healthcare costs of four diseases attributable to environmental exposures: lead poisoning, asthma, cancer and developmental disabilities. They estimated that the cost of treating the environmentally-attributable fractions of these conditions was 2.8% of total annual U.S. healthcare costs, or USD 54.9 billion[26]. Similar estimates are not currently available for low- or middle-income countries.

Trasande *et al*. (2005) examined the influence of decreased brain development due to methyl mercury exposure on lost economic productivity in the United States. They estimated that 600,000 U.S. children suffered IQ loss annually as a result of mercury pollution, leading to economic productivity losses of USD 8.7 billion annually[27]. These types of analyses would have to be conducted on a country-by-country basis to get accurate cost estimates, but the U.S. studies are useful for illustrating the potential scale of the economic costs of toxic pollution.

IQ decrements associated with pediatric exposures to neurotoxicants such as lead and mercury may have long-term, negative consequences for economic growth, although quantitative studies have not been done. Hypothetically, increased children's blood lead levels in a contaminated community could mean a drop in the proportion of children with IQs above 130 ("mentally gifted"), affecting its ability to be economically productive and attract investment. Conversely, it could mean an increase in the proportion of children with lower IQs, including those with levels below 70 ("mentally impaired"), who need special care and community support. There is evidence that low IQ individuals, including those with high lead exposure in early childhood, tend to be more aggressive, resulting in increased societal violence and its accompanying costs[28].

Eliminating toxic sites may also contribute positively to economic growth by expanding access to natural resources and land. If contaminated sites are associated with lower land values, it follows that cleaning them up can render them more economically useful, and potentially raise the market value of the land. This increased value can be realized through sale or economic use for industrial/commercial activity in urban areas, or in rural areas, crop cultivation or livestock grazing. In addition, rising demands for housing in urban areas due to rapid urbanization has led to informal settlements (shantytowns, *favelas*) in contaminated areas in many countries[29]. Many city governments, such as the Cities of Montevideo in Uruguay and Buenos Aires in Argentina, are concerned with this issue and see value in remediation not only to mitigate toxic exposures, but also to help alleviate housing pressures. These cities have begun integrating toxic hotspot identification and health risk assessment into their housing development programs. In short, whether contaminated sites are located in urban or rural areas, growing concerns about urbanization, and food and water security will likely mean the value of

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[29] Toxic Sites Identification Program. 2013.

remediated land will rise.

Toxic site cleanups can increase access to other valuable resources and reduce poverty. For example, informal used lead acid car battery recycling, which can lead to extremely high lead exposures in local populations, can be found in nearly every major urban area in low- and middle-income countries[30]. If more efficient, collection and recycling practices for used lead acid batteries are implemented, so that loss of lead-laden slag ceases, recovery of reusable lead will increase[31]. Similarly, artisanal gold miners can implement more efficient, and nontoxic practices that not only eliminate the use of toxic mercury, but also extract higher gold yields compared to traditional mercury-based methods[32]. Not only do the miners earn more income, but also less gold is lost in the tailings waste[33]. Toxic-free technologies that offer more profit to small-scale workers can increase their incomes and help them escape the poverty cycle.

The Global Alliance on Health and Pollution (GAHP) - Partnering to Rid the World of Toxic Hotspots

GAHP was formed in 2012 as a collaborative body tasked with coordinating resources and activities to assist low- and middle-income countries to take concrete action to address chemicals, wastes and toxic pollution and their impacts on human health, including remediation and prevention of future contamination. With 22 members, including the World Bank, Asian Development Bank, Inter American Development Bank, European Commission, Deutsche Gesellschaft fuer Internationale Zusammenarbeit (GIZ), UNEP, UNIDO, UNDP, the Ministries of Environment from Mexico, Indonesia, Peru, Philippines, Senegal and Uruguay, and others, GAHP provides capacity building, training and technical assistance to low- and middle-income countries in the following areas:

- Identification and rapid assessment of toxic hotspots and health exposure risk;
- Local, regional and national priority setting related to chemicals, wastes and toxic pollution;
- Mainstreaming chemicals, wastes and toxic pollution into national, country and donor development/ partnership strategies and plans;
- Development and implementation of national toxics action and sound chemical management plans;
- Detailed assessments of polluted sites;
- Pollution intervention and remediation planning;
- Intervention and remediation implementation;
- Regulatory review related to pollution;
- Stakeholder/community engagement and awareness raising/education;

GAHP also provides access to guidance documents and tools, good practices, successful cost-effective remediation models and case studies, and is committed to raising awareness internationally about chemicals, wastes and toxic pollution, and their human health and environmental impacts.

Strategies for Success

Four cleanup projects provide models of sustainable development practice:

Case Study: Clean Muthia - Multi-stakeholder Vermi-remediation Demonstration Project [34]

[30] Toxic Sites Identification Program. 2013.

[31] Hoffmann U and Wilson B. 2000. Economically viable management of battery recycling in the Philippines in the wake of Basel Convention trade restrictions. *Journal of Power Sources*. 88(1):115-123.

[32] Appel P and Na-Oy L. 2013. How to mitigate mercury pollution in Tanzania. *Journal of Environmental Protection*. 4:1-5; Appel P and Na-Oy L. 2012. The borax method of gold extraction for small-scale miners. *Journal of Health and Pollution*. 2(3).

[33] Appel and Na-Oy 2012; Appel and Na-Oy 2013.

[34] Description of pollution challenge and technical response adapted from Dabke SV. 2013. Vermi-remediation of heavy metal-contaminated soil. *Journal of Health and Pollution*. 3(4):4-10.

The Pollution Challenge: Muthia Village is located in an industrial park in eastern Ahmedabad, Gujarat State, India. A 1995 site investigation funded by the U.S. Agency for International Development described waste piles containing unknown chemicals of different colors around the village. A 2006 follow-up investigation conducted by Blacksmith Institute, India's Society for Environment Protection, and Vadodara-based Concept Biotech found a large number of industrial dump sites, and heavy metal contamination.

Technical Response/Innovation: In 2006, Blacksmith Institute, Society for Environment Protection and Concept Biotech initiated efforts to clean up the site. A multi-stakeholder group, comprised of community representatives, the Gujarat Pollution Control Board, the Naroda Industrial Association, and local non-governmental organizations (NGOs), reviewed, approved, and oversaw the implementation of a $25,000 remediation plan consisting of physical removal of approximately 3,000 metrics tons of industrial waste to a landfill and a pilot vermi-remediation project. Vermi-remediation uses earthworms (*Eisenia fetida*) to assist in remediation of contaminated soil because they enhance microbial and plant activity in degraded soils. The pilot project involved: baseline soil testing for heavy metals (lead, chromium, cadmium); amending the soil with a beneficial microbial inoculum, compost and earthworm growth accelerator; seeding the site with grass and maize; and introducing earthworms (approximately 300 kg). After treatment, soil chromium levels decreased, maize roots showed chromium, cadmium and lead uptake, and the earthworm population, non-existent beforehand, showed good survival rates after six months. Additional measurements such as metals concentrations in earthworm tissue were desired but limited by funding constraints.

Sustainable Development Practice Model: Through this project and involvement of the stakeholders, particularly the State Pollution Control Boards, the team demonstrated that locally-available technical solutions can be effective and feasible. The community-based approach, emphasizing public participation, accountability, and remediation rather than recrimination, was instrumental to success. Public participation was ensured by actively involving the *sarpanch or pradhans* (village heads), having them present during field activities and at quarterly stakeholder meetings. The local pollution control officer, academics from the local engineering college and industry representatives were also present during monitoring activities. Villagers were shown how to make compost using earthworms in open pits. Consensus was not always achieved but where it was, progress was rapid, including the expedient physical removal of contaminated soil by the industrial association. The association has since constructed a storage facility on a portion of the site, providing new economic value to previously degraded land.

Case Study: Promoting Mercury-Free Artisanal Gold Mining Practices from the Philippines in Indonesia[35]

The Pollution Challenge: More than 10 million artisanal and small-scale gold miners worldwide use elemental mercury to extract gold from ore. This process releases large amounts of mercury to the environment that is subsequently transformed into methylmercury, a potent developmental neurotoxicant. Gold-laden mercury "flour" lost during extraction also means financial losses for miners. In Indonesia, there are approximately 300,000 miners, most using mercury, making Indonesia the third largest emitter of mercury from artisanal/small-scale gold mining globally[36].

Technical Response/Innovation: Thirty years ago, miners in Benguet Province, Philippines discovered they could recover gold from ore concentrate using borax (sodium tetraborate), an inexpensive, non-toxic component of common household detergents, and an enhanced gravitational method. This method, often referred to as the "borax method" or "smelting" has since been refined and adopted by approximately 15,000 miners on the

[35] Description of pollution challenge and technical response adapted from Appel and Na-Oy 2012, 2013.

[36] AMAP-UNEP. 2013. Technical Background Report for the Global Mercury Assessment. Available: http://www.amap.no/documents/doc/Technical-Background-Report-for-the-Global-Mercury-Assessment-2013/848; accessed 9 August 2013.

island of Luzon. It involves crushing, milling, sluicing and washing the ore to form concentrate, then mixing the concentrate with borax and water and heating it with charcoal in clay bowls to release the gold. Borax acts as a flux, reducing the melting point of the gold, so it can be extracted. While the borax method likely will not work on all ore types, the method has been successfully demonstrated (*e.g.*, shown to extract more gold in the same quantities and timeframes as mercury) in Indonesia, Tanzania, Ghana and Mozambique. In Indonesia, a GAHP-funded consortium (Blacksmith Institute, Jakarta; Geological Survey of Denmark and Greenland; Workers' Cooperative of Emerald Mountain, Benguet, Philippines; Geological Engineering Department, Gadjah Mada University; Yayasan Tambuhak Sinta; and the Government of Indonesia Centre for Mineral Resources Technology, in collaboration with the Ministry of Environment) launched a year-long effort in January 2013 to further test the borax method in Kalimantan, Java, Sumbawa and Sulawesi. Preliminary results indicate the method will outperform mercury at 10 of the 14 original test sites.

Sustainable Development Practice Model: This project provides a model for how to promote South-South technology transfer and learning from an innovation ripe for scale-up. The borax method has built-in economic incentives for widespread adoption: borax is cheaper than mercury (e.g., USD 5/kg versus USD 160/kg) and readily available in local stores; the method can extract up to twice as much gold in certain areas, making it more profitable; and it does not require investment in expensive equipment[37]. The project relies on miners from the Philippines with direct expertise using and training others in the borax method, rather than developed country experts, to train the Indonesian miners via hands-on demonstrations using 50 kg sacks of local ore. Scalability is enhanced by involving local small mine owners and financiers in the demonstrations. Also, detailed mapping and geochemical analyses conducted by Indonesian and Danish experts will help define the optimal geological conditions for the method to be feasible.

Case Study: Lead Poisoning and Car Batteries Project, Senegal

The Pollution Challenge: Recovering lead from used lead acid car batteries (ULAB) is a profitable small-scale business in many developing countries. Small-scale ULAB recycling and smelting is often conducted in densely populated urban areas without pollution controls, releasing toxic quantities of lead to the local environment. In 2007-2008, 18 children died from lead poisoning in a ULAB recycling community in suburban Dakar, Senegal, although autopsies were not conducted[38]. Follow-up blood lead monitoring of 32 siblings, 23 mothers, and 18 children and 8 adults from the area showed all were lead poisoned, some severely[39]. Homes and soil were also severely lead contaminated, with up to 14,000 mg/kg in indoor dust and up to 302,000 mg/kg in soil outdoors (*versus* the U.S. and European Union soil guideline of 400 mg/kg)[40]. The children's deaths occurred during a local 'lead-rush' when a newly opened lead smelter offered USD 100/day for women and children to collect the waste in their stockpiles and sift through it to concentrate the residue. After the deaths, the government shut down the smelter.

Technical Response/Innovation: In response to a request for emergency assistance from the Senegalese Ministry of Health, a national/international consortium stepped in to respond. The University of Dakar's Toxicology Department worked with the Ministry of Health and local religious and village authorities to develop an education and outreach program to convey the dangers of lead exposure. The World Health Organization (WHO) conducted the emergency blood lead monitoring and environmental screening described above and later helped treat lead-poisoned children and adults. The Senegalese Department of Women's Affairs worked to develop alternative livelihood projects for the women engaged in ULAB recycling in the area. Blacksmith

[37] Appel and Na-Oy 2012.
[38] Haefliger P, Mathieu-Nolf M, Lociciro S, Ndiaye C, Coly M, Diouf A, et al. 2009. Mass lead intoxication from informal used lead-a-cid battery recycling in Dakar, Senegal. *Environmental Health Perspectives*. 117:1535-1540.
[39] Haefliger et al. 2009.
[40] Haefliger et al. 2009

Institute and other partners supported the local government in its soil cleanup efforts. Approximately 3,000 cubic meters of lead-contaminated soil were removed to a lined landfill using local contractors and community labor, under the supervision of Blacksmith experts and the Senegalese Ministry of the Environment[41]. Local women, trained and guided by Blacksmith experts, decontaminated more than 80 homes[42]. A newly-constructed ULAB collection center is now being used to manage batteries safely, while the French Global Environment Facility has supported additional efforts to provide alternative employment for women in the community. Policy changes are also in effect, targeting the elimination of informal ULAB recycling by better regulating battery collection, transport, storage and recycling.

Sustainable Development Practice Model: This was the first hazardous waste remediation project undertaken in Senegal to date. Soil lead levels in the area are now below 400 mg/kg while children's blood lead levels continue to decrease[43]. Although the tragedy of the children's deaths will not soon be forgotten, the project showed how local, national and international resources can be mobilized rapidly to address an acute contamination event. Sustained commitments from the various partners will help ensure that the tragedy is not repeated and that informal ULAB recycling is better managed in Dakar and elsewhere.

Case Study: Emergency Lead Poisoning Crisis in Zamfara, Nigeria

The Pollution Challenge: In March 2010, excess childhood death and illness occurring primarily amongst children under five in Zamfara State, Nigeria, was reported by Médecins Sans Frontières (MSF) to the state health authorities. Investigations led by the US Centers for Disease Control and Prevention (US CDC), in collaboration with Federal and Zamfara State authorities, MSF, Blacksmith Institute and the WHO, revealed that the outbreak was caused by acute lead poisoning. The source was massive environmental lead contamination from the informal processing of lead-rich ore to extract gold[44].

Technical Response/Innovation: In June 2010, Zamfara State and Federal health authorities requested assistance from WHO, CDC, MSF and the Blacksmith Institute to address the problem. MSF offered chelation therapy, a treatment that removes lead from the body, to children with critical levels of lead provided they would not return to a contaminated environment. Environmental assessments indicated that lead exposure could be eliminated by the removal and replacement of topsoil and by thorough cleaning/removal of dust from all interior spaces, homes and compounds. From June 2010 to March 2011, in collaboration with Terragraphics, UNICEF and local authorities and with funding from the UN Central Emergency Relief Fund, Blacksmith Institute conducted environmental decontamination project[45]. Local villagers were trained to assist with the clean-up operations, including cleaning of homes. Contaminated soil was removed to secure landfills and replaced with clean soil. In total, seven villages were remediated, including 282 residential compounds, 107 exterior areas and 23 processing ponds, allowing for MSF to provide chelation treatment for more than 1000 children. The project also removed highly contaminated material from seven ponds used to make bricks for compound repairs. In addition, UNICEF and project partners mobilized the communities and established advocacy programs to raise awareness, facilitate remediation and support prevention of recontamination. The project also trained more than 200 Ministry, village and private personnel, to conduct remediation activities and promote safer mining

[41] Blacksmith Institute. 2010. Used Lead-Acid Battery Recycling: Dakar, Senegal. Available: http://worstpolluted.org/used-lead-acid--battery-recycling-in-dakar-senegal-2010.html; accessed 8 August 2013.
[42] Blacksmith Institute 2010.
[43] Blacksmith Institue. 2013. Project Completion Report: Used Lead Acid Battery Contamination-Dakar, Senegal. Available:www.blacksmithinstitute.org/files/FileUpload/files/Project%20Completion%20Reports/Project%20Completion%20Report%20Senegal%20updated%20July%202013%20.pdf; accessed 9 August 2013.
[44] This outbreak was confirmed in several published studies, including Yi-Chun L. *et al.* Childhood lead poisoning associated with gold ore processing: A village level investigation – Zamfara State, Nigeria, October - November 2010. Environmental Health Perspectives. 2012. 120 (10) 1450-1455.

practices. During remediation, an additional seven villages were identified for urgent emergency remediation. The Government recently completed remediation of one of the largest affected villages, Bagega, and currently is working to set up a wider capacity building program on safe mining practices.

Sustainable Development Practice Model: This project demonstrated how the international community can work together to solve pollution problems at the request of a government, particularly such an acute, emergency situation caused by subsistence artisanal livelihood activities. In order for MSF to treat the lead poisoned children, homes needed to be lead-free, and recontamination prevented. The intervention required coordination and collaboration at local, state and federal levels. Involvement of local stakeholders, including community leaders was critical to ensuring thorough understanding (especially of the miners themselves) as to the causes of the outbreak, and how to avoid future contamination by implementing safe mining practices.

Conclusion

Toxic chemicals from industry and mining may affect the health of as many as 200 million people in low- and middle-income countries, most of who live in extreme poverty. Cleaning up toxic hotspots improves the natural environment, reduces environmental health risks, improves access to clean soil and water, and can improve recovery of valuable resources such as gold, lead, and urban lands. In addition, it has positive implications for poverty reduction, productivity and economic growth. In short, contaminated site clean-ups not only protect human health, they can also help fuel virtuous cycles of growth and sustainable development.

Section 6

Low-Carbon Energy and Sustainable Industry

GLOBAL ASSOCIATION
Master's in Development Practice Programs

Sustainable Development Practices: Advancing Evidence-Based Solutions for the Post-2015 Agenda.

Proceedings of the 2013 International Conference on Sustainable Development Practice

Chapter 15

Micro-hydro power with pro-poor public private partnership (5p) method: a sustainable solution for rural electrification in Indonesia

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Abstract

Despite of its massive economic growth, Indonesian still have problem to electrify some of its area. Approximately 105 million Indonesians in rural areas still live without electricity. The need of electrification is very important for Indonesia because without electricity, the developments of those areas are becoming stagnant. Micro hydropower generation has been seen as one of the viable solutions for this problem. This is because hydro power is the least costly option for rural electrification. The big advantage of hydro power is that after the construction of a micro hydro generator, its operation costs are much lower compared to other renewable or fossil fuel based energy sources. However although the application of micro hydropower technology in Indonesia has been going on for years and the technology works well, only small portion of Indonesia's huge potential of micro hydro power has been exploited. Financial, expertise and regulatory obstacles often pose barriers. Lessons drawn from similar projects taught us that institutional arrangements rather than technical quality determine the success of micro hydro power projects. In order to be sustainable, rural electrification through micro-hydro development also demands a high level of local participation. This paper believes that according to UNDP, Pro-Poor Public Private Partnership (5P) scheme is the best model to develop and maintain a successful micro hydro power plant. The term "pro poor" means that it engages the poor not only as passive recipients, but also as equal partners. The involvement of private sector with its entrepreneurial strength will bring efficiency and effectiveness to the project, and ensure that the problem of poorly applied subsidy, something common in government or international organization projects, does not occur. Last, the public sector can bring policy support to the venture. 5P offers combination of social, commercial, and authority approaches, bringing together the advantages of all sides. Research question: How to achieve energy for sustainable development in Indonesia? Finding: The paper can yield to an outcome of energy for sustainable development, poverty reduction, and local community empowerment due to it embraces three main components which are government, privates, and local community.

Background

Millions of rural people in Indonesia are still having no access to the electricity. Due to having no access to the electricity, rural people tend to consume more traditional energy sources that is available for instance diesel generators, batteries, and other fuels like kerosene. These sources are much more expensive per kilowatt-hour and less effective than electricity grid connections, but they are the only sources available. These sources are also very much dangerous for the environment because it emits high carbon emissions. To tackle this problem, micro-hydro power is introduced. The micro-hydro power is less costly, sustain, and having a very significant positive impact to the environment. Yet, without a right-on-the-target kind of policy, a good solution will never reach the poor people. Pro-Poor Public Private Partnership (5P) is believed can be able to reach the poor because it includes the poor people not only as the beneficiaries, but also as the partner and stakeholder.

Many kind of policies before were not appropriately reach the poor. It's because the mindset was to put the poor people solely as beneficiaries thus their actual needs sometimes were not fully sounded. Even worse, most of the policies were merely reach middle-class who in the case was not the actual target. In the case of Indonesia, even PLN (state-owned electricity company) is still not success to bring electricity to the rural people with their

conventional rural electrical programs. It's mostly cannot reach people in the remote area, and even their works are too slow compared with population and economic growth. Thus to meet the objectives of availability of the energy supply, competitive and affordable prices, and socially and environmentally compatible energy infrastructures,1 the micro hydro power with Pro-Poor Public Private Partnership (5P) may offer advantages for Indonesia to reach the aforementioned objectives.

This paper will mainly discuss about why micro-hydro power with 5P method can be classified as a sustainable solution for rural electrification in Indonesia. This paper is divided into 4 sections of analysis. The first section discusses about general electrification condition in Indonesia, the second section discusses about micro-hydro power with conventional method, third section discusses about micro-hydro power with 5P method, section forth discusses about

1. International Energy Agency Report. 1997. "Asia Electricity Study" p. 208.

the impact of micro-hydro power with 5P method for rural people, there are two study cases to reveal the success of micro-hydro power through 5P method, and the last is conclusion.

1.2. Research Question:

Why Micro-hydro power for rural electrification with 5P method is more sustainable compare to the conventional one?

1.3. Analysis:

Section I. General Electrification Condition in Indonesia

I.1. Electrification as basic need for rural areas

Indonesia is an archipelago country whose 70% of around 240 million inhabitants live in rural areas.[4] Only 24% of the Indonesian populations had access to electricity in 1990,[5] those rates improving only marginally in subsequent years. And most of those areas with access are urban areas. Levels of village electrification in Indonesia are uneven, for example, Java is 78% electrified, but Kalimantan is only 28% electrified.[6] While to back the rapid growth, Indonesia needs to develop remotes areas. To develop those remote areas, government needs to electrify those areas.

I.2. Conventional Rural Electrification

The government of Indonesia began the rural electrification program in 1977.[7] They set targets for development by 5 year plans. The way they select villages for electrification is based on ranking them in 14 variables in which modern villages situated close to existing power lines or showing potential for productive use of electricity are given priority.[8] This method of top down electrification usually leaves remote villages at low priority and defers their access to the social amenities of electricity in multiples of five years.

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[4] __*Rural Poverty in Indonesia*, was accessed from http://www.ruralpovertyportal.org/country/home/tags/indonesia on August 1st 2013 at 06.31.
[5] International Energy Agency Report., Op. Cit. 156.
[6] International Energy Agency Report., Op. Cit. p. 167.
[7] Lalit Kumar Sen, *Rural Electrification in Indonesia* (Cambridge: Harvard Institute for International Development, 1982), p. 4.
[8] International Energy Agency Report., Op.Cit. p. 66.

The PLN (stated-owned electricity companies) does not carry out feasibility studies in determining electrification, which often lets higher than expected lifecycle costs slow the entire process down. Although the Rural Electrification program was successful in increasing the number of households with access to just fewer than 40% by 1995, a large number of people still had no access.[9]

I.3. Micro-hydro power for Rural Electrification

Micro-hydro power makes use of the water's velocity and height of its falling into the small stream, to produce electrical less than 100 kilowatts.[10] The system does not need to remove the inhabitants; it also does not damage the forest since the system needs one of the forest trees keep hold of the water to get one kWh (kilowatt-hour). Also, according to IEA, micro-hydro power in Indonesia only requires less than 50 Wp/month.[11] Since most rural households require only a small amount of electricity, micro-hydro perfectly fit the needs of rural households. Micro hydro systems suitable for small loads (around 60 Wp, which could support about three fluorescent lights and a couple small appliances) are more cost effective than conventional systems. Micro-hydro systems also require less maintenance-little servicing and no refueling-than diesel generators or even grid supplies; this coupled with their high reliability translates into low life- cycle costs when compared with alternatives.[12]

Section II: Micro-Hydro Power with Conventional Method

II. 1. Typology

Micro-hydro power using the conventional method means micro-hydro power project runs either only by the government or privates/NGO and there is no partnership between those parties.

II. 2. Limitations of Conventional Method

By using the conventional method, each party cannot optimize their efforts. On the side of the government, it's becoming increasingly clear that government cannot meet the continually growing demand for services by acting alone, and there is need to look for support from other sectors of activities.[13] The public (government) for many times are not efficient in terms of money and time. The cost of project sometimes too high with low level of successfulness due to it mostly does not reach the actual target (the poor). Sometimes it lacks of supervision from other parties thus it's fragile of corruption. On the other hand, privates are solely profit seeking agents who have minimum awareness on poor people's needs. It's too often the case that the privates targeted the segments of the market where risks are lower and revenues are easier to generate (which is the middle class) hence without a strong public policy guideline, the poor people may be left out.[14] Or in the case of NGOs for instance, although it has high awareness on poor's needs, NGO is not policy maker. Too often, the NGO's interest clashed with the

[9] International Energy Agency Report,. Op.Cit, p. 67.

[10] __*Microhydropower Systems*, was accessed from http://energy.gov/energysaver/articles/microhydropower-systems on July 27th 2013 at 19.47.

[11] International Energy Agency. 1999. "Energy Prices and Taxes" in Quarterly Statistic. First Quarter, p. 456.

[12] U.S. Department of Energy. 1998. "Village Power '97 Proceedings." Photovoltaics 1996-1997. CD-ROM. Washington, DC: : Produced for the Office of Photovoltaics and Wind Technologies by the Office of Scientific and Technical Information, p. 9

[13] Agency for Public-Private Partnership. 2010. "PPP Guide for Central and Local Public Sector Bodies in Relation to the Procedures in the Agency for Public Private Partnership" was accessed from http://www.ajpp.hr/media/12445/vodic%20eng_twl.pdf on August 1st 2013 at 06.10.

[14] Miguel Perez Ludena. 2009. "Towards A New Model of PPPs: Can Public Private Partnership Deliver Basic Service to the Poor?." In *WP/09/01*, p. 1-25.

government interest. NGO needs government to give administrative permits and creating policies that are in line with the goal of NGO.

Section III. Micro-Hydro Power with 5P Method

III. 1. What is 5P Method?

According to Miguel Perez-Ludena, a researcher in UNESCAP, Pro-Poor Public Private Partnership or known as 5P is a kind of partnership that go beyond an agreement between a private company and a government agency, including as well NGOs, community organizations, and even informal entrepreneur that aiming to deliver basic needs to poor people and include poor people in the design and management of the operations.[15] 5P is seen as a viable strategy and method to deliver service to the poor. It combines the public interest of the government with community involvement and also with the efficiency of the private sector. As a result, it increases the quality of the service from the government while reducing government expenditures as the private is efficient and appropriately reaches the goal because the community is involving from the start until the end of the program.

III. 2. The Uniqueness of the 5P Method

By collaborations between public and privates/NGOs to reach the poor, the target can be achieved by pooling financial resources, know-how, and expertise to improve the delivery of basic services to all citizens, thus the public services can be provided while also in the same time, a good standard is also met.

Specifically, it can bring real benefits in helping government (public) to implement the policy appropriately and to finance infrastructure investment in a more efficient way. If government can be more efficient, it can devote some funding to other national spending priorities such as citizen's education and health. 5P is also having a strong emphasis on fixed staff and budgetary resources and public regulation inhibit rapid innovation or technology upgrades. While for privates, 5P offers them to improve profitability and expand markets. It can helps them to have wider customers, not merely middle-up customers, thus they can harness the dynamism and efficiency of the profit. For the community themselves, they are being both the project runner (together with donors) and owns the projects. They usually provide the labor for construction, giving housing for NGOs/ private team who stay with them, actively involved in decision making process, and having cooperative to manage the money from electricity produced.

III. 3. General Benefits of using 5P method for running the micro-hydro power

In general, there are 8 reasons why using the micro-hydro power with 5P method is a sustainable solution:

1. Community Participation

Community participation is important for securing, monitoring, and enforcement mechanism. When many of the formal mechanism for monitoring and enforcing agreements are not functioning properly, the practice will need to rely on informal ones, for which it is important the active participation of the community and its ownership over the practice.[16] A community may apply peer pressure to non-paying households in a much more effective way than a government or private company would.

[15] Ibid.
[16] Miguel Perez Ludena,. Op. Cit.

Through the 5P method, the NGO and government are able to work with local people closely. They work together to conduct capacity building and training for the local people to let the locals to be a main player in the project.

2. Reaching the Rural People

It involves rural people in the design and management of the scheme. The rural people who are mostly poor need to be empowered. According to the UN, Empowering rural people is an essential first step to eradicating poverty.[17] The poor involvement can bring some benefits such as first, increased ownership and confidence of the poor because they are not solely beneficiaries but also one of the stakeholders. Second, the policy can be appropriately reaching the targeted goals compare to if there is no involvement from the poor.

3. Meet the Deadline

The effectiveness of the private/NGO is able to enforce the project to be delivered on time or even sooner. Any delays in meeting the agreed timelines will suffer those three parties especially the private/NGO, thus they will bring both government and the community to be more efficient and effective as well.

4. Focus is at the bottom of the pyramid

It shifts the focus of the program from the top-middle of the pyramid to the bottom of the pyramid. All parties adapt to serve the poor communities thus the goal can appropriately reach the poor. It also increases community empowerment, increase village revenue, education for children of local people, increase health service, increase confidence of the local people, and increase the management and organizational skill of local people.

5. Full of benefits

The community has been able to generate revenue and reinvest it in village development through the provision of health care, education, seed-capital, and information access. It creates higher energy security because it can increase the electricity supply.

6. Feasible and Viable

It's an excellent example of a community-based, small-scale project that can be successfully implemented with local and affordable technology. The electricity output not only benefits the locals, but also can contribute to electricity supply for a broader area depending on grid availability. It's definitely a good practice for the same type of project.

7. Promotes Renewable Energy Development

It helps to promote renewable energy development and has positive environmental impacts, including reduction of fossil fuel dependency and no generation of GHG emissions and local air pollution. The local people are also motivated to protect the forest along the river because it directly influences the rate of water flow.

[17] UN, Rural Poverty in the Developing World, was accessed from http://www.un.org/en/globalissues/briefingpapers/ruralpov/developingworld.shtml on August 2nd 2013 at 20.10.

The local people are also having high sense of belonging to the project because they know the projects give many advantages for them in many aspects of life.

8. Risk Sharing

5P is designed so that the risk is equally transferred amidst public, private/NGO, and community. It's able to help to manage the risk cost effectively.

Section IV. The Impacts of micro-hydropower with 5P method for local people in remote areas

1. Economic impact

Access to basic social amenities involving electricity is often regarded as a contributor to more equal income distribution. Looking at the evolution of energy demands in the rural areas, one of its most notable aspects is the role and importance of electricity. Even at the lowest economic levels, just above subsistence, radios and torches can make a significant improvement in living standards and are widely used. The amounts of electricity involved are tiny, but are absolutely essential. Proceeding up the scale of rising prosperity, electricity is increasingly required to provide the services people demand. The emergence of different, and more effective, means of meeting these evolving electricity demands is a key feature in the rural development process.[18]

2. Social Impact

Electricity is more than a luxury item; it is important for essential social benefits, economic development, and environmental protection. In general, it is crucial to improve health by providing means of refrigeration, sanitation, and water supplies by electrically driven pumps. It also provides after dark lighting for educational purposes and can help improve productivity in agriculture though electric grain drying and processing as well as power tools.[19]

Another social impact of the micro-hydro power with 5P method is some local children can be granted scholarships. The scholarships come from the net monthly profit earned by selling the electricity to the PLN. Besides scholarships, there are also community radio station, health clinic, and village telephone.

3. Environmental Impact

Environmentally speaking, during operation, micro hydro produces no air pollution, hazardous waste or noise, and requires no transportable fuels or fuel combustion. According to the World Bank, as a substitute for traditional fuels, electricity also contributes to more efficient energy use and helps reduce deforestation, desertification, and losses of biological diversity, all usually associated with traditional fuel consumption.[20]

Study Cases: Success Stories

Some Successful Projects:

Especially in remote areas, micro hydro-power have already been proven as least-cost options; for example in Cinta Mekar village and Palanggaran village.

[18] Geral Foley. 1995. "Photovoltaic Applications in Rural Areas of the Developing World" in World Bank Technical Paper No. 304. Washington, DC: World Bank, p. 22.

[19] "Photovoltaic Rural Electrification Possibilities in Indonesia and the Philippines." Was accessed from 123HelpMe.com on 07 Aug 2013 at 07.33

[20] Ishiguro, Masayasu and Takamasa Akiyama. 1995. "Energy Demand in Five Major Asian Developing Countries" in World Bank Discussion Paper No. 277. Washington, DC: World Bank.

1. Cinta Mekar Micro-Hydro Power Plant[21]

Profile of the project:

Project Initiator	IBEKA Foundation
Funding Agency	UNESCAP, HIBS, and IBEKA Foundation
Community Contribution	Manpower, Stones, and Sands
Design	IBEKA Foundation
Developer	IBEKA Foundation
Number of Customers	122 households
Head	18.6m
Water Discharge	1500 liters/second
Power Output	120kW

The project is currently running, producing, and selling electricity to the grid. All electricity generated is sold to the PLN. All profit earned by the Mekar Sari Cooperative (a local cooperative to manage the profit earned) is being distributed among the community. The project is funded and managed by public and private institution. The total project cost was funded equally by three parties : a multilateral donor agency, UNESCAP; a private company, HIBS, and a NGO, called IBEKA Foundation. Yet, although the initial cost investment was covered by those three parties, the plant is indeed equally owned in a joint venture between the local people (represented by Mekar Sari Cooperative) and a private company (represented by PT HIBS). The joint venture sells the electricity generated by the plant to PLN, the state-owned electricity company, under a Power Purchase Agreement (PPA) for low voltage and medium voltage connection. The electricity is sold with a tariff of Rp. 432 (or $0.045) per kWh. During operation, monthly sales revenue from the plant is approximately Rp. 25 million1. After depreciation and maintenance costs, the total net monthly profit is approximately Rp. 10 million (roughly $1000), which is shared equally by the Mekarsari coop and HIBS.

As agreed in the early stage, Mekar Sari's share of the profits are to be returned to the community with special priority given to the poor. The Mekar Sari Coop has returned the profit to the Cinta Mekar village in the following ways: providing electricity connection; paying fees for education and schooling for the poorest households, building a health clinic, providing seed capital for income-generating activities, village infrastructure development, and other activities.

The project is considered successful by many parties and is known as the first community-based MHPP that connects and sells electricity to the grid. The project continues today, thus sustainable benefits are still being delivered to stakeholders. The project was aimed not only at providing electricity to the village community and the surrounding area, but also at generating income for the village community through the selling of power to the grid. The project is successful due to the community's capacity for self-management. A great benefit of this project is that the community is able to use the generated income to empower themselves through investment or production activities instead of mere infrastructure development. The community has used the money to build a health care clinic, provide scholarships, supply villagers with electrical access, and offer seed capital for income

[21] Data is gathered from IBEKA Foundation whereas I am doing my internship. IBEKA (Community-based Business and Economics Institute) is a NGO which aiming to improve economic conditions of rural people through village infrastructure development. It is mostly working on giving access to electricity for rural people through micro hydro-power. IBEKA has several electrical energy projects for communities in different villages in Indonesia, especially in remote areas where people are having difficulty in accessing electrical power. Besides from IBEKA, partial data was also accessed from http://www.bicusa.org/en/Document.102200.pdf on August 2nd 2012 at 20.57.

generating activities. A key success factor for this project was an emphasis on community involvement in the planning, development, and implementation stages. While similar projects often view the community solely as the beneficiary, Cinta Mekar involved the community as a main player and owner, allowing the villagers to develop and manage the project. As an owner of the project, the community is integral in the decision making process.

2. Palanggaran Micro-Hydro Power Plant[22]

Profile of the project:

Project Initiator	IBEKA Foundation
Funding Agency	LEAD International
Community Contribution	Manpower, Stones, and Sands
Design	IBEKA Foundation
Developer	IBEKA Foundation
Number of Customers	78 households and some public facilities
Name of River	Cirahong River
Construction Completed	August 2005
Head	22m
Water Discharge	100 liters/second
The Install Capacity	10 kW

Palanggaran is one of small hamlet in Sukawenang Village. It's surrounded by Mount. Halimun National Park. Population of Sukawenang sub-village is about 78 households or approximately 450 people. Most people live in sub-system way, keeping the culture intact, planting paddies once a year, fishing and growing vegetables and fruits as additional income. The construction of Palanggaran MHP (Micro-Hydro Power) was completed in August 2005 by IBEKA. All the labors were from the local people including the skill labors. IBEKA had only conducted supervisions. All the skilled labors were trained by IBEKA in 1997 during the construction of Cicemet MHP. Palanggaran MHP is operated and maintained by the KOMMET Co-Op. The operators are local people selected by the community in a Co-op meeting. They took the training during the construction time. Tariff for electricity was decided in a Co-op and community meeting. Part of the money collected from the electricity bill is saved for the Co-op and the remaining is used for the operator's salary as well as routine expenses.

Every household is supplied with 100-watt capacity and 0,5 ampere MCB. Most of the electricity consumption in Sukawenang is for lighting and electronic appliance such as TV and radio. The people of Sukawenang are now getting access to information and entertainment. At night the children can study more and have additional activities at the mosque. A radio community is constructed to disseminate information from the informal leader in the area to the local community. The public facilities that are using the electricity supply are mosques and public bathrooms. The mosque uses the electricity for lighting and sound system. They use the sound system to call for people to pray and doing other religious activities.

[22] Data is gathered from IBEKA Foundation whereas I am doing my internship. IBEKA (Community-based Business and Economics Institute) is a NGO which aiming to improve economic conditions of rural people through village infrastructure development. It is mostly working on giving access to electricity for rural people through micro hydro-power. IBEKA has several electrical energy projects for communities in different villages in Indonesia, especially in remote areas where people are having difficulty in accessing electrical power.

Conclusion

The Micro-hydro power with Pro-Poor Public Private Partnership (5P) method is sustainable compare to the conventional one because it gives a chance for the poor (community) to be one of the main players and the owner of the project. It gives them an important roles in the decision making process, thus they feel like they own the project and having a high sense of belonging to the project. It is motivated to operate the plant as well as maintain the surrounding infrastructure and ecosystem. Specifically, the water stream is of great importance to this project, so the community is invested in protecting the adjacent forest and water source to ensure the sustainability of the project. An additional motivator is the projected revenue stream that will continue to flow (through the cooperative system) to the community as long as the plant operates. Not only the poor who is gaining, the public and private are also gaining benefits. The public is able to help to provide basic needs to the poor in the effective and efficient way while for the private; it can help them to improve profitability and expanding their markets.

With all the parties involved are cooperating one another to achieve their common goals, micro- hydro power with 5P can be a model of solution and replicated to electrify many rural areas in Indonesia or other developing countries. Nevertheless, to make it works as it planned, according to the UNESCAP, there are still some conditions such as external financial support is available, participation of local community is created through awareness raising and capacity building activities, willingness of local community to participate in the project sustains beyond the completion of the project itself; policy and regulatory supports are in place, and the utility is willing to purchase electricity from the plant at a reasonable and fair price that benefits both the utility and the community, thus creating financial incentives for both parties involved.

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http://www.123HelpMe.com/view.asp?id=26543 http://www.bicusa.org/en/Document.102200.pdf

Primary Data:

Data is gathered from IBEKA Foundation. IBEKA (Community-based Business and Economics Institute) is a NGO which aiming to improve economic conditions of rural people through village infrastructure development. It is mostly working on giving access to electricity for rural people through micro hydro-power. IBEKA has several electrical energy projects for communities in different villages in Indonesia, especially in remote areas where people are having difficulty in accessing electrical power.

Section 7

Sustainable Agriculture and Food System

GLOBAL ASSOCIATION
Master's in Development Practice Programs

Sustainable Development Practices: Advancing Evidence-Based Solutions for the Post-2015 Agenda.

Proceedings of the 2013 International Conference on Sustainable Development Practice

Chapter 16

Food waste: an exploratory study in Portugal

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Abstract

Food crisis, food security and the food system unsustainability are increasingly becoming serious social, economic, environmental, ethical and political problems. Climate change, water use, land use, biodiversity, air, soil and water pollutions are environmental problems that can be associated with the way we produce and consume food. Animal welfare, inequality in food distribution, hunger, and malnutrition are ethical problems also associated with the food system. Population growth and changes in size and nature of demand (especially meat and fish) and competition for resources (land, energy, water) are main challenges to the food system in the near future. To achieve sustainability in the food system is an imperative in the globalized world. The European Commission is considering making 2014 the European Year Against Food Waste based on a EU Parliament recommendation as a key information and awareness-raising initiative for European citizens and to focus national governments' attention on this important topic. In Europe estimates say that up to 50% of wealthy edible food is lost along the entire food supply chain. Several studies have been quantifying food. Nevertheless, there were still no studies on food waste in Portugal. Project PERDA (2012) sought to answer two key questions: how much is wasted and why such waste occurs along the Portuguese Food Supply Chain (FSC) as well as in each one of its stages (production, processing, distribution and final consumption). By answering these questions, we may subsequently move forward towards implementing communication and awareness campaigns and promote ample reflection concerning this environmental, ethical, social and economic problem. This first exploratory study estimated that in Portugal roughly 17% of all food produced for human consumption is wasted. These estimates result from the sum of losses and waste occurring at different stages of the FSC. Reasons for wasting food vary along the different stages of the Food Supply Chain but all agents play key roles within the sustainability narrative that must be played out. The aim of this paper is to discuss the results of this project on food waste along food supply chain in Portugal, reasons for wasting food and ways to reduce it.

1. Introduction

PERDA (Project to study and reflect on food waste) is the first research project concerned with characterizing and understanding food waste along the Portuguese food supply chain. Despite recent attention in other countries, in both quantifying food waste (*e.g.* FAO, 2011; Kantor, *et al*, 1997; Jones, 2004; Hamilton *et al*, 2005; Hodges *et al*, 2011; Quested, *et al*, 2011, Bloom, 2010, Cox *et al*, 2007) and in trying to understand why such waste occurs (*e.g.* Mena *et al*, 2011; Guyomard *et al*, 2012; Godfray *et al*, 2010; William *et al*, 2011; Evans, D., 2011a, 2011b, FSA, 2008) only in the past 2 years the topic earned due attention in Portuguese science, media and civil society.

Apart from environmental and economic costs associated to any form of waste, this particular type of waste puts us head-on with an ethical dilemma. Millions of tons of food are thrown away every day in a world where one sixth of its population is still undernourished.

There is an environmental dimension at stake – the pressure on ecosystems caused by using resources and wasted products rotting in landfills (Garnett, 2008; Mena *et al* 2011; Stuart et al 2009; Lundqvist *et al*, 2008). –,

an economical dimension – the monetary value associated to those losses (Mena et al, 2011; Hodges *et al*, 2011) – and an ethical dimension - problem of intra and inter-generational justice- (Mena *et al*, 2011; Henderson, 2004, Stuart, 2009). This is a sustainability problem in all its dimensions.

Project PERDA sought to answer two main key questions in this problematic: how much food is wasted and why does such waste occur along the Portuguese Food Supply Chain (FSC): production, processing, distribution and final consumption. By answering these questions, we may subsequently move forward towards understanding how better to curb it both through identification of potential political action and through communication and awareness campaigns. The main reference institutions on this theme - WRAP (Waste and Resources Action Program) in the UK and USDA (United States Department of Agriculture) in USA - also consider that raising awareness is an important part of an integrated set of solutions to reduce food waste (Mena *et al*, 2011; WRAP, 2011, Hodges *et al* 2011) and therefore this was also a key output of this Portuguese research project.

2. Food Waste in Portugal

The results obtained in this project point to a value of circa one million tons of food wasted every year along the FSC in Portugal (Baptista, *el al*, 2012). This value matches up roughly 17% of all food produced for human consumption in the country (see figure 1). This value is lower than the referred in international literature on the subject (*e.g.* FAO, 2011; Kantor, *et al*, 1997; Jones, 2004; Hamilton *et al*, 2005; Hodges *et al*, 2011; Quested, *et al*, 2011, Bloom, 2010, Cox *et al*, 2007). Reasons for this could be: the small scale of Portuguese agro-industries, which in turn make them easier to manage; low productivity in some commodities force producers to be efficient; families are changing their own habits due to the economic crisis. Still, each Portuguese wastes annually almost one hundred kilograms of food along the supply chain.

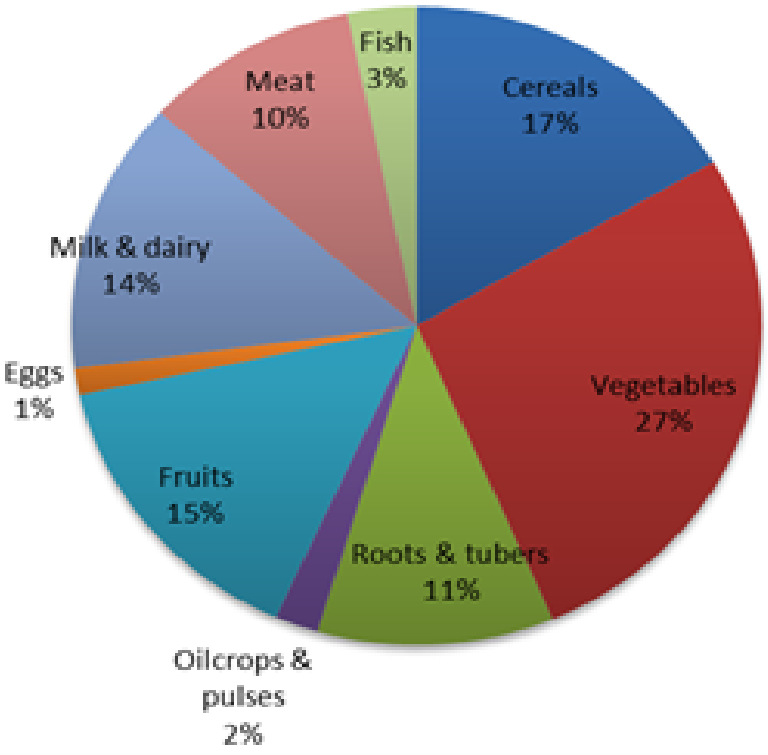
Figure 1 – Annual Food Losses Along The Food Supply Chain In Portugal.

Source: Baptista, et all, 2012, pag 24

These estimates result from a mass flow analysis for the stages of the FSC, using the methodology of FAO (2011). The data was gathered from official statistics and other literature; furthermore about 70 interviews to producers, industrials and retailers were carried on; and an online survey was set up with the participation of 800 families and 40 semi-structured interviews were done to individuals in order to get further insights on why do families waste so much food.

As can be observed in figure 1, the most efficient stage in using food products is food processing, where losses are minimal and reused in other productive processes. Almost the totality of losses and waste occur at the initial and final stages of the FSC. As for the commodities, vegetables, cereals and fruits represent more than half of all the food losses (figure 2).

Figure 2 – Composition Of The Total Food Losses In The Food Supply Chain



Source: Baptista, *et all*, 2012, pag 25

At the first stage of the chain one of the main constraints identified was the fact that food production is vulnerable to external conditionings, namely weather and price variations of food products in national and international markets. Due to these conditionings and in order to assure a constant and secure food supply, there is an incentive to produce in excess, which tends to generate higher losses. Currently, the Portuguese FSC provides an average of 3640 kcal per day to each person; a value well above the recommended daily intake of calories (2000- 2500 kcal).

Different reasons were identified both in the literature (e.g. Mena et all, 2011; Guyomard et al, 2012; Godfray et al, 2010; William et al, 2011; Evans, D., 2011a, 2011b, FSA, 2008) and in interviews and analyses of the work produced in PERDA and Table 1 summarizes the main causes for both food loss which refer to the decrease in edible food mass throughout the part of the supply chain that specifically leads to edible food for human consumption which take place at production, postharvest and processing stages in the food supply chain (Parfitt et al., 2010)) and food waste which occur at the end of the food chain - retail and final consumption - and are related to retailers' and consumers' behavior. (Parfitt et al., 2010) (Herein food waste stands for both food loss and food waste).

The analysis carried out in PERDA identified the main reasons which influence food waste. With a certain degree of simplification, these can be summarized as follows:

- A tendency for the increase in the length of FSC moves producers further away from consumers, imposing a higher number of handling operations throughout the intermediate stages of the FSC, thus promoting quicker degradation of food products.
- Agriculture production, apart from threatened by factors such as extreme weather events and pests,

Table 1 – Main causes for loss and food waste in the different stages of the FSC

Production	Processing	Distribution	Consumption
Agriculture and storage: –crops left in the field –mechanical damage during harvest and handling –loss due to disease, animal and pest attacks	damage during packaging	improper handling and storage	date marking
Livestock: –animal mortality –diseases (e.g. loss in milk production due to mastitis) –transport to slaughterhouse	losses of the processes	lack of refrigeration	inadequate storage
Fishing: –discards during fishing –fish with no commercial value is sent to flour processing industries	mechanical damage during processing	stock management (validity, fresh and daily produce)	plate losses
	beginnings and end of production, cleaning, testing new products	unsold products	other losses

undergoes also market pressures.

- At the food processing and industrial stages, processes are optimized and losses are minimal.
- Regarding distribution and retail, stock management is fundamental, but it often suffers from commercial pressures (e.g. having always food available).
- Within households, causes for waste are more complex and go from lack of awareness and knowledge of the problem to planning, date marking, storage, as well as other socio-economic factors which influence waste in people's homes.

3. Household Food Waste in Portugal

As shown in figure 1, food waste occurs mainly in the production, distribution and consumption phases. The scope of PERDA was to calculate the amount of food waste and understand the main reasons for the values encountered. The distribution phase, even if representing 1/3 of food waste is a difficult sector to enter due to its closeness and due to the limited time of the project (one year). The production phase also representing 1/3 of waste has its own singularities and causes for waste have a complex set of influences (e.g. European and national policies, world and national economic pressures, weather conditions, health scares, etc), not easy to research within the time and expertise of the team of PERDA project. So the remaining focus of PERDA was directed at the consumers, trying to understand why also 1/3 of food is lost and what could be done about it.

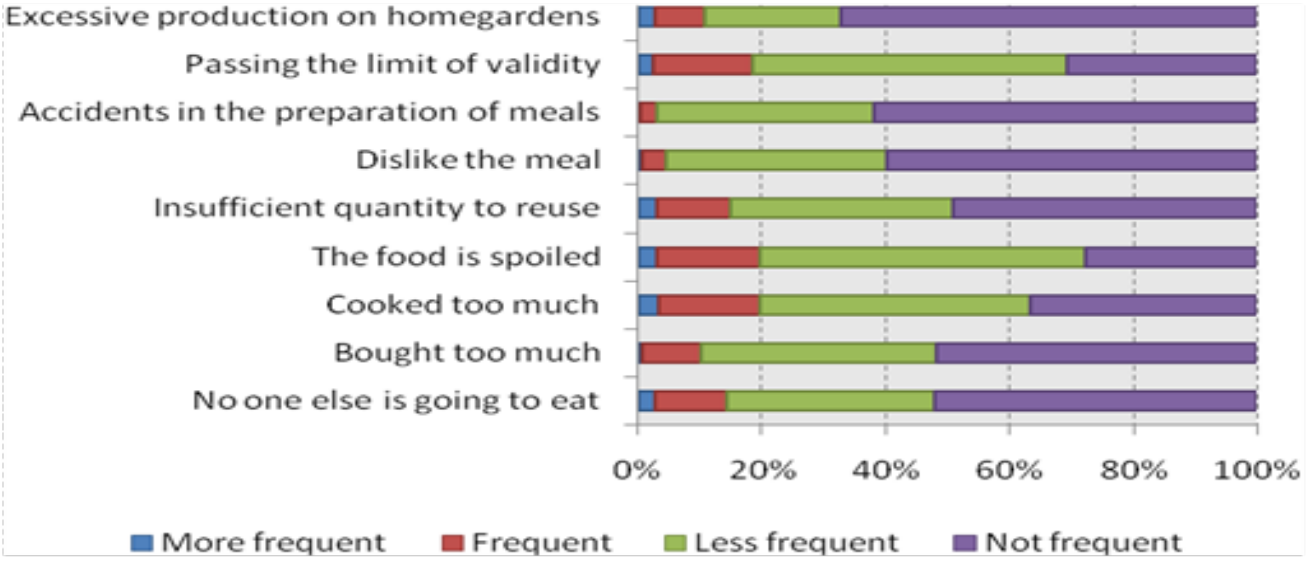
Nevertheless reducing food waste at the final consumption stage seems to be much trickier than reducing in other stages of the FSC, because it implies changing behaviors, habits, attitudes and even people's cultures and routines. Therefore in PERDA this part of the chain was looked with more detail and an online survey sought to gather data on how much is wasted in Portuguese households. This survey was complemented with a more qualitative study intended to understand why Portuguese families waste edible food through an interview project (41 individuals/families).

In order to design both the survey and the interview guide, a focus group was organized to capture insights on different viewpoints on causes for food waste in families. In this focus group, among the most referred causes, participants mentioned: lack of kitchen skills, lack of knowledge regarding food properties, date marking, disorganization and lack of time as the main reasons why people waste food.

The survey was designed and was online for 3 months obtaining circa 800 valid answers and an interview guide was produced in order to conduct semi-structured interviews over a period of 3 months (41 individuals), which provided detailed information on the practices that result in people wasting some of the food they buy or receive. The guide was flexible, in terms of the sequence of questions, with open questions and answers. But information was actively collected according to a matrix where specific data should be recorded for each family. This data covered people's routines, everyday life projects involving planning, shopping, preparing and eating, people's values and beliefs in relation to food consumption (preferred foods, preferred shopping sites). Additionally, we registered information regarding: perceptions and effects of the economic crisis in consumption options; the influence of the media and its reports of increased poverty; respondents sense of social responsibility in a period of crisis and their perceptions about food waste as a persistent problem, with serious consequences to the environment.

The analysis of the results showed a complex set of interlinked causes for household food waste[1]. This analysis provided information for defining a set of possible strategies to efficiently reduce waste at this level.

Figure 3 – Frequency With Which Respondents Waste Food



Source: PERDA's Online Survey about Food Waste

[1] A paper focusing on this component of PERDA with detailed information on the methodology and analysis carried out on these interviews is on its final stages, and to be submitted and hopefully published shortly.

As it may be observed in Figure 3, the online survey allowed the identification of the main causes for wasting food within households, which were classified as 'direct' causes. The results of the 41 interviews confirmed the survey's results. Causes may be thus summarized in the following list:

- Not planning meals nor using a shopping list;
- Inefficient management of food stocks at home;
- Not storing conveniently;
- Buying too many fresh produce which are not used in time;
- Allowing date marks to pass (due to forgetting, because too much was bought or due to changes of appetite, among other possible causes);
- Not using leftovers (don't like to use them, don't know how to use them, intended to use them but forgot Tupperware in the fridge).

Nevertheless, we found that there are no linear or simple causes, since each of these causes does not necessary result in more waste. Instead, there is a non linear and multilevel framework resulting from the interdependent action of the 'direct' causes referred above. This 'web' of causes in turn suffers influences, such as family type (with or without children), family routines and lifestyles. Finally, a few external pressures were identified, exerted by the economic crises and the media, which conditions people's behaviour regarding consumption and food waste.

The current background of the economic crisis, unemployment rates and the number of people facing the poverty threshold have been increasing in Portugal in the last years, and the media coverage of those topics has also increased, tending to heighten people's awareness of the ethical dimension of wasting food, and enhancing personal motivation for not wasting.

An example of one respondent is clear on this matter: "*(…) it's a matter of civic responsibility, I don't want to either buy too much or throw out something. We are OK, we still have the same lifestyle and we buy only the best, but I won't feel comfortable throwing things away when so many are facing serious hardships.*"

Understanding that the causes are of different types (economic, ethical and environmental – even if the latter was found to be the least mentioned by respondents) lead towards a multilevel perspective of the problem, as well as a strategy for reducing waste that keeps such complexity in mind. Thus, based on the analysis of the results some practical recommendations to reduce household food waste might be suggested:

- Planning (shopping and menus);
- Information regarding appropriate storage;
- Choosing packages with an adequate amount of product in relation to the number of people in the household;
- keep in mind date marking while managing food stocks;
- Try to cook in the right amount;
- Use leftovers;
- Look for products that most members of the household will appreciate, whenever possible.

Despite these recommendations, and bearing in mind the multilevel framework for characterizing complex causes for food waste within households, motivation seemed to be the foundation stone for the success of any strategy. How to create this motivation and how could this motivation be transformed in everyday practices is still an ongoing question. Nevertheless this conclusion makes plain that awareness campaigns play a central role in reducing waste at the household level. How to design these campaigns, i.e. identifying which elements can trick a change on consumers attitudes and behaviours is not linear, but the above causes found in the interviews and that confirm much of the results in other research projects provides some clues on the subject.

4. Reducing Food Waste in Portugal

It seems consensual that, whether it is for economic, environmental or ethical reasons, food waste should be reduced. This is also the political orientation promoted by the European Parliament with a Resolution put forward on 19th January of 2012, exhorting the European Commission to design "to take practical measures towards halving food waste by 2025 and at the same time preventing the generation of bio-waste" also suggesting that 2014 be the "European Year Against Food Waste."

The main actions identified by PERDA to make it possible that Portugal reaches the 2025 target proposed by the European Parliament are:

- Invest on scientific research and a better articulation between all chain actors in the food production and supply system;
- review agricultural subsidy policy, which to a certain extent tends to promote waste;
- promote increased producer/consumer proximity;
- adequate diverse commercialization barriers (such as packaging size);
- information and awareness campaigns;
- endorse flexibility in quality standards, relative to dimension and shape of fruit and vegetable products imposed by European and national legislation;
- facilitate donation of food, namely via legislation;
- analyse and overcome obstacles placed by diverse norms relative to civil responsibility, public health, food hygiene and consumer protection.
- Promote awareness campaigns on food waste and its impacts at several levels

These clues were identified as important within the complex dynamics of reducing food waste and represent a transversal effort requiring an integrated action on multiple levels and by relevant actors. In fact, agents from all stages of the Food Supply Chain do play key roles within the sustainability narrative that must be played out. Nevertheless, it is important to highlight the part of the state, which cannot be marginal, and can be best described as that of a facilitator, regarding legislative and fiscal measures, but also as a model and promoter of a more active and participative citizenship. This should be the scope of a second phase of PERDA as reducing food waste calls for a joint effort not easy to implement.

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Chapter 17

Working with Women's Groups in Jordan: Building networks and social capital

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Abstract

Throughout the world, rural women provide vital contributions to agriculture and food security. Studies have revealed that, in Arab countries, women provide up to 70% of the agricultural labor. A 2003 field survey conducted in Jordan found that women do the majority of work related to livestock which includes feeding/watering, milking, supervision of calving, and shearing. In agriculture, it is women that primarily do the weeding while also contributing to land preparation, planting, harvesting, and packing produce. In some households women also provide labor for irrigation, fertilization, pesticide spraying and marketing (Al-Rousan, 2005). Despite their importance, women in the Middle East are often excluded from agricultural extension and advisory services due to a number of gendered and cultural constraints. With USAID funding through the Modernizing Extension and Advisory Services (MEAS) program, our project endeavors to ascertain if working through women's cooperatives, and developing and building on social capital and networks, can help women to overcome these typically prohibitive barriers allowing them to improve their access to resources and information. The year-long project, titled: *Extension and Advisory Service Delivery for Women's Groups in Jordan: Assessing Competencies and Building Social Capital* began in November of 2012 in collaboration with Jordan's National Center for Agricultural Research and Extension (NCARE) and will wrap up in December of 2013. This partnership allows us to research how participatory teaching methodologies may build on women's social capital while strengthening their network connections. This research is taking place as rural women undergo a series of trainings facilitated by NCARE that are designed to build the capacity of three participating women's cooperatives of which the participants are members. Changes in social capital and networks are being tracked through the use of qualitative and quantitative tools including focus group discussions, questionnaires, social network analysis, and direct observation. After providing details on the prohibitive constraints that face women in Jordan, the reader will learn more about the project including the research setting, methodology used, findings to date and some challenges faced.

Introduction

Despite their critically important roles, female farmers often lack access to extension and advisory services (EAS) that could assist them in increasing agricultural and livestock productivity. There are a multitude of reasons that extension agents overlook women, both throughout the world and in the Middle East where our research takes place. These typically result from cultural, legal and gender norms that prevent women from having equal access, control, and ownership of agricultural resources that could be leveraged to purchase necessary inputs or otherwise invest in the productivity of the land. These constraints can include laws and traditions governing property and inheritance that serve to preclude women's ownership of land. Without title to the land, women often lack collateral and thus bank credit, which can be essential for funding improvements in agricultural production. In Jordan, women have the legal right to inherit land under Islamic law though, in general, this will be a lesser amount than her male relatives (MENA Gender Equality Profile - Status of Girls and Women in the Middle East and North Africa: Jordan, 2009). While women legally have the right to own land, many are pressured by their male relatives to forfeit their lands to them so it is not surprisingly that women comprise only 10% of land and property owners in Jordan (Gender Equality and Social Institutions: Jordan, 2012). It is a common problem that, in the absence of land title, women are not considered the Head of Household

which is the typical qualification for being viewed as farmer. Women's roles in agriculture therefore go unseen by extension agents who typically engage only with 'farmers' leaving women relegated to the invisible role of 'household laborer'. Additionally, women may also grow their own crops for home consumption, as opposed to the cash crops that men are more likely to produce. Despite the fact that these crops contribute greatly to the household's food security and the family's nutrition and health, there is an erroneous perception by extension agents that women's crops are less important and less worthy of attention (Manfre, *et al*., 2012). In 1989, the FAO's global survey revealed that, in Africa, the impact of these perceptions resulted in women only receiving 7% of extension resources -only 1% of which was directed at home economics (Al-Rousan, 2005).

Another common constraint affecting women in more culturally conservative areas, like many in the Middle East, is that of mobility and restrictions on their public interactions. Al- Rousan (2005) explains, "We in Jordan have inherited a strict paternalistic system from our ancestors, which seeks "with the best of intentions" to overprotect woman…this state of affairs has resulted in creating a totally dependent woman; she must refer to her male guardian with regard to even the simplest of matters – those relating to her own life and of her children." In some areas, this paternalistic system limits possible interactions in that it is not acceptable for women to interact with male non-relatives which is a barrier to their attending mixed-sex trainings. It also restricts their involvement in various aspects of the value chain, including the market, where they would have to converse and even negotiate with men. Female extension agents may be able to help overcome this problem yet they are in short supply. The National Center for Agricultural Research and Extension (our field partner) has a total of 58 extension agents for the entire country – of those, 17 are women (Augustin, Assad, & Jaziri, 2012). There is still a mobility issue wherein with the availability of women to participate in trainings is dictated by their household and childcare duties. Women also typically have less formal and/or technical education than men. This is certainly the case in Jordan where 11.4% of adult women are considered illiterate (Jordan Human Development Report, 2011). This can create a problem for extension agents as they may have to adjust training methods so that reading and arithmetic skills are not a prohibitive factor.

These constraints have resulted in a dearth of extension and advisory services targeted toward women producers. In the early 1990s, the FAO conducted a survey on extension in 115 countries that found that women, worldwide, receive only 5% of extension services (Meinzen- Dick, *et al*., 2011). Recent studies reveal that in Ethiopia and India women's access to EAS were 20% and 18% respectively, but were as low as 2% in Ghana (Manfre, *et al*., 2012). It is likely that women's access in the Middle East and North Africa (MENA) is similarly low, if not lower. FAO's research reveals that women farmers are 20-30% less productive than men due in large part to their exclusion from the same resources that their male counterparts enjoy including the benefits of EAS. If both sexes had equal access to productive resources and extension and advisory services, food output in developing countries would increase 2.5-4% and have a large impact on food security (Food and Agriculture Organization, 2011).

The Research

Given these powerful and binding constraints it is necessary to consider ways of overcoming or circumventing these conditions to get extension and advisory services to women. One promising approach is to work through women's groups such as cooperatives or community-based associations. These can both mitigate stigma related to their activities, as well as provide leverage within the community, and with service providers, through collective action and the pooling of resources. For this approach to succeed however, two things are necessary: strong cooperatives and capable, confident women to make them function and succeed. Our research seeks to identify ways that these strengths can be developed through building social capital and strengthening networks for collective action, as well as the dissemination of practical skills and knowledge.

Social networks are able to function more constructively when people "act collectively" towards a certain outcome (Woolcock & Narayan, 2000). A key underlying component of this theory is that social capital facilitates action. In development literature particularly, social capital has been a useful framework for evaluating micro-

finance programs (Lions & Snoxell, 2005). These studies have found that building social capital enhances trust and reciprocity, which further enhances the success of group projects. In many regions, women already have the social capacity in their communities to come together (e.g., cooperatives, support groups, community meetings). Furthermore, these forums allow women to work collectively toward goals, such as creating a revolving savings program; thus social capital is a "by-product" of an already standing relationship (Lions and Snoxell, 2005; Woolcock & Narayan, 2000). In other words, the social capital foundations are already in place and are ready to be developed further into action.

In order to build upon these foundations, our research is being carried out alongside a training program that is being facilitated by the National Center for Agricultural Research and Extension (NCARE) in Jordan. This training program spans the course of a year and focuses on a number of training topics that fall under five categories:

1. Group Management
2. Natural Resource Management
3. Savings and Financial
4. Business and Marketing
5. Technology and Innovation

The categories encompass five skill sets that were identified as being necessary for building a cooperative's agency capacity, helping to overcome coordination failures, and contributing to the empowerment of the rural poor to enter markets. These skill set categories were identified by Catholic Relief Services after conducting research on farmers groups in India, Uganda and Bolivia (Ashby, *et al.*, 2011). The training program is funded by the Middle East Partnership Initiative (MEPI) with funds from the U.S. Department of State, and uses a peer-to-peer mentoring model. A well established, successful women's cooperative, *Ngera Cooperative for Social and Charitable Causes*, is paired with two women's cooperatives that are newer and less developed: *Al-Khudair Women Cooperative for Social Development and; Mawakeb Al-Noor Women Cooperative for Charitable Causes.* The leadership within each of the cooperatives identified 7-8 of their members (henceforth referred to as MEPI trainees or participants) who agreed to commit themselves to attending the full training program.

Research on how adults learn has concluded that it is most effective when participants are involved in determining their own learning objectives, when the training is focused on actual problems faced by the trainees, and when the training is carried out in a varied environment using participatory techniques. David Kolb, an educational theorist, developed the Experiential Learning Cycle based on this thinking (ARC Resource Pack: Facilitiator's Toolkit, 2009). The methods being used in the MEPI training program enlist both inductive and deductive learning that allows participants to learn new information and then build on that with reflection before drawing their own conclusions about its application. Participatory methods, such as small group discussions and activities, open debate and discourse, and sharing personal opinions and conclusions with the group helps to build women's confidence in their ability to learn new skills and articulate their ideas and conclusions in front of others. In this way, women are learning to be leaders and building their personal skills while developing capabilities that will serve to strengthen and advance the goals of their respective cooperatives.

Methods

Data was also collected through a baseline questionnaire that was constructed and administered with the MEPI participants comprised of questions in the following nine sections:

- Demographics
- Participation in cooperatives/voluntary organizations
- Communication skills
- Community dynamics

- Organizational management
- Savings and financial skills
- Business and marketing skills
- Technology and innovation skills
- Sustainable production and natural resource management

Additional information was collected through focus group discussions. Using the format and questions from an earlier focus group discussion with members of the Ngera cooperative, researchers from NCARE and UF repeated the process with women from the two newer cooperatives. These women, who were not personally participating in the trainings, volunteered for the focus group discussions that took place in May of 2013. In addition to collecting basic demographic information, the questions for these discussions revolved around the topics of: women's access to information; leadership and participation in the cooperative; daily activities; and water resources and climate change.

Questions for a third focus group, comprised of MEPI participants from each of the three cooperatives, were designed to discover the opinions and experiences of the women on a number of issues. Broadly, these included: their involvement in the MEPI trainings and how it has, or has not, changed them; feelings toward themselves, their future, and the future of their daughters; their ambitions related to leadership roles; their social networks and social capital; and lastly, the strengths and weaknesses of their communities and cooperatives.

In order to assess potential changes within the MEPI trainees' social networks and capital, a Social Network Analysis (SNA) survey was designed. The survey asked about relationships and communications that respondents from each cooperative had with the MEPI participants from their cooperative. The survey was administered to the MEPI participants asking about the fellow cooperative members in the trainings. The same survey was administered to women that where not participating in the trainings that also asked about the MEPI participants from their cooperative. In total, six sets of surveys were collected as a baseline with a plan to follow up in late September of 2013 to compare changes.

The goal of utilizing SNA is to capture potential changes in social capital and networks of the women undergoing the training program. In order to capture a snapshot of the existing social capital of the individual participants, in relation to each other, they were asked how similar they feel they are to each other; if they share personal information; if they have given or received a favor; and who they have gone to for information about the cooperative. Respondents were also asked if they recognized both the name and face of each MEPI participant, as well as the frequency of their communications with them. Before we can give a weight to any changes in the answers we receive later this year, it was also necessary to inquire about familial relationships within the groups as they are likely to be strong already and therefore not reflect a change later. Similarly, we asked if the respondents held a position, such as board member, within the cooperative as these individuals would likely already have high social capital within the group.

Findings

The questionnaire revealed that half of the participants in the trainings from the newly- established cooperatives have held responsibilities within their respective cooperatives for less than one year with an additional 27% having no responsibilities as yet in the cooperative; the remainder have had responsibilities only for the past 1-3 years. The majority of MEPI participants from the two newer cooperatives are voluntary members of their respective cooperatives, receiving no income from the cooperatives at this time. There are a number of participants with leadership positions within their cooperatives. The president and vice president of both of the two new cooperatives are taking part in the trainings as are two board members from Ngera – the well-established cooperative. One third of the participants from the newer cooperatives have never received any type of training before while 100% of the participants from Ngera have received training in past.

In terms of personal confidence and leadership, the questionnaire allowed us to make comparisons between the newer cooperatives and the older Ngera cooperative by asking women to select their level of agreement with statements provided. Results showed that only about half of the participants from the two newer cooperatives somewhat agreed that they are good at solving problems and getting their point across. Compared to 100% of participants from Ngera, 67% of MEPI trainees from the newer cooperatives indicated strong agreement that they feel comfortable being the spokesperson for a group (see table below). Furthermore, only 73% from the newer cooperatives stated they regularly expressed their opinions or asked questions during cooperative meetings compared to 100% from Ngera. These questions will be repeated at the close of the research project to determine if the women have gained confidence from their experience with the MEPI trainings and the participatory learning strategies therein employed.

Table 1: Personal confidence and leadership comparision between cooperatives.

	Ngera Cooperative* (n=8)					Mawakeb Al-Noor & Al-Khudair Cooperatives (n=15)				
	Strongly Agree	Some-what Agree	Neutral	Some-what Disagree	Strongly Disagree	Strongly Agree	Some-what Agree	Neutral	Some-what Disagree	Strongly Disagree
I am organized	62.5%	25%	12.5%			66.7%	26.7%			6.7%
I am good at getting my point across	37.5%	62.5%				40%	53.3%			6.7%
I am willing to take on new challenges	75%	25%				73.3%	26.7%			
I am good at solving problems	62.5%	25%	12.5%			40%	53.3%	6.7%		
I am comfortable making decisions on my own	75%	25%				66.7%	26.7%		6.7%	
I can motivate others for common goals	87.5%	12.5%				73.3%	26.7%			
I feel comfortable speaking in front of people	75%	25%				80%	20%			
I feel comfortable being the spokesperson for a group	100%					66.7%	26.7%	6.7%		
I am patient when explaining new ideas to others	62.5%	25%		12.5%		93.3%	6.7%			

* Ngera Cooperative was established in 1994 while Mawakeb Al-Noor, and Al-Khudair, cooperatives were established in 2012 and 2009 respectively.

Questions were also posed to the MEPI participants to gain insights on their access and control over financial resources as well as personal levels of mobility. Interestingly, 75% of the women from Ngera had their own money and could decide for themselves how it would be spent compared to only 27% of their counterparts in the newer cooperatives. When asked whether or not they, or their households, possessed assets or savings, 50% of the women at Ngera, and 20% of women from the other cooperatives answered in the affirmative. Finally, twice as many of the newer cooperative participants indicated that they have not traveled outside their community within the past three months than the participants of the more established cooperative. These answers speak to the level of social capital that women have within their households and are therefore noteworthy in comparing the different levels experienced by the women of Ngera.

To gain insights on the social capital within their communities questions were posed to the participants asking about cohesion and problem solving. Of the newly-established cooperative participants, only 67% stated that the feeling of togetherness or closeness in their community was somewhat strong compared to 100% among participants from Ngera, the established cooperative. Half of the newly established cooperative participants indicated that people in their community were only somewhat likely to cooperate to solve a problem together. They also indicated they were currently less involved in community-wide matters, with 40% participating contributing time or money 'sometimes' or 'not at all' to addressing community problems, while 88% of Ngera's participants contributed time or money towards addressing community-wide problems. These women were also asked if they felt that people like themselves have influence in making their respective communities a better place to which all of the women from Ngera responded affirmatively compared to 87% of their counterparts.

Focus group responses from cooperative members that were not participating in the trainings reflected their understanding that being a cooperative can provide ways to develop their own social capital. For instance, as the idea of a cooperative is relatively new to the women of the Al-Khudair cooperative, they noted, more women are beginning to understand the benefits that cooperative membership provides for their personal livelihoods. They stated that prior to the establishment of the cooperative, women often did not or could not attend training sessions due to cultural restrictions on their movement and out of a fear of the potential repercussions that their families may face. However, when trainings are provided within the women's cooperative, women feel less of a stigma to attend and participate. They also acknowledged the benefits that membership in the cooperative offered them: greater knowledge and awareness from trainings and lectures; care and support that they receive from and give to each other; and a spirit of service to provide moral and financial support for women in their community. Furthermore, women in both of the new cooperatives commented that they found working in this peer-to-peer setting - in which they are learning alongside, and from, Ngera - has been useful due to the opportunity to socialize, interact, and learn from each other's experiences and views.

Researchers' direct observations of the trainings to date show that members of the new cooperatives were actively engaged in training activities. For example, during the Fundraising series in which MEPI trainees were learning about project design and funding proposals, researchers observed that the women were very engaged in the process. Participants were required to work together in small groups to create and present PowerPoint presentations detailing their work developing project proposals while defending to the group the benefits of funding their projects. The women were debating and discussing in great detail the positive and negative aspects of each participant's project ideas while offering advice and varying opinions. The group dynamics appeared to be comfortable and open as participants were regularly sharing opinions and asking questions. Participants from all three cooperatives were observed openly discussing and planning tangible ways in which the cooperatives can positively impact and improve local communities as well as generate income or improve resources for at-large cooperative members. In May of 2013, during a focus group discussion with the trainees from the newer cooperatives, participants indicated increased comfort participating in a group or public setting, one stating, "Yes, we have become more confident as we have more courage to share our opinion." Direct observations by the professional, contracted trainers conducting the training indicated an increase in communication and planning skills on the part of the participants. The financial skills trainer stated, after the majority of the training was completed, that he believed the project proposals being generated by the MEPI participants were of very high quality and were better than most that he had previously seen. He also commented on the participants' enthusiasm and high level of engagement in the trainings and discussions.

Another source of data, the social network analysis (SNA) of the MEPI participants, has yielded interesting information about the women and how they relate to each other. One of the questions asked, "Who have you talked to, outside of activities/trainings, about an issue related to the cooperative?" in order to determine who may have stronger social capital, personal bonds, and higher credibility within the group. The data from this, and other SNA questions, revealed that specific women in the cooperatives seemed to carry much more weight and be in possession of more social capital than others (see Figures 1 and 2 below). When compared with other

data collected on the participants, we found that these women were already formal leaders in their cooperative or, interestingly, had been identified as a potential leader in a Training of Trainers that will evolve from the MEPI trainings. Our follow-up social network analysis will ask the same questions of the same participants to determine what, if anything, has changed in their relationships. It is likely that the women in the MEPI trainings will feel closer to each other and may rate themselves as being more similar to each other while also finding them more trustworthy on a personal and professional level. However, the findings from the non-participant groups who will be asked about their relationships with the trainees will prove interesting in its own right. In the initial SNA, many of the non-participants from the newer cooperatives indicated that they rarely spoke to, and also felt dissimilar to, the MEPI trainees with a few even being unable to match the name and face of particular trainees. It is our hope that the women who are undergoing the training will continue to share the information they have learned and take on more prominent roles in their respective cooperatives which may be revealed by our follow up data collection efforts.

Who have you talked to, outside of activities/trainings, about an issue related to the cooperative?

Figure 1. Sociogram of Ngera Cooperative
Red: MEPI Participants
Blue: Non-participants from the same cooperative

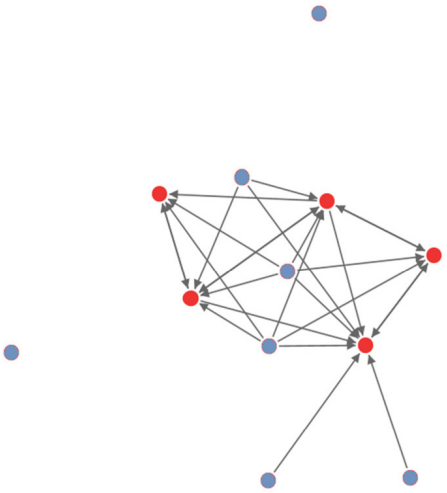
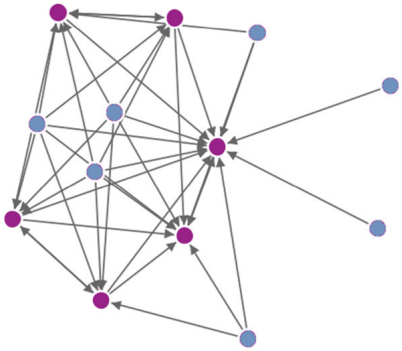


Figure 2. Sociogram of Mawakeb Cooperative
Purple: MEPI Participants
Blue: Non-participants from the same cooperative



These figures are sociograms that were created with the Socilyzer platform depicting which MEPI participants are sought out by other members when information about the cooperative is needed.[1] Each circle, called a node, represents an individual in the network. A line between two nodes details the communication between them with the arrow pointing to the person being sought out.

During the course of this year-long project there have been a number of challenges. The MEPI training program started on schedule, alongside our own MEAS project, but it soon faced the problem of losing two of the three initial cooperatives. The cause was noted as lack of commitment to the trainings but it was noted that, for at least one of the cooperatives, there was no support for teaching women leadership skills. Efforts to replace these two cooperatives took several months as it was necessary to find two relatively new cooperatives in nearby

[1] Socilyzer.com Challenges Faced

communities with women who, in addition to having the time and commitment to participate, also possessed the literacy and education required to fully engage with the training materials. The MEPI project was extended an additional year, which changed the training schedule and impacted the ability for qualitative and quantitative assessments of both the participants and non- participant groups at specific points in time throughout the training progression. The delay created a misalignment in the two projects (MEPI training and MEAS research) that has resulted in our inability to capture and track changes from the entire training program which is now scheduled to end roughly four months after the MEAS project.

Another challenge was created when a small number (4) of MEPI participants left the training program. While some were replaced with other women committed to the program it is not possible to utilize these individuals in the social network analysis which further limits our study size for that component. The training schedule was also delayed by the month-long observance of Ramadan due to the women's role in preparing for iftar, the large nightly meal that is often an important social gathering bringing many guests to the home. Another noteworthy issue was presented in the summer of 2013 when the number of trainees temporarily declined. When asked about the change in attendance we discovered that several of the women were busy with their families as it was the common time for weddings in Jordan.

Conclusion

Our research has followed participants from three cooperatives as they undergo a series of trainings designed to strengthen the capacity of their respective cooperatives. During this time we have observed their membership in the cooperatives appears to help them overcome cultural barriers to participation while also increasing their access to extension information. The participatory approaches utilized in the trainings have already improved the self-confidence of the participants and we believe our final data will show that it has also helped to strengthen their social networks. The peer-to-peer model that pairs a well-established, successful cooperative with ones that are less developed, has been highly effective in strengthening the capacity of both the individual trainees and the cooperatives. Having an example, in the form of the successful cooperative, is allowing the members of the new cooperatives to see for themselves the benefits of their involvement and dedication to their cooperatives and communities. When this model was coupled with successful, participatory extension training focusing on the five skills sets groups need to become successful, individual participation in the group and the community at large increased, as evidenced in the effective generation of community project proposals.

Further analysis of post-training changes via follow-up focus groups, questionnaires and social network analysis are required and pending in order to further validate direct observations in the field; however, comments from the newer-cooperative MEPI participants themselves clearly indicate increased confidence, increased networking, and group cohesiveness. Utilizing participatory, targeted skill-set training and peer-to-peer mentoring in order to increase social capital within women's cooperatives is an effective way for extension planners and educators to facilitate the strong groups and social cohesion necessary to successfully implement extension information and projects in the MENA region. Increased training of extension agents in these gender-specific methods, as well as scheduling trainings and meetings at times when women can best participate, are simple and efficient methods for improving outcomes in these areas where women's participation can often be culturally constrained.

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Chapter 18

Collective action as solution to enhance access to markets by women small-scale farmers: Evidence from three African contexts

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Abstract

Practical efforts to increase smallholder agricultural productivity in African countries are constrained by persistent gender inequalities in access to inputs and markets, locking women farmers into low-productivity and low-income traps. Overcoming these constraints remains a major development challenge in order to release the growth potential of African agriculture and address gender inequalities. Development organizations have regained interest in marketing cooperatives and other collective action (CA) groups, due to their potential to raise women's contribution to agriculture by accessing higher value markets and strengthen their influence in household decision-making. Oxfam's Researching Women's Collective Action Project (RWCA) investigated the conditions under which collective action can deliver economic and empowerment benefits to women small-scale farmers. This large collaborative work, conducted by an inter-disciplinary team, involved fieldwork in three countries and across three sectors: honey in Ethiopia, Shea butter in Mali, and vegetables in Tanzania. Quantitative findings from the RWCA suggest significantly higher economic benefits of women members of marketing groups relative to comparable women producing and trading the same agricultural products independently. CA membership is particularly effective in expanding access to credit and market information. Women also rely on their groups to grade their products; source information; and access more distant markets. As a result, women members experience increased productivity (Tanzania) and sales value (all three contexts), receive better prices for their produce (Ethiopia), and specialize in more lucrative products (improved Shea butter in Mali). Qualitative case studies of strategies of development actors supporting women's collective action in African agricultural markets found that supporting women-only producer groups can be an effective strategy in sectors that are traditionally women-dominated (Shea butter in Mali) and have a tradition of organization. However, sectors where both men and women are economically active, and where access to household land and labor is a pre-requisite (vegetables in Tanzania), may require support to women's involvement in mixed groups. 'Hybrid' strategies are useful where women are not very involved or visible in sectors (as in honey in Ethiopia), i.e. by separately organizing women, targeting them with resources and developing their leadership skills, as well as linking them to 'mixed' organizations.Changes in membership rules and pro-active targeting of marginalized social groups (such as female heads of household) are necessary to increase women's participation in traditionally male cooperatives: in Ethiopia, female participation in honey cooperatives jumped from 6% to 47% as a result. However, simply increasing female membership does not ensure women's influence in group decision making or that they will benefit from resource allocation. This requires the development of women's leadership capacity and support to women leaders to challenge deeper gender group dynamics. The RWCA findings also shed light on the limits of CA, and the need to better understand whether and how intra-household dynamics contribute to, and are affected by, the benefits from group participation. Efforts to reduce women's workload and address social attitudes towards women's mobility and economic roles should be directly factored in designing development interventions to ensure the sustainability of collective action benefits.

[1] The authors gratefully acknowledge the work of Oxfam GB and her staff in carrying out the RWCA project and all the field researchers who contributed to the collection of data during 2010-12 (see www.womenscollectiveaction.com for full details). The paper draws on reports authored by, or co-authored with, numerous consultants to the project, particularly Marcella Vigneri, Carine Pionetti and Jonathan Kaminski. This project was supported by funding from the Bill and Melinda Gates Foundation.

1. Introduction

Prioritizing 'investment in women farmers' has become a mantra in almost every development circle, at national and international levels. While much focus in past interventions has been on increasing women farmers' access to credit and production inputs, a priority area for current policy is to increase women's involvement in agricultural markets (Doss, 2001). In small-scale farming households, women often have more limited engagement in market transactions for household produce than men. Where they do sell produce directly, women small-scale farmers are primarily involved in local markets and trade in lower volumes, more perishable, or lower value goods, than men. While some women are active in trading in wider agricultural markets, they tend to be concentrated at lower levels of the supply chain or value chain (Baden, 1998; IBRD, 2009).

Collective action (CA)[1] holds substantial promise for enhancing women's participation in agricultural markets, increasing their economic benefits, and empowering women economically (Charman, 2008). An extensive literature has shown how collective action enables small-scale farmers to pool resources and information, reduce the transactions costs of market engagement, and thereby improve access to markets and market services. Group action can also enhance small farmers' bargaining power in market negotiations and open up new opportunities for skills development, access to technology and value addition (Penrose Buckley, 2007). Moreover, collective action potentially enables smallholder farmers to have a voice in, and influence, wider institutions that govern markets.

Many African governments and donors have promoted agricultural cooperatives in order to improve smallholders' access to markets and value chain development. To date, however, CA interventions have rarely been designed to take into account gender relations, or else have limited themselves to set up women-only groups. In practice, many rural women's groups have primarily focused on savings and credit, and wider social goals, rather than on commercialization of agricultural produce, in contrast to the dominant model of 'male' organization (Baden, 2013). Formal agricultural cooperatives in sub-Saharan Africa (SSA) often have low percentages of women members (Assefa and Tadesse, 2012). Even where women are more numerous in formal cooperatives, it can be hard for them to pursue their interests, as they are rarely well represented in leadership and decision-making positions (Nyang et al., 2010). This is because many existing interventions do not distinguish between men and women's different capacities and motivations for joining groups; do not take into account the numerous barriers that women may face to becoming group members; and also fail to address gender-based power dynamics which come into play when women join groups (Abdulwahid, 2006; Meinzen–Dick et al., 2004).

Thus, although interventions favoring rural women's organizing have undoubtedly multiplied in the last decade, and the policy environment has also become more favorable to this, the potential of collective action for strengthening women small-scale farmers' engagement in agricultural markets is not yet being realized, and its effects remain poorly understood. There is a need to better analyze outcomes from women's participation in collective action in different contexts, and to identify which strategies can best enhance women's involvement in agricultural markets.

The Researching Women's Collective Action (RWCA or WCA) project carried out by Oxfam during 2009-12 [2] aimed to provide rigorous new evidence, from quantitative and qualitative research carried out in Ethiopia,

[1] CA can be defined as both the process by which voluntary institutions form to pursue common interests and the actor that emerges as a result. CA includes varied forms from informal groups to agricultural cooperatives. All have in common the involvement of a group of people, a shared interest, and some common action. See Pandolfinelli et al (2007) and Meinzen-Dick *et al* (2004).
[2] For further description and the full range of outputs see: www.womenscollectiveaction.com.

Mali and Tanzania, on the economic and empowerment benefits of women's participation in collective action groups across different agricultural farming systems and markets. This paper draws on the findings from this project regarding the outcomes of women's participation in CA and discusses the success factors and types of intervention strategies in support of CA that have enabled women small-scale farmers to derive the most significant economic benefits, and, where applicable, to empower themselves within the household and the community. The paper emphasizes the challenges faced by development policymakers and practitioners aiming to support women's collective action in livelihoods programs, highlighting some of the shortcomings of existing interventions, thus providing further recommendations for future policy and practice.

2. Research questions and methods

The RWCA project set out to examine whether women who participate in formal marketing groups are more likely to derive greater economic benefits from trading in a given sector, than similar women active in the same sector, but not participating in groups. It aimed to identify which types of women participate in groups, to assess whether gains are more likely to accrue to women of given socio-economic and demographic characteristics, or those active in specific sub-sectors. Since a reputed advantage of collective action is the possibility to overcome market barriers that are constraining for individual smallholders, the research tried to assess whether women who participate in collective action are in a better position to source their inputs, sell more, obtain a higher price, or access market information. The final objective was to identify what development actors can do differently, and what good practices can be built on and scaled up, so that collective action in agricultural markets can convey economic benefits to women, lower the barriers they face, and increase their say and decision-making power in households and groups.

In order to identify which women participate in groups as well as the magnitude and type of benefits women derive from participating in formal agricultural cooperatives, individual surveys were administered to women both group members and non-members, engaged in the production and marketing of the same product in each country.[3] Profiling of members vs. non-members enabled comparison of their characteristics. Quantitative analysis used propensity score matching to estimate the effect of treatment (group participation) on the outcome of interest (marketing, productivity and empowerment benefits). In order to enable sensible comparison between women members of groups (the *treatment* group) and women producing and selling the same product independently (the *control* group), a two-step procedure was adopted to match women non-members with women with similar characteristics except that they were also members of some type of formal agricultural association.

The quantitative analysis also attempted to measure economic empowerment, by adapting a methodology recently developed to design the Women in Agriculture Empowerment Index (WEAI) (Alkire *et al*, 2012)[4]. Following a definition of empowerment as pertaining domain-specific attributes (Ibrahim and Alkire, 2007), the RWCA project measured women's empowerment across the following domains: decisions about agricultural production, access to and decision making power over productive resources, control over use of income, and freedom of movement. The goal of this analysis was to probe the question of whether group membership correlates with greater empowerment in any of these domains, and what may be the most significant factors associated with higher empowerment.

[3] The target sample size for the quantitative surveys was 900 women per country: 300 group members (the 'treatment' group) and 600 non-members (the 'control 'group). The final total sampled was 2796.

[4] The WEAI was pioneered by the Oxford Poverty and Human Initiative (Oxford University) with the International Food Policy Research Institute (IFPRI) and the Unites States Agency for International Development (USAID).

Qualitative methodology focused on identifying perceptions of barriers to joining groups, and benefits of participation, through focus-group discussion, individual and group life histories, and interviews with a variety of key informants, from market intermediaries to development actors, delving also into group dynamics in both women-only and mixed groups. The approach was to identify and study WCA groups in the focus areas that were 'positive exceptions', i.e. groups that could potentially teach us something about the circumstances and conditions under which women engaged in collective action are most likely to gain economic returns and empowerment benefits through market engagement, while maintaining a spread across women-only, mixed, formal as well as informal groups. This research component was designed to deepen our understanding of how market linkages, group composition, structure and governance (itself influenced by policy on collectives), and evolving gender relations at household and community level have shaped women's ability to participate in collective action groups, formal and informal.

3. Context for the research

Ethiopia, Mali and Tanzania are all poor countries and all have agriculturally based economies, with a dominance of small-scale family farming. They face similar and critical challenges in terms of market development and integration. There are also some commonalities in their long tradition of informal collective action groups, such as labor sharing and savings and credit organizations (called *tontines* in Mali).

Oxfam and other development actors working in these countries support both externally formed and locally-developed groups; encourage new women's groups, or increase female membership in existing mixed groups. Interventions also offer formal training to women members, subsidize inputs, provide access to technology (such as modern beehives allowing women to start honey production in Ethiopia) and promote better links to markets, so that women benefit from product commercialization.

There are important differences across the three countries, however, in terms of their agro-ecological conditions, politico-legal history as well as socio-cultural and socio-economic conditions, all of which impact on the forms and functioning of collective action as well as women's ability and willingness to take part in it.

In all three countries, within the past 10-15 years, governments have passed new legislation to regulate agricultural cooperatives (Baden and Pionetti 2011)[5] and set up a viable framework for cooperative development. In Ethiopia, the primary form of recognized collective action for production support and agricultural marketing is the Multipurpose Farmers Primary Cooperatives, present in each *kebele*, the lower level administrative tier, with specialized cooperatives emerging in some subsectors and operating at higher administrative levels (*woreda*). Alongside these is a longstanding tradition of informal savings and labor groups. In Mali, most rural villages count one or more formal cooperatives, traditionally male dominated, but women's participation in cooperatives has significantly increased since 2004 as a result of changes to the cooperative law promoting gender equality as well as improved access to training, leadership skills and credit offered to rural women (Coulibaly *et al* 2011). In Tanzania, savings and credit cooperatives (SACCOs) have emerged as the dominant form of formal collective action in agriculture. Tanzanian government legislation focuses on primary cooperatives and confederations. However, many producer organizations exist without formal registration (Lazaro *et al*., 2011).

The type of agricultural subsector and its market structure also shape the existence and nature of CA groups. The final phase of the WCA research on which this paper draws was focused on one sector in a selected region in each country: honey in Amhara, Ethiopia; vegetables in Tanga, Tanzania; and Shea butter in Mali's Sikasso

[5] In Tanzania this is the 2003 Cooperative Societies Act, in Ethiopia the 1995 Agricultural Cooperatives Society Proclamation (and its 1998 Amendment) and in Mali the 2001 Loi No. 01-076 regulating the establishment, functioning and dissolution of cooperative societies.

region (Table 1). These sub-sectors and regions were chosen after extensive scoping research and consultation with local and national stakeholders, during 2010-11, on the basis of their market potential, their significance for women's livelihoods, the presence of collective action as well as their significance for current and future Oxfam programs.[6] All three sub-sectors are 'high value' (vs. staples – where collective action is less prevalent) with honey and Shea butter both having significant export as well as domestic markets, while vegetables in Tanzania predominantly sold on the domestic market. Honey and Shea butter are also both tree products: as they rely less on land, women's participation is less constrained by their lack of claim to land ownership.

While women are engaged to varying degrees in all three, these sectors present different profiles in terms of their gender composition. Shea butter is a strongly 'women dominated' sector; both men and women are very involved in different aspects of vegetable production in Tanzania; and honey in Ethiopia has traditionally been regarded as a male dominated sector, though this is slowly changing with the introduction of new technologies. These gender differences by sub-sector have important influences on the types of cooperatives and of interventions found in each context and, arguably, on the types of strategy likely to enable successful WCA.

Table 1. Research focus and case studies

Country, sector	Region, district/ woredas	No. groups studied	Avg. group size	% female	Informal groups
Mali, Shea butter	Sikasso, Koutiala	27	119	96	SHGs, tontines
Tanzania, vegetables	Tanga, Lushoto	28	43	57	ROSCAs
Ethiopia, honey	Amhara, Mecha and Dangila	2[1]	915	44	WSHGs

In Mali (as in the rest of the Sahelian region) Shea nut collection, processing and marketing are almost entirely women-dominated activities. Women have usufruct rights over the nuts which are collected from trees on their husbands' land (or from land not under cultivation) during May-September. Shea nuts have traditionally been processed domestically for household consumption. Nut collection and almond drying is usually an individual activity, but butter extraction has been traditionally carried out collectively within women's groups, which have operated informally for a long time.

Interventions in the sector have aimed to strengthen and formalize these women's groups, so to facilitate access to capital and training, and establish links with regional and international markets. Subsidized modern equipment and training has enabled women's collectives to produce higher-quality, improved butter, which fetches a much better price and is highly valued in the international cosmetic industry. The WCA research covered 27 Shea butter cooperatives out of the 42 existing in Sikasso region. Average membership is 119, of which 96% is female. All cooperatives are legally registered and most date back to the middle of the 2000s.

In Tanzania, vegetables have been a traditionally female sub-sector although men are increasingly entering cash-crop horticulture. Women's roles include planting seedlings, taking care of vegetables in the field, harvesting and transporting vegetable while men are typically involved in land preparation, spraying of pesticides, and marketing. Although traditionally women were not involved in selling to brokers, their increased control over portions of land means that they are increasingly able to engage directly in the sale of their produce. Most of the middlemen however remain men (Unilever and Oxfam 2010), although during the pilot study it emerged that there are increasing numbers of women brokers.

[6] For further information on this scoping research and consultation see Baden and Pionetti (2011).

[7] In the Amhara region in Ethiopia, in the honey sector, current regulation allows that only one umbrella cooperative is to be established per woreda, the second level administrative unit. For this reason, the research covered 2 districts in Ethiopia, with one formal cooperative in each.

The Lushoto district was selected due to the important presence of farmer's collective action organizations (in total 128), the majority established under government sponsored programs. Average group membership has increased from 43 at inception to 63 in 2012. Most groups are mixed, with, on average, 57 per cent of women members – it was 53 per cent at groups' inception but men have dropped out of some mixed groups, due to 'female dominance'. The share of collectives that are registered is low (39%) compared to Mali and Ethiopia where registration is the norm.

Interventions in the honey sub-sector in Ethiopia aim to increase the quality and yield of honey to meet growing global demand, often through a steady diffusion of modern beekeeping methods, which make up only 3% of honey production, and require extensive training and follow-up. The adoption of new hive technology by some groups has been instrumental in enabling women to become more involved in the honey sector, creating an opportunity for development interventions to encourage a more equitable gender membership in groups, while supporting the adoption of modern technology and greater involvement in markets.

In Ethiopia, while membership of formal cooperatives (one per woreda) is typically reserved to just one family member (normally the household head), with the support of Oxfam, CA groups in the honey sector successfully lobbied district offices of the Ethiopian government's Cooperative Promotion Agency to allow dual membership of husbands and wives in groups. This has allowed married women to become members in their own right, thus increasing the membership, voice and representation of women in mixed groups. Of the two formal cooperatives studied, the Agunta cooperative in Dangila (770 total current members) saw its share of female membership jump from under 1% to 45%; while in the Meserete Hiwot co-operative in Mecha District (1060 total members), it went from 15% to the current 49% - and all this in only about 10 years. This increase has been brought about through promoting Women's Self Help Groups (WSHG) linked to the honey cooperatives.

In all three countries, female cooperative members are also part of a number of informal groups, such as rotating saving and credit associations (ROSCAs), self-help groups (SHGs), and labor exchange groups. These women's groups provide members with much needed access to credit and information, as well as a context in which they can acquire confidence and self-assertiveness, with positive repercussions for their capacity to participate in, and benefit from, formal groups.

4. Key findings

Across all three countries, both quantitative and qualitative data analysis indicate that when women small scale farmers participate in formal collective action in agricultural markets, they gain significantly greater economic benefits from markets.

The extent of gains varies considerably across the different contexts and sectors[8]. Women's membership of groups generates the highest monetary gains to *mboga* (leafy vegetable) producers in Tanzania (of about US$340 per year overall in net value of production), while in Ethiopia women group members earn around US$35 more than non-members in the honey sector, while women Shea producers in Mali gain a lower figure of US$12 through group participation (Vigneri *et al*. 2013). However, in Mali, when considering the net marketed value of all Shea butter produce (improved as well as 'traditional' butter), women members earn about US$20. While the share of production that women market is broadly similar between members and comparable non-members, group membership is associated with higher production (Ethiopia and Mali) and productivity (Tanzania). Only in Ethiopia is group membership associated with systematically higher prices – thanks to an

[8] The figures give an order of magnitude but are not directly comparable across countries.

arrangement with Ambrosia PLC, which has committed to buy honey from group members at better than local prices.

The research shed some light on how the benefits of group membership are generated. Participation in cooperatives enables women to lower barriers to markets, for instance through access to more lucrative market outlets, as in Ethiopia where the majority of members (78%) sell their honey via the group, while 82% of non-members sell directly to traders, where they get a lower price. Members of cooperatives also have access to a wider range of market information sources than non-members, and, particularly, greater access to information on more distant markets. In all countries, a greater proportion of non-members than non-members source market information from the local/weekly market. Groups also facilitate access to technology for value addition: in Mali, only women members of formal groups have the technology and the training to produce the more lucrative improved Shea butter.

Finally, we find that group members systematically have significantly better access to production credit than non-members, even if production credit for women remains very limited in two of the three countries studied. Access to credit for members is 6% in Mali, compared to 0.5% for non members, and 2% in Tanzania (compared to 0.0% for non members). In Ethiopia, by contrast, access to credit for production purposes is substantially higher for members (35%) than non-members (1%), thus demonstrating the huge difference that formal cooperatives can make for their members in the honey sub-sector.

As emphasized also by qualitative data, the type and extent of economic benefits vary not only depending on the context, but also according to the demographic and socio-economic characteristics of the women concerned. Quite consistently, women from wealthier households (in terms of non-land assets) are more likely to participate in formal cooperatives and/or assume leadership positions, especially in Mali and Tanzania. Age and marriage are also important status markers, so that it is rare to find young and unmarried women participating in formal organizations. The exception was Ethiopia, where group members are significantly less likely to be married. Cooperative members in Ethiopia and Tanzania are also less likely to be involved in agricultural work, in contrast to those in Mali who collect Shea nuts alongside their agricultural work. These differences are due to product specific characteristics (e.g. honey not requiring land), or the design of groups and interventions supporting them, with conscious efforts in Ethiopia to target more economically marginalized women. Differences in gender relations also come into play. For example, women in Mali, and to some extent Tanzania, have time and freedom to devote themselves to their economic enterprises only when they are past their child-bearing age and can rely on other household members, including younger co-wives, to perform household duties.

When it comes to benefits of group participation in terms of women's economic empowerment within the household and the community, the evidence from quantitative analysis is less compelling. There is an uneven relationship between formal group membership and empowerment domains, as well as variation across countries (Vigneri *et al*. 2013). In Mali, women members are more empowered than non-members along three dimensions: decision-making over agricultural income, access to credit and freedom of movement. In Tanzania, women members have more freedom to attend meetings, but women non-members have more decision-making power over agricultural assets and more rights over agricultural assets. Finally, in Ethiopia, women members have a higher ability to control income for household expenditures, but surprisingly have significantly less freedom of movement than non-members. However, when informal group membership is taken into account in regression analysis, either as a separate factor or in interaction with formal group membership, the relationship between CA and empowerment is more consistently positive, and is visible across several dimensions. Nevertheless, there is a need to be cautious about the direction of causality, as the degree of empowerment may also determine whether women are more or less likely to join groups.

Qualitative evidence from the selected 12 groups suggests that participation in women's collective action is perceived, both by women themselves as well as male group or wider community members, to improve their status at household and community levels (Pionetti, 2012). Divergences with the quantitative findings may relate

to the fact that the case studies were chosen as "positive exceptions" in the selected communities. Respondents attributed increased empowerment to women's greater earnings through participation in organizations, but also to the production skills women members acquire, their exposure to new ideas, which enhances their capacity to make informed decisions, their enhanced self-confidence, and their capacity to take part in meetings. These changes were most apparent in Mali, where men seemed to actively support women's activity in a context of declining agricultural revenues from cotton production, for example by attributing community resources to Shea plantation and supporting the purchase of mills. By contrast, in Tanzania, conflictual gender dynamics within mainly mixed groups prevailed alongside a tendency for women to be excluded from leadership positions. In some cases husband's supported or facilitated wives' activities but more often women were using a variety of strategies including informal collective action to access resources.

Overall, these findings confirm that while, under the right conditions, participation in CA can lead to significant economic benefits for women, there is a need to refrain from attributing a causal connection from women's economic benefits to greater women's empowerment. More research is warranted on these issues.

5. Key success factors and promising strategies for effective women's collective action

Which key conditions should be in place, for interventions aimed to foster women's CA in agricultural markets to be successful? The research has enabled us to identify a number of important pointers or lessons for success factors and promising strategies.

Analyze gender relations in the sector of intervention

In order to most effectively support women's collective action it is critical to understand the sector requirements, where they are currently positioned in the sector overall, including existing market channels used by women and the location of collective action within these. Win-win strategies, which link opportunities for enhancing women's market position with growth of new markets, or development of new products via value addition, can be useful entry points for effective WCA.

Lesson 1: Sectors where women are already active and which require few or no land assets are less constraining for promoting women's collective action. Engagement in expanding high value domestic markets, via the introduction of new technologies and products in 'women friendly' sectors, is particularly promising as women can benefit from value addition opportunities and also continue private trading.

Design groups and interventions to be inclusive of marginalized women

The qualitative research found that groups often operate with rules which indirectly discriminate against women or specific categories of women, e.g. single membership per household, requirements for land ownership, or single women not being included. The findings also suggest that groups will tend to favor those who are better off.

Lesson 2: Changes to membership rules and flexibility in requirements for contributions (e.g. allowing payment in kind or in labor) can enable more inclusive membership. Linking formal groups to informal women's groups, enabling group savings and targeting members with training or resources, as in Ethiopia, can support less well-off women to participate effectively in more formal groups.

Favor women-only or mixed groups flexibly according to the context

There is a trade-off between supporting mixed groups versus women-only groups. While women-specific groups allow women to become comfortable with other forms of collective action, they may have difficulty in transitioning into successful women-led agricultural marketing groups (Enria, 2011). Mixed groups have

an advantage, in that they can exploit men's wider access to land and inputs, their market contacts and social connections, which women often lack. Women members of mixed groups may sometimes do better (e.g. in the vegetable sector in Tanzania). The best course of action depends on the contexts, which leads us to:

Lesson 3: In sectors that are traditionally women dominated, or where women already have some experience of separate organizations, supporting women-only producer groups can be an effective strategy for development organizations (e.g. Shea butter in Mali). Conversely, in sectors where both men and women are economically active and where access to household land and labor is a prerequisite, such as vegetables in Tanzania, supporting women's involvement in mixed groups may be necessary to ensure access to the required resources and networks. In all cases, the support of men at household and community levels is important in enabling women's active participation.

Link informal and formal groups to maximize sustainability and benefits

Our quantitative analysis suggests that participation in informal groups (e.g. ROSCAs) has an additional positive impact on the marketing outcomes of members of formal groups. Qualitative analysis confirms the presence of important synergies. While informal groups help women develop leadership skills and build savings, formal group members have greater access to inputs and services, and engage more effectively in markets. Informal CA, for instance, has been integral to the development of women's trading in the vegetable sector in Lushoto, where small, loose associations of friends and kin come together, sometimes temporarily, responding to a specific market opportunity – more effectively perhaps than inflexible formal group structures.

In the end, no one group type seems to benefit women the most; women experience advantages from different kinds of groups, and empowerment impacts are often greater from the combined effect of membership of more than one group.

Lesson 4: Interventions are more likely to succeed in delivering benefits where (a) there is a tradition of women informally organizing collectively, and (b) where interventions seek to link informal groups to formal ones.

Address gender issues in groups and increase women's leadership

While all kinds of groups are characterized by complex power dynamics, mixed-groups may additionally incur potentially problematic gender relationships. Our qualitative research finds that neither a critical mass of female members nor female leadership is able to ensure, by itself, gender-equitable decision-making processes, or gender-equal outcomes from group membership. Despite being initially in the majority, women were then quickly disempowered within the Tanzanian ULT Malindi group, due to a change of leadership in 2006 that left men in the key positions. As these men leaders grabbed for themselves lucrative marketing opportunities, many female members became disillusioned, and group dynamics deteriorated. Ultimately, group size decreased, and membership became for the majority male (as the members declined from 50 to 5 women, and from 32 to 13 men). In another context, e.g. honey in Ethiopia, however, strategies that fostered leadership among women in informal self-help groups created the conditions for increasing women's leadership in mixed cooperatives, and led to a wider recognition of women's positive contribution within the community (Garomsa *et al*. 2012).

Lesson 5: Interventions need to address gender issues in mixed-groups and power dynamics in all kinds of groups by: training women members in leadership and management skills; favoring awareness raising with male leaders; and helping to establish mechanisms for rotational leadership and membership quota targets.

6. Conclusions

This paper has drawn out some practical lessons for development actors, based on systematic evidence of the potential, as well as limitations, of women's collective action to deliver economic and empowerment gains, across different African countries and agricultural sectors. While there is compelling evidence that participation in collective action, given the right conditions, can deliver significant economic benefits, further efforts are needed to identify and understand the relationship of these economic benefits to wider empowerment gains.

For development actors, clearly, there is no single blueprint that is adequate to all contexts. Understanding the context – in terms of the policy environment, existing gender relations, social capital and networks, and the history of interventions – is critical to any meaningful intervention. Gender analysis of the subsector is also key. In designing interventions, possibly, the most important lesson is to recognize both the importance of often informal, women-only spaces to develop solidarity and confidence, and build up women's assets and capacities, as well as the necessity in many contexts of women engaging with men, and of mixed organizations, to ensure market reach and benefits. Without the former, the latter risks reinforcing existing gender inequalities in agricultural markets.

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Chapter 19

Sustainable Food Systems for Future Cities: The Potential of Urban Agriculture

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Abstract

Populations around the world are growing and becoming predominately urban, fueling the need to re-examine how urban spaces are developed and urban inhabitants are fed. One remedy that is increasingly being considered as a solution to inadequate food access in cities, is urban agriculture. As a practice, urban agriculture touches on all three pillars of sustainability; namely, economics, society, and the environment. Historically, as well as currently, economic and food security are two of the most common reasons for participation in urban agriculture. Urban agriculture not only provides a source of healthful sustenance that might otherwise be lacking, it can also contribute to a household's income, offset food expenditures, and create jobs. Social facets are another reason for populations to engage in urban agriculture. A garden or rooftop farm is a place where people can come together for mutual benefit, often providing a common social and cultural identity for city residents. Larger urban farms also participate in community enrichment through job training and other educational programs, many of which benefit underserved populations. Finally, urban agriculture can play an important role in the environmental sustainability of a city. As a form of green infrastructure, urban farms and community food gardens can help reduce urban heat island effects, mitigate urban stormwater impacts and lower the energy embodied in food transportation. This paper will describe a multi-year study undertaken by the Urban Design Lab at the Earth Institute to assess the opportunities and challenges associated with the development of urban agriculture in New York City (NYC). The paper will present metrics on potential growing capacity within the City inclusive of both rooftop and land-based options, results from a survey of New York City based urban farmers that gathered information on the challenges and barriers to food production in NYC, with a focus on rooftop farming, and data from an environmental monitoring study on a commercial rooftop farm in Brooklyn. The paper will use the results of the multi-year study to provide insight into the potential role of urban agriculture to creating a more sustainable food system for New York City and cities elsewhere.

1. Introduction

Populations around the world are growing, projected to increase to 9.3 billion by 2050 (USCB, 2012), and becoming predominately urban. Indeed, in 2011 the urban population in some of the world's developed regions, including the United States (US), surpassed over three- quarters of the total population (UNDESA, 2012). This growth in urban population is fueling the need to re-examine how urban spaces are developed and urban inhabitants are fed. One remedy that is increasingly being considered as a solution to unhealthy and/or inadequate food access in cities is urban agriculture. Urban agriculture is usually described as horticultural, agricultural, and farming activities carried out on small plots of land in and around urban centers, however some definitions also include animal husbandry (Enete and Achike, 2008; Graefe *et al.*, 2008; Vagneron, 2007). As a practice, urban agriculture touches on all three pillars of sustainability; namely, economics, society, and the environment, as described below.

1.1 Economic Benefits of Urban Agriculture

Historically as well as today, community development, food security and economic security are three of

the most common reasons for participation in urban agriculture. Urban agriculture not only strengthens socials ties and provides healthful sustenance that might otherwise be lacking, it can also contribute to a household's income, offset food expenditures, and create jobs.

Food security is affected by both the quantity and quality of food available to a household. Even in locations where urban agriculture does not contribute significantly to employment, food security is of major concern to urban farmers (Nugent, 2002). Food insecurity, or the lack of access to adequate food for an active and healthy life (Nord *et al*, 2006 in Widome *et al*., 2009) is not just a problem in the developing world, but in the United States as well (Enete and Achike, 2008; Nugent, 2002; Widome *et al*., 2009). Food insecurity can be temporary or chronic (de Zeeuw *et al*., 1999) and is associated with a variety of problems in adolescents, who are at higher risk than young children (Widome *et al*., 2009). A perceived or actual need to improve food security and a lack of ability to rely of food from rural areas can result in the use of urban agriculture (Graefe *et al*., 2008; de Zeeuw *et al*., 1999), which has been shown to improve the quantity and quality of food available to low income urban households under a variety of conditions (Enete and Achike, 2008; Graefe *et al*., 2008; Nugent, 2002; Widome *et al*., 2009; de Zeeuw *et al*., 1999).

The extent to which urban agriculture supplements household income is diverse and can be dependent on crop choice and the scale of production. Staples, such as rice, can provide income security for a household (Vagneron, 2007), but vegetables can often command higher market prices (Graefe *et al*., 2008; Vagneron, 2007). Animal husbandry can also provide high profits (Graefe *et al*., 2008; Nugent, 2002; Vagneron, 2007) through the sale of dairy products (Nugent, 2002) or manure as fertilizer (Graefe *et al*., 2008). In some cases, only excess produce is sold (Graefe et al., 2008; Vagneron, 2007) or urban agriculture is used to supplement inadequate household incomes (Enete and Achike, 2008; Nugent, 2002; Vagneron, 2007). In other cases, urban agriculture may be the only reported source of income for a household and plays an important role in alleviating poverty (van Averbeke, 2007; Graefe *et al*., 2008). For households who do not sell produce, urban agriculture frees up funds for other uses (van Averbeke, 2007; Enete and Achike, 2008; Nugent, 2002; Vagneron, 2007). This can stretch the household budget, allowing for the purchase of other essential items (van Averbeke, 2007; Nugent, 2002) or increase economic freedom for women where household budgets are male- controlled (van Averbeke, 2007). Job creation through urban agriculture is also highly variable. In some areas, half of urban farmers employ workers (Graefe *et al*., 2008). In others, urban farmers are too poor, or the employment market too fragmented to provide more than occasional or seasonal job opportunities (Nugent, 2002).

1.2 Societal Benefits of Urban Agriculture

Social facets are another reason for populations to engage in urban agriculture (van Averbeke, 2007; Nugent, 2002). A garden or rooftop farm is a place where people can come together for mutual benefit (van Averbeke, 2007; de Zeeuw *et al*., 1999), often providing a common social and cultural identity for city residents (van Averbeke, 2007). Urban agriculture is commonly cited as a means of fostering community empowerment or as an opportunity for urban residents, particularly in underserved areas, to directly engage with food production and food procurement, which is increasingly seen as a social justice issue (Mees and Stone, 2012). Larger urban farms also participate in community enrichment programs such as skills development, job training and other educational programs, many of which benefit underserved populations. These programs use the produce in cooking and nutrition lessons for residents, as is done at Seeds to Feed Rooftop Farm, in Brooklyn (SFRF, 2013) or the Growing Chefs program, which offers educational programing in farming, gardening and cooking at numerous locations, including the Eagle Street rooftop farm (Growing Chefs, 2013). Programs such as CORE/ El Centro in Milwaukee also use urban farming as part of their healing therapies agenda and to help re- connect immigrant communities to their cultural roots, which value access to fresh, locally grown produce (Fredrich, 2013).

1.3 Environmental Benefits of Urban Agriculture

Finally, urban agriculture can play an important role in the environmental sustainability of a city. As a

form of green infrastructure, urban farms and community food gardens can help reduce urban heat island effects, mitigate urban stormwater impacts, and lower the energy embodied in food transportation.

The Urban Heat Island (UHI), defined as higher mean temperatures in an urban area than the surrounding rural area (Alexandri and Jones, 2008; Getter and Rowe, 2006; Memon et al., 2008), can lead to urban temperatures between 0.6˚ C and 12˚ C warmer than those of surrounding rural areas (Cheval, et al., 2009; Memon *et al.*, 2010). Increasing the amount of vegetation in an urban area is one of the more popular methods of mitigating the UHI through altering the heat balance of a city (Akbari, 2002). Shading by vegetation blocks and redistributes incoming solar radiation and diffuse light reflected from nearby urban surfaces (Akbari, 2002; Alexandri and Jones, 2008) that would otherwise be reflected or re-radiated as sensible heat by urban surfaces (Memeon *et al.*, 2008). Evapotranspiration in vegetated areas acts as a heat sink and also results in lower ambient and surface temperatures than urban areas without vegetation (Akbari, 2002; Alexandri and Jones, 2008; Getter and Rowe, 2006). Unfortunately many urban areas do not have much ground level land for additional green space, leaving rooftops as important space for greening. Rooftop farms can help reduce local temperatures (Wong *et al.*, 2007) and when implemented on a city wide scale, could result in significant cooling of the urban environment (Bass *et al.*, 2003).

Urban vegetation, including agricultural space, can also be used in stormwater management. Its effectiveness at reducing stormwater runoff quantities and improving runoff quality is dependent on a number of factors. Green roofs can retain between 52.3 and 100% of precipitation, reducing the amount of stormwater runoff (Czemiel Berndtsson, 2010; Getter *et al.*, 2007; Hathaway *et al.*, 2008; Rowe, 2011; VanWoert *et al.*, 2005). This has garnered them attention in municipal policy in cities such as Portland, OR (Lipton, 2005) as well as NYC. The ability of green roofs to improve runoff water quality is less clear. Green roofs release lower concentrations of heavy metals in runoff water than non-vegetated roofs (Berndtsson et al., 2006; Czerniel Berndtsson, 2010; Rowe, 2011), but have mixed performance with respect to nutrients, such as nitrogen and phosphorus (Berndtsson *et al.*, 2006; Hathaway *et al.*, 2008). Fertilizer application to green roofs only increases the levels of nutrients in runoff (Berndtsson *et al.*, 2006;

Emilsson *et al.*, 2007; Rowe *et al.*, 2006). The effect of fertilizer on runoff water quality is on important environmental issues associated with rooftop agriculture and it is yet to be fully understood (Whittinghill and Rowe, 2012).

Urban agriculture can also lower the energy embodied in food transportation by reducing the number of miles food has to travel from the farm to the table. It has been estimated that food typically travels about 1300 miles (2080 km) from farm to table, a figure which could be reduced to 30 miles (49 km) for some foods if they were produced more locally (Peters et al., 2009). Additionally, decreasing the distance that food travels can have a significant impact on reducing spoilage and therefore food waste; preliminary analysis has indicated that from an embodied energy perspective, decreasing food waste may be more significant benefit of highly localized food distribution than fuel use (Ackerman et al., 2012). Urban agriculture may also improve nutrient cycling through local recycling and re-use of organic and water wastes (de Zeeuw et al., 1999), thereby reducing the ecological footprint of urban centers (Peters et al., 2009; de Zeeuw et al., 1999). Many rooftop farms rely on compost that is made from locally collected food scraps, including the Brooklyn Grange described in Section 2.3 (Ben Flanner, personal communication, May 24, 2012). In some cases, such as the Intercontinental New York Barclay hotel, these are food scraps from the kitchen of the building on which the farm is located (IHR, 2013).

2. Urban Agriculture and New York City

To provide insight into the potential role that urban agriculture could play in creating a more sustainable food system for today's evolving cities, the Urban Design Lab (UDL) at Columbia University's Earth Institute has undertaken a multi-year study of urban agriculture potential in New York City (NYC). The study has

examined the food production capacity within the City (Ackerman et al., 2011) as well as the challenges and barriers to urban faming, with an initial focus on rooftop farming. In addition the study has undertaken some initial quantification of the environmental benefits and impacts of urban farming, again with an initial focus on rooftop farming. Findings to date in each of these areas are reported below.

2.1 Potential food production capacity within New York City

Understanding the capacity of urban agriculture to feed urban populations necessarily hinges on estimations of how much food can be grown within a city area. This is a critical assessment, in that the viability of urban agriculture and the degree to which it is afforded political and cultural support is, to some extent, dependent on perceptions of whether it can have a significant impact on local food availability and security.

In New York City, urban agriculture is already contributing to improved food security in many neighborhoods. Community gardens across the city are providing food to members and supplying local food banks with their produce. Researchers at the Farming Concrete project estimated that 87,690 lbs. of vegetables were grown on 67 gardens of the city's hundreds of community gardens in 2010 (Gittleman 2010). Urban farms such as Added Value Red Hook and East New York Farms have Community Supported Agriculture (CSA) programs offering produce from their farms, while Eagle Street Rooftop Farm has a CSA which is supplemented with produce from a farmer in the Hudson Valley (this may be the first CSA in the nation to be at least partially supplied by a rooftop farm). Farms and community gardens are also selling their produce at farmers markets, in some cases onsite (such as with Added Value Red Hook, East New York Farms, La Finca Del Sur, Hattie Carthan Community Garden, and others), and the City is partnering with Just Food to establish five more farmers markets at community gardens.

Many of these farmers markets also host regional producers from outside the city. These examples provide evidence of how urban agriculture is acting as a catalyst for larger food system change by providing facilities and logistical support for regional producers to gain access to urban consumers. Many of these community farmers markets are in areas where conventional grocery stores are reluctant to locate due to concerns about neighborhood income levels and demand.

To up-scale current urban agricultural activities to the point where NYC might be self- sufficient in supplying its fruit and vegetable needs research by the paper's authors indicates that between 162,000 and 232,000 acres of land are needed (Ackerman *et al.*, 2011). This figure does not account for the approximately 886 million lbs. of tropical or warm-weather fruit consumed annually by New Yorkers, which cannot be grown locally (these warm-weather products represent 64% of total annual fruit consumption by weight and 24% of combined total annual fruit and vegetable consumption by weight). If all of the potentially suitable vacant land in the city (estimated at 4,984 acres) were converted to urban agriculture with an average growing area of 70% of the lot area, the research estimates that this could supply the produce needs of between 103,000 and 160,000 people - depending on whether conventional or biointensive food yield figures are used. Although this is a substantial number of people, it falls well short of the population of NYC. Thus, while there is much more land potentially available than simply vacant lots, it is clear that NYC cannot strive to be anywhere close to self-sufficient in supplying its fruit and vegetable needs, much less all foods.

Although urban land availability precludes non-warm weather fruit and vegetable self- sufficiency for NYC, Ackerman *et al.* (2011) do show that for specific high value, healthy crops suited to urban farming, localized production is actually feasible from the perspective of land availability. While crops such as beans and potatoes need a great deal of land area and are not particularly well suited to small-scale, urban production, crops such as leafy greens and tomatoes may be grown in large quantities in urban areas. For dark green vegetables, for example, only 8,671 acres are needed to supply NYC using biointensive growing methods, and the approximately 360 million pounds of tomatoes consumed annually by New Yorkers could be grown on 8,260 acres. Furthermore, considerably less area would be needed for these vegetables to be grown hydroponically.

Considering the needs and resources of particular communities within NYC also adds a different dimension to the analysis. There are a number of NYC neighborhoods where a confluence of factors makes urban agriculture a particularly attractive and effective means of addressing multiple challenges. These include low access to healthy food retail, high prevalence of obesity and diabetes, low median income, and comparatively high availability of vacant and other available land. Not coincidentally, these factors are all correlated, and it is in these areas where urban agriculture could have the greatest impact on food security.

New York City neighborhoods which fit the pattern of inadequate healthy food access, high incidence of diet-related disease, greater percentage of vacant land, etc., were found to include East New York, Brownsville, Crown Heights, Bedford-Stuyvesant, and Bushwick in Brooklyn, the Lower East Side and East and Central Harlem in Manhattan, and Morrisania, Claremont Village, East Tremont, and Belmont in the Bronx, among others. These are also neighborhoods where the presence of many community gardens signifies community interest in and engagement with food production. In these neighborhoods, urban agriculture could improve fresh food availability. For example, Brooklyn Community district 16 (Brownsville) has 58 acres of vacant land, which, if converted entirely to vegetable production, could produce as much as 45% of the district's 85,000 residents' annual supply of dark green vegetables (broccoli, collard greens, escarole, kale, lettuce leaf, mustard greens, spinach, and turnip greens; this estimate assumes an average lot coverage of 70% for growing area). This district also has an estimated 23 acres of green space on New York City Housing Authority (NYCHA) property, as well 14 acres of surface parking – converting some of this area to farming or gardening could increase the availability of fresh produce even further.

2.2 Challenges and Barriers to Food Production in New York City

The capacity of urban agriculture to meet certain food needs within a city also hinges on the ease at which urban faming can be practiced. To develop a better understanding of the challenges and barriers facing urban farmers, and to evaluate whether changes to policy or other systemic conditions could help alleviate such barriers, the UDL undertook a survey of NYC based farmers. The survey was informal and was administered to 22 individuals who are active in rooftop farming and gardening in NYC. Respondents were asked to identify challenges and barriers to the development phase (planning, design, construction) of a rooftop farm or garden, how they addressed these challenges, and whether they could think of broader solutions that would help mitigate or alleviate these challenges for them or other prospective farmers in the future. They were then asked a similar series of questions regarding the operation of rooftop farms and gardens (encompassing farm management, maintenance, etc.). This structure allowed for the differentiation between the barriers to entry for prospective rooftop farmers and gardeners, as opposed to the challenges encountered once a farm or garden has already been established - a distinction which was deemed be important to identifying how potential policy incentives or solutions might best be targeted. Participants were free to identify as many challenges as they wished, as were not asked to create a hierarchy; although some did so of their own volition, specifically referring to some issues as "primary," "the major problem," etc. Questions were left open-ended and follow-up questions were asked for clarification. Results were then transcribed, reviewed, and compiled, and common themes were identified.

Survey participants were identified using a variety of sources, including existing UDL contacts, the greenroofs.com database (GRC, 2013), and pubic information on recipients of tax incentives and green infrastructure grants. These individuals included 20 people with experience in the rooftop farming development process, which includes the planning, design, and construction phase, 7 people who have an oversight, management, or maintenance role on an active rooftop farm or garden, and 10 active rooftop farmers or gardeners (with many of the individuals filling multiple roles). Collectively, respondents participated in the development and/or operation of 13 rooftop farms and 19 rooftop gardens with a total growing area of over 150,000 square feet and a median growing area of 1,000 square feet (and with a total of approximately 100,000 additional square feet in the planning phase). Thirteen of the roofs use an intensive green roof system, 3 are extensive, while 15 involve some form of container farming or gardening (with some roofs including more than one type). Three of these operations are in the Bronx (total 11,000 square feet), 11 in Manhattan (10,275 square feet), 14 in Brooklyn (86,400 square feet), and 2 in Queens (47,000 square feet) (none of the roofs are in Staten

Island). Four of the roofs are commercial rooftop farms, generating revenue primarily from sales to retailers, restaurants, and through farm stands and CSAs; 7 are projects on residential buildings intended primarily for use by multiple building occupants; 3 are non-profit operations staffed by volunteers supplying shelters or kitchens, 4 are on schools and meant primarily for educational purposes, 6 are on restaurants or hotels and used to supply commercial kitchens, and 6 are on private residences. Given the fact that rooftop farming and gardening is not a widespread activity in NYC, the study that was undertaken is believed to be fairly representative of this small but growing community. This is because a majority of rooftop food producing sites in NYC are in some way represented by the respondents, whether through people involved in design and construction or those who are responsible for day-to-day operations.

The range of topics raised by the survey respondents included: Regulation and Permitting; Tax Incentives; Green Infrastructure Grants; Rooftop Farm Siting; Funding; Roof System and Growing Media; Farm Maintenance and Labor; Access to Equipment and Materials; Climate and Pests; Information and Knowledge Dissemination on Best Practices; Community Outreach and Involvement. This wide range of topics is an indication of the complexity of rooftop food cultivation and the many challenges farmers encounter in their efforts to develop a successful operation. Nonetheless, the barriers mentioned in the survey can be broadly organized into four nested categories: at the highest level, rooftop farmers identified challenges that have to do with starting a small business in NYC, which many other types of businesses may face, such as securing loans and managing costs and labor requirements. The second category of challenges involves issues faced by small farmers generally, and includes such things as pest management and developing a viable marketing or distribution plan. The third category is specific to urban agriculture, incorporating the opportunities and constraints inherent in growing food productively in a dense urban setting. The last category, encompassing the majority of the problems identified, is specific to rooftop agriculture. These challenges included finding an appropriate site, securing the proper permits, financing construction, and managing and operating a farm or garden. Rooftop farms are both green roofs and farms, and some are commercial businesses while also attempting to demonstrate larger social and environmental benefits. These goals do not easily coincide, and many of the problems raised had to do with determining how to navigate this difficulty.

2.3 Environmental monitoring of a commercial rooftop farm in Brooklyn, NYC

Financing the construction of a rooftop farm, especially a larger facility that has the potential to become commercially viable, was raised as a key concern by responders to the survey discussed above. Green infrastructure grants or tax incentives are both means via which rooftop farmers might access necessary finance, provided it can be demonstrated that rooftop farms have environmental benefits, most especially with respect to stormwater management. To date, however, few studies have quantified the impact of green roof farming practices on stormwater management isses, leading to lack of clarify on whether rooftop farms are even eligible for certain grants or tax incentives.

In order to address current lack of information on the environmental performance of urban rooftop farming, the UDL is engaged in monitoring the Long Island City Brooklyn Grange rooftop farm located at 37-18 Northern Boulevard. The rooftop farm was installed in 2007 and uses Rooflite® green roof media (Skyland USA LLC, Landenberg, PA) mounded into rows with a depth of 20-25 cm (8-10 in) and 2.5-5 cm (1-2 in) between row depth. The farm covers almost all of the 3,716 m^2 (40,000 ft^2) rooftop. A 281 m^2 (3,022 ft^2) watershed located centrally on the northern side of the building was selected for instrumentation to measure stormwater runoff quantity, while a second drainage basin located on the north west corner of the farm was selected to monitor runoff quality. Non-vegetated areas of the roof include a stairwell, the central roof walkway made of gravel, and walkways between crop rows. The green roof is planted with vegetables, herbs and some flowers for cutting, including sunflowers. Irrigation is supplied to the plants through a drip irrigation line 3 timed daily for 30-40 min, depending on weather conditions. Monitoring for water quality runoff at the farm began in January 2013, while monitoring for runoff quantity began in May 2013.

Preliminary results from the monitoring program have focused on examining the water quality of runoff from the rooftop farm. Runoff water quality is determined from samples collected during individual storm events as runoff enters a rooftop drain. Rain water from the same storm is also collected for comparative purposes. To date, one irrigation water sample has also been gathered. After collection, the samples are taken back to the Heffner Laboratory at Columbia University and analyzed for pH and electrical conductivity with an Accumet™ excel XL50 duel channel pH/ion/conductivity meter (Fisher Scientific, Hampton, NH), turbidity with a 2020we turbidity meter (LaMotte, Chestertown, MD), and color and true color with a DR/890 colorimeter (Hach, Loveland, CO). A portion of each sample is also stored in a freezer and will later be sent to Auburn University Soil Testing Laboratory (Auburn University, AL) for nutrient content analyses, including nitrogen and phosphorus.

Thus far, a total of 20 samples have been taken for water quality analysis. To compare the environmental impacts of the farm with that of a conventional green roof, the Brooklyn Grange water quality data were compared to data obtained from prior work that examined the quality of runoff from extensive sedum green roofs, as well as traditional non-vegetated roofs, installed on a variety of NYC buildings (Culligan *et al.*, 2013). Comparative findings to date are summarized in Figures 1 to 4.

The average pH of runoff from the Brooklyn Grange is slightly higher than that of rain from Manhattan and lower than that of rain from the Brooklyn Grange or runoff from the extensive sedum green roofs (Figure 1). The conductivity (Figure 2) and apparent color (Figure 3) of runoff from the Brooklyn Grange are much higher than all other water sources, which are similar to each other. Sample true color follows the same pattern (not shown). The average turbidity of runoff from the Brooklyn Grange appears higher than that of either rain source, but similar to runoff from both non-vegetated and extensive sedum green roofs (Figure 4). That runoff from the Brooklyn Grange has higher conductivity and true color than runoff from conventional green roofs might indicate poorer runoff quality from the rooftop farm than a sedum green roof.

3. Conclusions and Recommendations

There are distinct opportunities and challenges inherent in urban agriculture in NYC, which is the highest-density US metropolis with some of the nation's highest land values, making the prospect of farming in the five boroughs a demanding proposition. On the other hand, NYC has particular advantages: the economic and cultural robustness that serve to maintain high property costs are also associated with a high level of awareness, support and potential access to investment capital for projects that promote healthy food systems

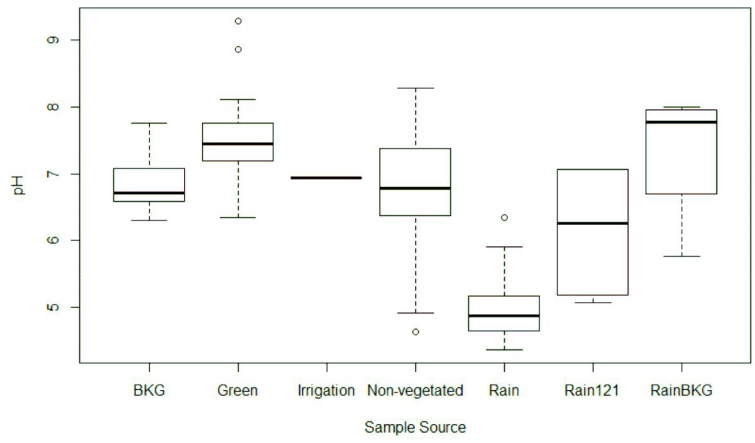

Figure 1. Average pH of water sampled from Brooklyn Grange runoff (BKG), Brooklyn Grange irrigation (Irrigation)*, rain from a Manhattan Building (Rain121) and rain from the Brooklyn Grange (RainBKG). Runoff measurements from traditional non-vegetated roofs (non-vegetated), extensive sedum green roofs (green) and rain (rain) samples were collected from a previous study (Culligan *et al.*, 2013).

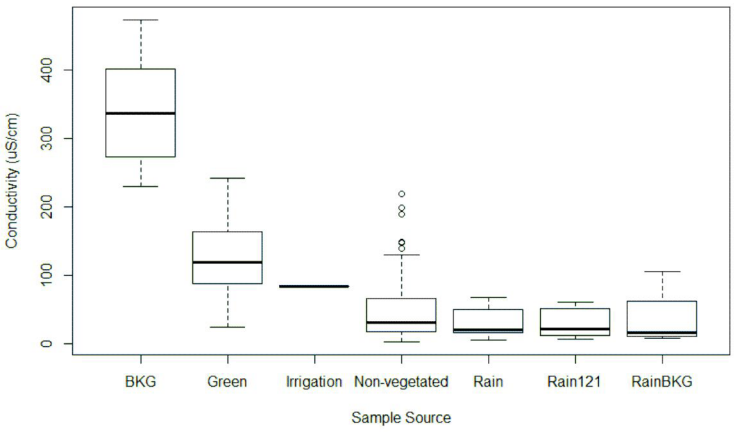

Figure 2. Average conductivity of water sampled from Brooklyn Grange runoff (BKG), Brooklyn Grange irrigation (Irrigation)*, rain from a Manhattan Building (Rain121) and rain from the Brooklyn Grange (RainBKG). Runoff measurements from traditional non-vegetated roofs (non-vegetated), extensive sedum green roofs (green) and rain (rain) samples were collected from a previous study (Culligan et al., 2013).

and sustainability. Specifically, urban farms are uniquely dependent on their surrounding communities to provide a strong customer base, and NYC's density, and diverse and vibrant food

culture make for an attractive context for aspiring urban farmers. NYC's industrial and manufacturing areas are also highly suitable for rooftop agriculture due, in part, to access to re- development capital, a robust transportation network and adequate physical infrastructure. And despite what some might assume to be an inhospitable climate for agriculture, NYC's five boroughs have a rich farming history, with Queens and Kings Counties being among the most productive agricultural counties in the nation in the late 19th century, all

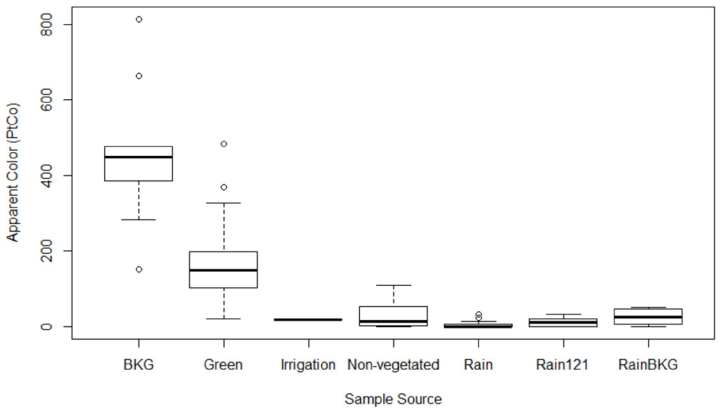

Figure 3. Average apparent color of water sampled from Brooklyn Grange runoff (BKG), Brooklyn Grange irrigation (Irrigation)*, rain from a Manhattan Building (Rain121) and rain from the Brooklyn Grange (RainBKG). Runoff measurements from traditional non-vegetated roofs (non-vegetated), extensive sedum green roofs (green) and rain (rain) samples were collected from a previous study (Culligan *et al.*, 2013).

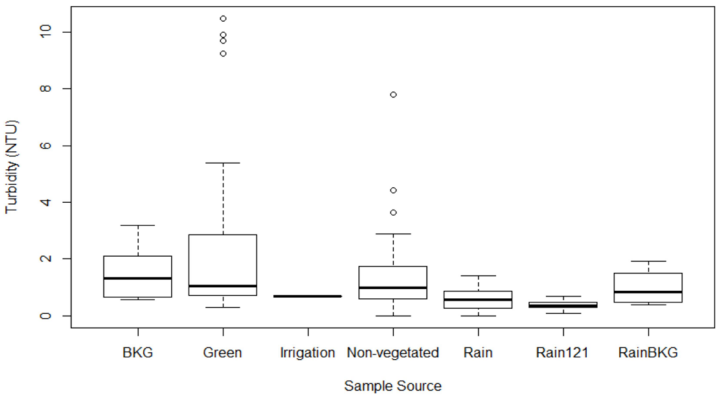

Figure 4. Average turbidity of water sampled from Brooklyn Grange runoff (BKG), Brooklyn Grange irrigation (Irrigation)*, rain from a Manhattan Building (Rain121) and rain from the Brooklyn Grange (RainBKG). Runoff measurements from traditional non- vegetated roofs (non-vegetated), extensive sedum green roofs (green) and rain (rain) samples were collected from a previous study (Culligan *et al.*, 2013).

before the advent of advanced season-extension techniques (Linder and Zacharias, 1999). In Manhattan, for several decades in the 19th century, the extensive squatter settlements were said to produce a large proportion of the produce consumed by the city (Plunz, 1990). Indeed, as with other urban areas, the demise of localized production only began with the advent of modern food transport technologies such as refrigerated rail boxcars, interstate trucking, and air freight, which successively promoted the nationalization and then the globalization of the food system.

Urban agriculture has great potential to help mitigate critical public health and environmental problems faced by NYC. The city suffers from higher than average rates of obesity and diabetes (Raufman *et al.*, 2007), which are correlated to inadequate access to fresh, healthy food retail (Morland *et al.*, 2006). This is relevant to the issue of urban agriculture because, as discussed in Section 2.1, the communities that suffer the most from diet-related disease and inadequate access to healthy foods are also the areas where much of the city's vacant land is located.

Urban agriculture is also part of a broader range of horticultural strategies that involve the creation of productive green space to directly address some of NYC's most intractable environmental problems, including those associated with urban stormwater management (Carson *et al.*, 2013) and mitigation of the urban heat island effect. Additionally, urban agriculture could decrease the environmental and economic costs of dealing with the City's waste stream by providing alternative means of disposing of organic waste through composting. Although urban farms could realistically process only a small percentage of NYC's compostable waste, as with other issues, the value lies in their potential as a catalyst for promoting shifts in consciousness and behavior that could greatly amplify such, otherwise modest, impacts.

The solutions that urban agriculture offers to multiple problems in NYC, as discussed in this paper, are likely to be similar to those in other cities around the world, as are the hurdles to urban agriculture implementation. The work conducted by the authors of this paper indicates that these hurdles require urban policy amendments that would make it easier for urban farmers to obtain permits and undertake practices such as large-scale composting at their facilities, as well as further research that could lead to the development of best urban farming practices, including practices that reduce nutrient loading in the runoff from urban farms. Development of urban agricultural extensions at urban university centers is one way of cultivating the knowledge and expertise that could maximize the value of urban agricultural for city inhabitants.

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Chapter 20

Building Inclusive livelihoods

Connecting subsistence Indian community engagement experiences of sustainable Food Systems with sustainable inner-city development in mid-sized Canadian citie

Ramani Sankaranarayanan, Geeta Vaidyanathan[1], Stephanie Mancini, Joe Mancini[2]

[1]CTx GREEN: is the abbreviated operating name of the Kitchener, Ontario based Canadian not-for-profit organization: "Community-based Technologies Exchange fostering Green Energy Partnerships."

[2]The Working Centre, Kitchener, Ontario, Canada

Abstract

CTx GREEN works in villages in Odisha, India researching and facilitating linked community-based projects in the area of agriculture, energy and water. Pedal powered biodiesel reactors and bioethanol cookstoves are just some of the tools that convert under-utilized seeds and fruits into usable community energy designed to increase agricultural yields, community and livelihoods. CTx GREEN was founded and continues to be guided by Ramani Sankaranarayanan and Geeta Vaidyanathan. Over 32 years, The Working Centre community has evolved volunteer-inspired, access to tools projects in ventures that include computer labs, a bike shop, community kitchens, gardens, greenhouse, transitional housing, cafes, and thrift stores comprising over 30 projects in five owned and operated warehouse buildings. The Working Centre was founded and continues to be guided by Joe and Stephanie Mancini.

Introduction

Too many sustainability projects have their origins in top-down, well financed programs that immediately lose their grassroots credibility in managerial directives. The Working Centre and CTx GREEN are two community-based organizations that share a different approach. This paper will present how two similar community development models are unfolding in Canada and India. Both groups have a priority towards;

- developing self-reliance and pride in one's efforts
- using shared tools to build community
- respecting the balance of nature with human-scale activities

CTx GREEN is promoting, over the last 10 years, a model of locally generated energy supported by growing entrepreneurial agro-service potential for local productive uses, in Odisha, India. The Working Centre has been revitalizing the urban core in Ontario, Canada over the last 30 years. Both approaches use synergies so that the maximum value of benefits from access to tools accrues to the local community.

The CTx GREEN "Local Production for Local Use" model: *Food-Fuel-and-Income Security through 'Village Level Biodiesel'*

CTx GREEN has developed and fine-tuned a strategic package of small-scale technologies and social engineering over the past nine years. CTx GREEN is a Canadian not-for-profit organization[1] working closely

[1] CTx GREEN's vision is often expressed as "Local food and fuel security for global environmental security"

with grass-roots NGOs as well as universities in India and Canada. Partnerships are emerging with NGOs in Ethiopia, Kenya and Sri Lanka. CTx GREEN's package promotes sustainable agriculture within agro-forest communities to improve their self-sufficiency in *food-fuel-and-household-income*. Un-utilized and under-utilized local resources are harnessed to achieve a climate resilient, *local production for local use* model. The *local production* in this model refers not only to food but also to (bio)fuel produced from local agro-forest resources. "Feed yourself first before looking for a market for the surplus" is a key concept in maximizing local uses and benefits from the local production of fuel and food.

The use of oil cake as a local input to agriculture and the use of locally produced biodiesel fuel to increase agricultural mechanization are two important elements of the package. By increasing the level of mechanization of agriculture,[2] it is possible to bring more land under cultivation in rain-fed conditions by providing timely inputs of tilling, sowing and organic fertilizer (power tilling with local green fuel, good native seed varieties, and local oil cake, respectively). Overall food production, land productivity (tonnes/hectare) and soil health can thus be improved simultaneously. Relay cropping and mixed cropping of pulses, cereals and oil seeds are among agricultural practices that need to be adapted and customized to local agro-climatic conditions, to improve nutritional security as an integral part of food security. Trees grown as a part of agro-forestry packages will not only provide tree-borne oilseeds and fruit as raw material for making biofuels, but will also reduce soil erosion in the catchments of the watershed and enhance soil carbon. An increase in the green cover reduces vulnerability to climate change by sequestering carbon while supporting food-fuel-and-income security. Thus all of these elements, together and individually, build climate resilience. Technologies to facilitate the local availability of edible oil, oil cake and biodiesel include: small-scale oil presses and expellers; CTx GREEN's pedal-powered biodiesel reactors, and village-scale refining of oil, biodiesel, glycerin and ethanol; biodiesel-fuelled multi-use power tillers, pump-sets, and a range of post-harvest value addition tools (threshers, rice mills, oil mills, and even gen-sets). The implementation of such small- scale technologies provides local jobs, training and economic opportunities to youth, and an incentive to reverse migration to urban centers. watershed and enhance soil carbon. An increase in the green cover reduces vulnerability to climate change by sequestering carbon while supporting food-fuel-and-income security. Thus all of these elements, together and individually, build climate resilience. Technologies to facilitate the local availability of edible oil, oil cake and biodiesel include: small-scale oil presses and expellers; CTx GREEN's pedal-powered biodiesel reactors, and village-scale refining of oil, biodiesel, glycerin and ethanol; biodiesel-fuelled multi-use power tillers, pump-sets, and a range of post-harvest value addition tools (threshers, rice mills, oil mills, and even gen-sets). The implementation of such small- scale technologies provides local jobs, training and economic opportunities to youth, and an incentive to reverse migration to urban centers.

We watched every year as more than 300,000 kilograms of tree-borne oil seeds were sourced by middlemen from the hills of Tumba and trucked away to the cities. Some of these oil seeds were collected by residents who had right over the forest produce and continued to protect the resource. A lot more of it was collected illegally by people from the foothills that logged and mined these forests for quick returns.

In 2010 we motivated one Self Help Group, Maa Bijayalakmi Dal of Ankuli village to protect a part of their karanj seeds. They withdrew Rs.15,000 from their savings in the Rushikulya Gramya Bank at Turubudi, and with a matching loan of Rs.15,000 from the Biodiesel project, managed to buy 3,000 kilograms of karanj seeds from their cluster. Since Ankuli village was at an elevation more than 900m above mean sea level, the Gram Vikas-CTx GREEN Biodiesel project set up an oil expelling facility at the foothills, as a pilot business feasibility demonstration. The oil expeller was attached to a power tiller engine and fuelled by biodiesel to press the oilseeds. The SHG paid a milling charge and pressed the oilseeds at this oil mill.

[2] Subsistence agriculture in much of Odisha state in eastern India is not mechanized.

Oil and oilcake were available for sale at the foothill. All the oilcake was purchased by farmers and used as an organic nutrient and bio-pesticide for paddy cultivation. Unadulterated karanj oil was sold at the local market and also purchased for conversion to biodiesel to fuel the power tiller driving the oil expeller.

In this manner, the Self Help Group, Maa Bijaylakshmi Dal was able to earn a profit of Rs.10,000/- over their investment. The money (Rs.15,000/-) would have earned them only about Rs.700/- if they had left it in the bank. Instead they earned almost fifteen times more by investing in the purchase of karanj seeds and the sale of oil and oilcake. Additionally, the oil mill where the seeds were pressed generated local employment and the farmers were able to displace chemical fertilizers by using karanj oilcake.

The community of nearly 50 villages in the Tumba hills comprises nearly 1,500 households, mostly farmers who also collect and sell forest produce to augment their incomes. There are enough tree-borne oil seeds to keep not just one but several small-scale oil mills in business in the hills. However, a greater number of the more than 100 self-help groups need to be motivated to participate in the supply side of "the expanded value chain of oil seeds." And more of the farmers need to gain confidence in accessing the benefits of oil cake as manure and biodiesel-fuelled power-tilling and other agricultural post-harvest value addition activities (i.e., drive the demand side). Running the production mills and agro-service centres must be recognized by youth as lucrative as, if not better than, migrating to far-flung cities in search of labour jobs.

The challenges are clear, and the way forward is beginning to get much needed support. Our journey started with seed funding from the World Bank Development Marketplace (DM2003) to demonstrate biodiesel-fuelled water sanitation and rural electrification in villages of Odisha, India, in partnership with Gram Vikas. Support from the Shastri Indo-Canadian Institute's (SICI) Millennium Development Goals Grant through U. Waterloo helped us shape the strategic transformation to fuel agricultural mechanization. Other small grants have kept us going. Recently Grand Challenges Canada awarded CTx GREEN two Stars of Global Health grants: http://www.grandchallenges.ca/grantee-stars/0222-01/ and http://www.grandchallenges.ca/grantee-stars/0227-01/ to launch us on our next leap forward.

The CTx GREEN definition of *food-fuel-and-income security* is more in tune with the concept of Food Sovereignty, first defined by the farmer's organization La Via Campesina in a manner than extends beyond the UN Committee of Economic and Social and Cultural Rights (CECSR) definition of Food Security.[3] La Via Campesina[4] defined Food Sovereignty in a manner that concerns all people's right to food but also where this food comes from and how it is produced:

> "Food Sovereignty is the right of peoples, communities and countries to define their own agricultural, fishing, food and land policies which are ecologically, socially, economically and culturally appropriate to their unique circumstances. Food Sovereignty places the people who produce, distribute and consume the food in the centre of the food system and its policies, instead of demands from markets and companies."

By forging a link to increased local production of food through locally produced fuel and fertilizer, the local community is then in a stronger position to reduce the outflow of cash to purchase inputs to agriculture, and increase cash income from the sale of surplus food. Biofuel produced in this "*local production*

[3] The UN CECSR definition of Food Security: "*… when every man, woman and child, alone or in a community with others, has physical and economic access at all times to adequate food or means for its procurement using a method that is in agreement with human dignity*."
[4] The quote on food sovereignty is reproduced from page 7 of "The betrayal of the poorest – on the agriculture aid that disappeared," The Swedish Cooperative Centre (SCC), Facts from SCC, Nr. 7, June 2008, www.utangranser.se

for local use" model is far more likely to increase *food-fuel-and- income security* at the local level than large-scale centralized production of biofuels to substitute fossil fuels used in urban transportation, which may pose serious threats to food security by diverting land under food cultivation to cash-crops for fuel.

The CTx GREEN model of *local production for local use* that targets the strengthening of *food-fuel- and-income-security* is named **VLB** (as an abbreviated moniker for Village Level Biodiesel[5]) to differentiate it from other conventional biodiesel models based on mega-plantations and centralized production of fuel for urban transportation purposes. In the case of the latter models, not only is there a serious threat to local food security, but there is also little likelihood of the benefits trickling down to the producers of the feedstock.

The VLB model for strengthening food-fuel-and-income-security takes an approach that has three prongs, namely,

- creation of biodiesel-fuelled green livelihoods,
- delivery of value-added products and services, and
- practice of sustainable agriculture.

In the Odisha context, particularly in hilly forested regions inhabited by tribal people (adivasis, or indigenous people), the first value chain addressed by CTx GREEN's VLB model is that of the abundantly available yet under-utilized and un-utilized oil seeds. (Typically the pre-VLB value chain comprises the collection and sale of these seeds, often at low prices to outside traders, who often double as money lenders in times of need). The engagement of local actors in the expanded value chain is critical to maximize the benefits to the local economy. Farmers drive the demand side as consumers of oil cake and biodiesel in sustainable agriculture. Youth are trained to operate the oil mill, biodiesel production centres and biodiesel-fuelled agro-service tools such as power tillers, rice hullers, etc., in a profitable manner. Women's self-help groups are engaged in securing the raw materials (procured from collectors and cultivators) and marketing of products, by-products and services within the local community. Appropriate financing packages and training for all three groups of actors (youth, women and farmers) are critical supports that need to be extended to empower the actors in their roles as successful entrepreneurs. A producers cooperative is also envisaged as an overarching need to streamline the production and sale of surplus goods and services emerging from the activities – every family in the cluster would be eligible for membership and full voting rights in the producers cooperative which becomes a fourth local group to train and support.

Over time, as the individual as well as collective capacities of the various actors increase with experience, the range and scope of value-added products and services can be expected to expand. For example, a soap making unit could be added to add further value to surplus oil. Value addition to surplus food could begin and so on. The scales of local production and use of various products and services can also be expected to grow over time. The knowledge and experience gained in expanding the oil seed value chain can be expected to auto-catalyze the expansion of the value chains of other forest produce as well (ranging from fruits and ingredients used in medicinal preparation to raw materials that are converted into household consumer goods)

*Our **VLB** model is designed to **catalyze** and strengthen community-government initiatives aimed at (1) appropriate development and management of the watershed, (2) regeneration of land and water through plantation of trees, and (3) agricultural extension activities to improve food production and land productivity. Government programs are typically premised on the power and ability of the market to compensate producers. The market often fails to reward the poorest of the poor producers, with middlemen ready and eager to skim off much of the fat. By providing small-scale tools for local value addition, the VLB model strives to provide an important link that not only helps local producers in maximizing their returns, but also generates local jobs and entrepreneurial training, all of which are beneficial to the mandates of additional Government departments such as Human*

[5] VLB could also stand for Village Level Bio-ethanol, or Village Level Biofuel, or even Village Level Biotechnologies

Resources Development, and Rural Development. A conscious integration of the VLB model into the watershed and reforestation programs will steer the reforestation efforts towards mixed plantations that include native species of tree-borne oil seeds and fruit bearing trees and shrubs. Bolstered by tools to maximize the benefits from forest produce, residents of these agro-forest eco-systems are better equipped to understand and appreciate the importance of biodiversity protection and conservation, which will have a direct impact on the long term sustainability of their food, fuel and income systems. An even more dramatic impact can be expected from the synergistic integration of the VLB model into agricultural extension programs such as the creation of "60,000 oil seeds and pulses villages in Eastern India" and "Bridge the yield gap."[6] These Government programs currently provide input subsidies (for seeds, fertilizer and cultivation labour) and promotional materials in the drive to increase the production of edible oil seeds, pulses and grains. The introduction of a technology package from the VLB model, including small-scale oil expellers, biodiesel production units and other small farm implements, into village communities will go a long way in improving the returns to the farmers and ensure self- sufficiency in edible oil, food, fuel and fertilizer.

Before wrapping up this description of our VLB model, it will be useful to trace its philosophical moorings. Our VLB model is very much rooted in E.F.Schumacher's proposal[7] that "development outcomes could be maximized, or speeded-up, with technologies that are intermediate in scale and labour-intensive enough to create local jobs and capacity, much more so than with technologies deployed in bigger fully-automated mega-factories." Schumacher based much of his theses on Mahatma Gandhi's teachings on the importance of self-reliance and the utility of simple technologies that not only add value to local resources but also empower gram swaraj or village independence (and self-sufficiency). More importantly, we draw inspiration from Ivan Illich's differentiation[8] between (mega)technologies that enslave humans and convivial technologies that liberate them, thus empowering and elevating the human spirit. On a contemporary level, we also subscribe to the principles embedded in The Working Centre's concept of providing access to Community Tools,[9] where the idea is to nurture learning environments for those interested in picking-up skills and experiences that could be of collective and individual benefit. VLB technologies and processes have thus been designed to be simple to learn, operate and manage, and more importantly, to grow in step with local needs and capabilities.

CTx GREEN has expanded self-reliance through agro-services, created shared tools that engage community, and provides a model for harmonizing human impact in forested rural areas. CTx GREEN's holistic philosophy grew out of discussion and interaction with The Working Centre community in the early 2000's. The process of learning from each group and applying similar philosophies to urban and rural areas has the potential of demonstrating effective, holistic community development.

The Working Centre Community Tools Model in an Urban Environment

> *"The work of a real community is a way of life in which purchasing power is valued less than the power to produce with one's own mind and hands. It is a culture that tries to make room for everybody, pay a little respect and look for ways to make a trade."* [10]
>
> *Ken Westhues, Producerism: A Real-life Example*

The Working Centre is a hard-working community of people committed to creating access to tools in

[6] Both of these programs were first announced as part of the Government of India's budget for 2010-11. Both continue to have priority and financial allocation in the 2012-13 budget with an additional mandate to integrate them within the National Livelihood Mission.
[7] E.F.Schumacher, "Small is Beautiful Economics as if People Mattered," 1973, Harper & Row, N.Y
[8] Ivan Illich. "Tools for Conviviality," 1973, Harper & Row, N.Y.
[9] For more details on The Working Centre's Community Tools, go to http://www.theworkingcentre.org/community-tools- projects/151
[10] Ken Westhues, Producerism: A Real Life Example, Good Work News, September 1998

downtown Kitchener, Ontario. A tour through the five storefront and warehouse buildings and six houses confirms the impression of a lively, vibrant social dynamic that fixes bikes, offers easy-to-use public access computers, builds its own transitional housing, serves a free daily community meal, operates a lively cafe and scores of other projects. When you visit these projects, the feel is nothing like a social service bureaucracy. By virtue of our roots and the consistent choices we have followed the projects highlight the shared use of tools organized and deployed for cooperation in human scale spaces. The pride in the work being accomplished is reflected in Ken Weshues' description of The Working Centre community as a "society of skilled and small scale producers plying our trade in creative reciprocal relations." [11]

In our first 17 years we had operated essentially out of 58 Queen Street South and St. John's Anglican Church. When we took on a small mortgage to revitalize 43 Queen we quickly came up with a plan. We had a three story, 9000 square foot building and lots of ideas. While paying for the renovations was our first concern, just as pressing was ensuring that The Working Centre culture would translate into a new building? The effort starts with discussions. How could we build shared housing? How could we incubate a community bike shop? What kind of community gathering space do we want on the main floor?

These ideas would only be accomplished after the physical effort of stripping the building and rebuilding it floor by floor. That meant inspired volunteer effort, it meant involving the wider community in all steps of the work. We started designing the cooperative projects that would operate in the space. The project came together as the open nature of the public space became a catalyst for increasing the volunteer spirit. The projects that were established like The Front Window craft retail space, Barterworks, shared housing, Recycle Cycles Community Bike Shop, Computer Recycling and the Arts Space demonstrated that our culture could be productive and give people a voice in the development of the projects.

Three years later, we made a leap to renovate and expand into 66 Queen and then 97 Victoria Street North. The Victoria street campus quickly became an alternative space where the redistribution of food and the recycling/redistribution of furniture and housewares was done with volunteers, but more importantly by giving volunteers a say, involving them in the core of the work, making St. John's Kitchen and Worth a Second Look thrift store a place where participants had a stake in the culture of the projects..

Community Tools

The Working Centre calls its projects Community Tools[12] when they create access to tools, teach cooperation and give people opportunities to contribute to the community. They are designed to put productive tools into the hands of people, seeking to make daily living more affordable and cooperative. Examples of Community Tools projects include Recycle Cycles Community Bike Shop where 50 volunteers refurbish for sale 600 bikes and 3500 people tune up their bikes at the public bike stands. Public Access Computers combines our fully equipped computer training labs and the computer recycling and fix-it lab that sells refurbished computers. We have 40 public access computers that are used over 1000 times a month. Our training labs are constantly in use, as is our community voice mail. The Job Resource Centre offers a wide range of easy access resources for 3,000 job seekers a year. St. John's Kitchen serves up to 300 meals each day. With a limited staff, it operates with the work of approximately 100 volunteers, 80% of whom are patrons. Showers, laundry and an extensive network of outreach and psychiatric supports supplement this work. Worth a Second Look Furniture and Housewares,

[11] Ibid p.5

[12] Community Tools takes their name from Illich's Tools for Conviviality with the goal of inverting the structure of tools for wide community use.

Barterworks, Hacienda Sarria Market Garden, Green Door Clothing and Arts Space, Multicultural Cinema Club, a commercial kitchen, and the Queen Street Commons Café are other Community Tools offered through The Working Centre community.

For 30 years, The Working Centre has advanced a model for sustainable development while renovating and operating 55,000 square feet of warehouse buildings and houses in downtown Kitchener. Altogether we employ over 100 people and incorporate 400 volunteers in this work of community. We have identified Producerism, Local Democracy, and Social Inclusion as key practices that hold our grassroots community together.

Producerism

Since the 1980's we have witnessed the structure of the labour market change. Low wage jobs have increased while middle wage jobs continue to disappear. This phenomenon has squeezed out those who once made their living in the marginal sector of the economy. By consequence, The Working Centre has always been filled with people excluded from the economy for lack of work, who are not able to compete, who live on the margins either on social assistance or just scraping together enough income for rent and food. While the economy excluded this group, we found new ways to assist people to fulfill their dignity by creating opportunities to contribute to society.

We adopted the idea of Producerism to emphasis the importance of how work builds community. We took from Christopher Lash's writings the ideal of rooted communities where economics and social relationships were intertwined through labour, craft, church, and civic improvement.[13] Lasch describes Producerism as the underlying dynamic that pushed forward the development of villages throughout North America during the nineteenth century when blacksmiths, carriage makers, farmers, mill operators, and householders were the lifeblood of the economy. This was a time when craft was as important as the work. As Jung wrote, creativity is not a luxury, it is a vital human need. When people give up control of their work, they lose meaning and their ability to contribute to the common good. Virtue comes naturally to those working their land to produce food for others. Producerists celebrated the skill and knowledge of the baker, planter, tiller, clothmaker, miller, tanner, and blacksmith – the trades that incorporated art into work.

For Lasch, virtue can only take root through the cultivation of friendship, craft, and adherence to a calling, not for status but for service to others.

> "Producerism would] recapture a moral vision that has been largely lost in modern society. It is first of all a useful way of criticizing the pretensions of progress and also a way of setting in relief certain values I cherish: a sense of limits, a respect for accomplishments and aspirations of ordinary people, a realistic appraisal of life's possibilities, and genuine hope without utopianism which trusts life without denying its tragic character. It asks the right questions about civic virtue and is connected to a moral tradition."[14]

The Working Centre community started to scout out opportunities where common work could be expressed – renovation projects, bike recycling, bartering, computer recycling, redistributing food – all these activities could be done with skill and craft with a bias towards creating the conditions where the effort of community building were respected as much as the end product.

[13] Lasch, Christopher, The True and Only Heaven, Progress and its Critics, 1991, Norton
[14] "On the Moral Vision of Democracy (A Conversation With Christopher Lasch)" Civic Arts Review Vol. 4, No. 4, Fall 1991 found at http://brandon.multics.org/library/Christopher%20Lasch/car_interview.html

We found in E.F. Schumacher an echo of Gandhi's critique of progress. Village life can be supported with a combination of labour intensive work and appropriate technology. Villages or urban communities want to experience work where scarce resources are used in cooperative ways to build community. People seek to contribute their labour to make their community better. Producerism is the path of small scale projects that are less competitive, that resist power and are geared to help people enjoy the necessities of living through common sharing.

Local Democracy

In order to root the concept of Local Democracy, The Working Centre has designed and offered a Diploma in Local Democracy. The goal is to teach a wider interpretation of democracy.

> "In a democracy, citizenship means more than voting. Democracy happens as we engage each other day by day in producing our own goods, our own culture as we share experience, skills, knowledge. We teach and learn cooperatively, respecting each other individually and thereby bring democracy to life."[15]

There are two ways that Local Democracy comes alive at The Working Centre. The first is to support the community dynamic that assists and supports ideas that grow from the bottom up. The second is to nurture this same approach internally among Volunteers, Staff, and Board. Ideally it should be hard to distinguish the difference between these two movements, as both are ways of serving Local Democracy, building community in new and unique ways.

Mac Saulis, a First Nations scholar at Wilfred Laurier University emphasized that Local Democracy is when citizens work as equals toward the common good together.[16] He equated Local Democracy with the aboriginal world view that understands that everything in Creation is interrelated. Each individual is responsible for putting the community above themselves; the group is stronger when each looks after the other. Without community you are left to face the world by yourself. Coexistence means seeking peace with others, walking in a good way, never just thinking of yourself.

Local Democracy is about listening and learning about the other. Respect grows when people can hear the story of the other, especially as they work to solve problems together. In our community it is important to work at finding the words, language, descriptions, actions that help individuals bring these democratic ideas into their relationships, projects, and community. When these ideals are missing, we have to find ways to positively insert cooperative words and actions. The goal is to continually help individuals develop their own knowledge of democratic habit.

Social Inclusion

Social Inclusion is the habit of listening and acting with the people that want to add their voices and action to building community. People quickly realize that if they are being treated trivially, then this is an indication that their efforts are not valued. People become deeply involved when their ideas, work and actions

[15] http://www.theworkingcentre.org/diploma-local-democracy/188
[16] Public lecture for Diploma in Local Democracy, March 2009, **Democracy as an Expression of Aboriginal World View**

are taken seriously, to the extent that their roles have an equal status with staff. In this equation, a worker who is not encumbered by bureaucracy, can change and redesign the work they are doing. Social Inclusion at the grassroots means organizations have to change to be open to those traditionally excluded.

When organizations are open to change then they will reap benefits that they never would have expected. It might be an unemployed worker who brings trench digging skills that are perfect for solving a plumbing problem, or a landowner who offers 2 acres of land to start a market garden, a homeless fellow who honestly dissects greed and arrogance by observing and teaching others what he sees, or learning how to recognize the gifts of a cleaner who could be the organization's best networker. Social Inclusion can be as simple as ensuring the organization is designed to hear and listen to many voices and to then channel this energy into positive results.

Integration

The Working Centre community has benefited from integrating the ethics of producerism, local democracy and social inclusion into its daily work of creating a network of access to tools projects that create grassroots work, livelihood and sustainability initiatives. CTx GREEN has followed the path of developing agro-service tools that villagers can use to create livelihood and sustainability opportunities. In both cases, those who use the tools are primarily in control of developing the conditions for how they are used.

Sustainable community development, in either the north or south, is best practiced when livelihood projects are designed in human scale increments. This is the natural environment for local democracy and inclusion. It is common sense to give full voice to those who are learning new technologies or recreating community cooperation. When full voice is denied then grassroots participation and commitment will suffer. Large projects, hierarchically designed to do good, are notorious for creating structures that leave out the main proponents, the people at the grassroots. This is the greatest hindrance to community development.

Poverty cannot be solved by just creating easy access to money, food or infrastructure. Amartya Sen teaches us how scarcity is just one aspect of the problem of distribution.

"Through his work, Sen makes it clear that famines are not always a result of decline in food- supply. He says that people starve even when there is plenty of food available because they have lost their means of control over food. Scarcity, according to Sen is "the characteristic of people not having enough, and not the characteristic of there not being enough." He says, "While the latter can be the cause of the former, it is one of many causes."[17]

Both CTx GREEN and The Working Centre have interpreted poverty relief as developing processes that increase people's access to tools. This is not a slogan but a broad understanding of assisting people to learn, to teach, to craft, and to serve and this can only be done in community. This process starts with mechanisms that ensure people's voices are listened to. Practical projects give people the opportunity to express their learnings by actively contributing to the community. This is the means of strengthening community by demonstrating positive ways of working together. This is the work of enhancing the culture of community reliance.

[17] Vaidyanathan, Geeta, Housing as Process, Good Work News, June 2003, citing Charles Gore 1993: "Entitlement Relations and 'Unruly' Social Practices: A comment on the work of Amartya Sen," Journal of Development Studies, Vol. 29, No.3, April 1993, pp.429-460."

Our main learning is that no one action relieves poverty. It is the cumulation of many different projects and initiatives that allow for different people with different ideas to participate. Altogether this aggregate of projects become the cornerstone for building community. CTx GREEN has developed a constellation of projects that include manufacturing a pedal driven biodiesel machine that can be used in villages, teaching barefoot engineers how to make biofuel, demonstrating in villages how to use biodiesel for tilling, running the seed mill, recharging LED lights/batteries/phones, and pumping water, involving villages in planting and harvesting seeds, demonstrating how pressing seeds for oil in the villages can increase value of seeds and be used as an inexpensive fertilizer, demonstrating how to gather unused fruit for conversion to bioethanol and to test bioethanol fuel stoves in villages. Each step has required close interaction and support in villages. Each step is part of building community.

The Working Centre social infrastructure creates access to tools in areas as diverse as bikes, bartering, fix-it-shops, housing, renovations, cafes, medical clinics, showers, laundry facilities, film making, arts and sewing spaces, community gardens, greenhouse production etc. Each of these community tools emphasizes teaching, learning and serving. These are fundamentally the building blocks of community. The result is a growing integrated community providing sustainability services that leverage the skills and talents of a community.

This work rejects top down approaches by creating development projects that slowly take root in the receptive culture. This affirms pride and self-reliance, creates access to tools and develops human scale activities that respect the environment.

Section 8

Forests, Oceans, Biodiversity and Ecosystems Services

GLOBAL ASSOCIATION
Master's in Development Practice Programs

Sustainable Development Practices: Advancing Evidence-Based Solutions for the Post-2015 Agenda.

Proceedings of the 2013 International Conference on Sustainable Development Practice

Chapter 21

Sustainable Development Goals for the Brazilian Atlantic Forest Biodiversity

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Abstract

The Millennium Development Goals (MDGs) are international development goals created by the United Nations and agreed by all United Nations member states to make efforts to meet the needs of the world's poorest. Since 2000, the MDGs have focused on reducing extreme poverty, while environmental dimension including biodiversity, global warming, agriculture, forestry and fisheries have been underrepresented being limited to only one of the eight MDGs – the MDG 7, and failures in one area, such as environmental sustainability, can deeply undermine progress in others. The conservation of the Atlantic Forest represents one of the largest issues and potentials to apply the dimensions of sustainable development in Brazil, since more than 112 million people live where the Forest used to cover and more than 85% of the Forest has been cleared. The Forest still harbors of a range of biological diversity similar to that of the Amazon, which is why is considered a hotspot today. This article aims to verify how the Atlantic Forest biodiversity can be related to sustainable development, by pointing out: (1) main threats that lead to loss of biodiversity; (2) key stakeholders related to the local sustainable development; (3) which targets inside of MDG 7 for Brazilian Atlantic Forest have been achieved and (4) suggestions of how the next UN Sustainable Development Goals (SDGs) could include ways to solve some of the Atlantic Forest conservation problems. We used a problem/objective tree to indicate the root causes and immediate consequences; a stakeholder and institutional analysis; satellite images and geospatial data to identify land use changes and recent Atlantic Forest deforestation, and Brazil's official reports of the Millennium Development Goals. According to the problem tree, the focal problem is that the forest fragments are becoming smaller and more isolated from each other, indirect or direct caused by urban expansion, increasing national and international demand for meat and food and weak institutional capacity for implement and enforce policies to the environment. The shrinkage of the fragments leads to biodiversity loss and final consequences back to economic activities and social issues. The main key stakeholders involved in the Atlantic Forest are the local government for environment, environmental groups and Brazilian police. The ones that would be most affected directly or indirectly by a policy to reduce biodiversity loss are small and large-scale farmers, food industry, construction industry and vulnerable populations. According to the results, the network of actors described related to sustainable development in Atlantic Forest should concentrate their efforts in search and implement efficient solutions as describe in the objective tree for the future we dream of. They must consider the equity and social problem solving, including environmental conservation as a way to promote sustainable economic emancipation of stakeholders across involved. The second step is to encourage policy-makers to embrace a unified environmental and social framework for the next SDGs, based on analysis of past experiences in a way that advances in development are not lost and our planet resources are used for the benefit of the whole global population.

Introduction

The Millennium Development Goals (MDGs) are international development goals created by the United Nations and agreed by all United Nations member states to make efforts to meet the needs of the world's poorest, inside of the four dimension of sustainable development: economic development, social inclusion, environmental sustainability, and good governance (UN 2014[1]). The Goals are integrated and synergetic in nature, thus balance between these four dimensions is essential since failures in one area can deeply undermine progress in others. What we see, however, is that since 2000 the MDGs have focused on social progress while environmental dimension including biodiversity, global warming, agriculture, forestry and fisheries have been underrepresented and limited to only one of the eight MDGs – the MDG 7 (Holmgren 2013).

The Goal 7 consists in ensure environmental sustainability by achieving 4 targets (UN2013):

1) Integrate the principles of sustainable development into country policies and programs and reverse the loss of environmental resources;
2) Reduce biodiversity loss, achieving, by 2010, a significant reduction in the rate of loss;
3) Halve, by 2015, the proportion of the population without sustainable access to safe drinking water and basic sanitation;
4) Achieve, by 2020, a significant improvement in the lives of at least 100 million slum dwellers.

Brazil is on track to achieve 70% of the eight MDGs by 2015 and most of this success can be attributed to Brazil's adoption of a broad range of social reforms. However, these significant advancements should not overshadow the social inequalities and environmental issues still going on in the country. There are three MDGs that the country has not achieved yet and the MDG 7 is one of them. Brazil itself is one of the world's most environmentally diverse and sensitive countries, home to nearly 50% of all of the world's biodiversity. The MDG 7 is a challenge for the country especially for the targets 2, 3 (sanitation) and 4 (UN 20142). Regarding the target 2, the country has achieved important results in reducing deforestation rates and creating new marine and terrestrial protected areas, by the use of remote sensing and GIS technology to monitor the Forest cover and strengthening the Protected Areas Policy, respectively. Still, land area covered by forest fell from 69% (1990) to 62.4% (2010) and might decrease even more after recent changes in the Forest Code be approved against public and scientific opinion.

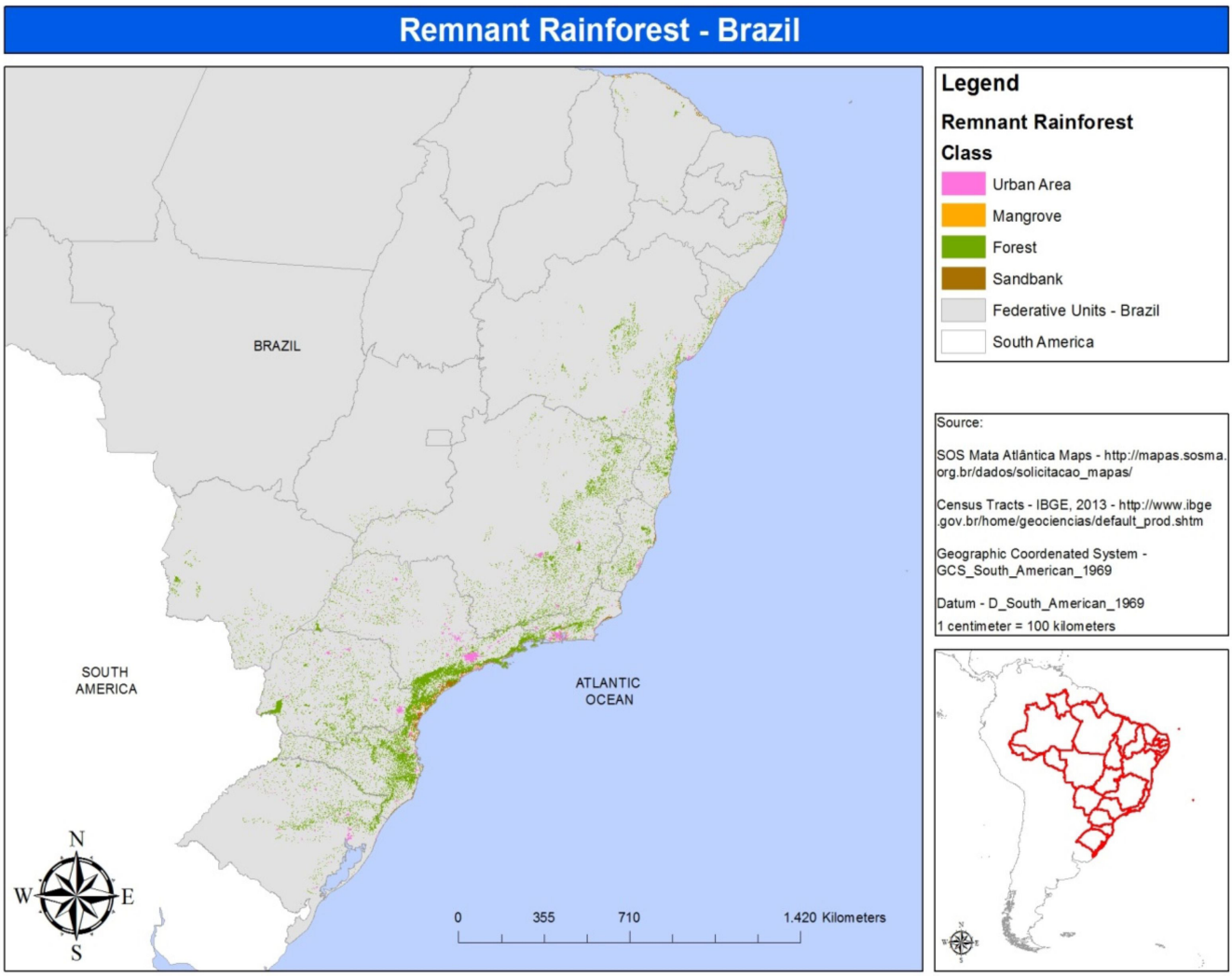
Even though most of MDG 7 targets have been accomplished in the country, the political unwillingness to go beyond merely extending the MDG is a concern. Brazil is still the country that faces deep institutional challenges as it tries to advance the cause of sustainability in the public and private sectors. The same country that hosted the United Nations Conferences Rio 92 and Rio +20 and has almost half of all the energy from renewable sources is the one that approves controversial measures in favor of a not always sustainable economic growth.

The conservation of the Brazilian Atlantic Forest is an example of how the environmental dimension is important and contributes to sustainable development in Brazil. More than 112 million people live where the Forest used to cover: the country's biggest cities, the most visited Natural Park's and several indigenous, quilombolas and caiçara communities are located in the Forest area which also ensures water supply for more than 120 million and influences around 80% of the Brazilian population lives (WWF 2014). Although more than 85% of the Forest has been cleared, the Forest still harbors of a range of biological diversity similar to that of the Amazon, which is why is considered a hotspot today (TNC 2014). All these features make the Atlantic Forest one of the largest potentials to apply the dimensions of sustainable development in Brazil.

There are a great number of studies regarding the environmental sustainability in Brazilian Atlantic Forest addressing main causes of deforestation and its social impacts. However, the most important challenge is not always easy to be identified since the root causes and consequences of deforestation are often a combination of interrelated reasons. Many of the known threats seem to be consequence of the varying degrees of interest and power between stakeholders who have different views of how to treat the Forest: as a fully protected area, as a preserved area with sustainable economic activities within, or as an area where economic growth should be a priority over protecting the environmental.

Thus, the development of any policy to minimize threats and promote local sustainable development in Atlantic Forest area must be aligned with the stakeholders' interests that may be directly or indirectly affected by such an initiative. The purpose of this paper is therefore to verify how the Atlantic Forest can be used as a source of sustainable development application by pointing out (1) the main threats that lead to loss of biodiversity in this Biome and (2) key stakeholders related to the local sustainable development. Through analyzing the context,

Figure 1 – Map of current Atlantic Forest cover in Brazil.



Source: Own elaboration from SOS Mata Atlântica and IBGE (2013).

the challenges, and the key players, this paper ultimately can be used to set future goals to ensure sustainable development in Brazil's coastal area and similar regions.

Materials and Methods

Problem Tree

The term "problem tree" refers to a conceptual model used as a diagnostic tool to analyze a sequence of events that eventually leads to a problem (Fussel 1995). The roots of the tree represent the root causes, at the bottom, while the branches are the consequences, at the top. When drawing a problem tree, the symptom is noted at the top of the diagram or page with its proximate cause immediately bellow it, and with a short arrow pointing upwards, from cause to symptom. Since ecological impacts tend to have complex interactions, the arrows in an ecological problem tree tend to grow out into many branches. The drawing of problem trees facilitates accurate diagnoses and guides the effective management of problems.

In order to identify the most important challenges of conserving Atlantic Forest biodiversity, we used a

problem tree to outline the root causes, immediate consequences and how are they interlinked. The trees were developed in an interdisciplinary group comprising professionals in biology, geography and engineering to provide a valuable amount of debate.

Stakeholder Analysis

A Stakeholder Analysis is a participatory social analysis conducted in relation to projects and policies, that seeks to identify who are the key stakeholders that are involved in or may be affected by the project/policy and what are their interests. These include governments, beneficiaries, businesses, donors, interest groups, NGOs and the like. This analysis allows for a pre-examination of the potential stakeholders that could be engaged to strengthen the proposed project/policy's outcome and implementation for conserving Atlantic Forest biodiversity, and the ones that if ignored, can have a negative influence on the projects/policies or conversely. It often clarifies additional barriers and opportunities.

The analysis was also developed in an interdisciplinary group and stakeholders were divided into directly affected, governmental and non-governmental stakeholders.

Results

Problem Tree

From the problem tree developed, the focal problem found is "the forest fragments are becoming smaller and more isolated from each other". The indirect and direct causes identified were urban expansion, increasing industrialization, priority economic growth over environment preservation, increasing national and international demand for meat and food, increasing traffic of native species and weak institutional capacity for the effectiveness of environment policies.

The shrinkage of the fragments leads to reduction in the provision of ecosystem services (as the biodiversity loss, reduction in the availability and quality of water and reduction in carbon stocks), change in land use and mainly final consequences such as high costs in the public budget to adapt to the new scenario, irreparable and permanent loss of important ecosystem services and increased risk of natural disasters and most vulnerable populations.

Stakeholder analysis

For the environmental sustainability in Atlantic Forest, we identified stakeholders that engage in land use change and deforestation or that would be affected directly or indirectly by a policy to reduce land use change and deforestation in order to mitigate biodiversity loss. The directly affected stakeholders are populations that will most closely benefit or suffer from the proposed policy. Table 1 below lists such stakeholders and the reasons why they have been characterized as such.

Figure 2– Problem Tree: root causes, focal problem and consequences

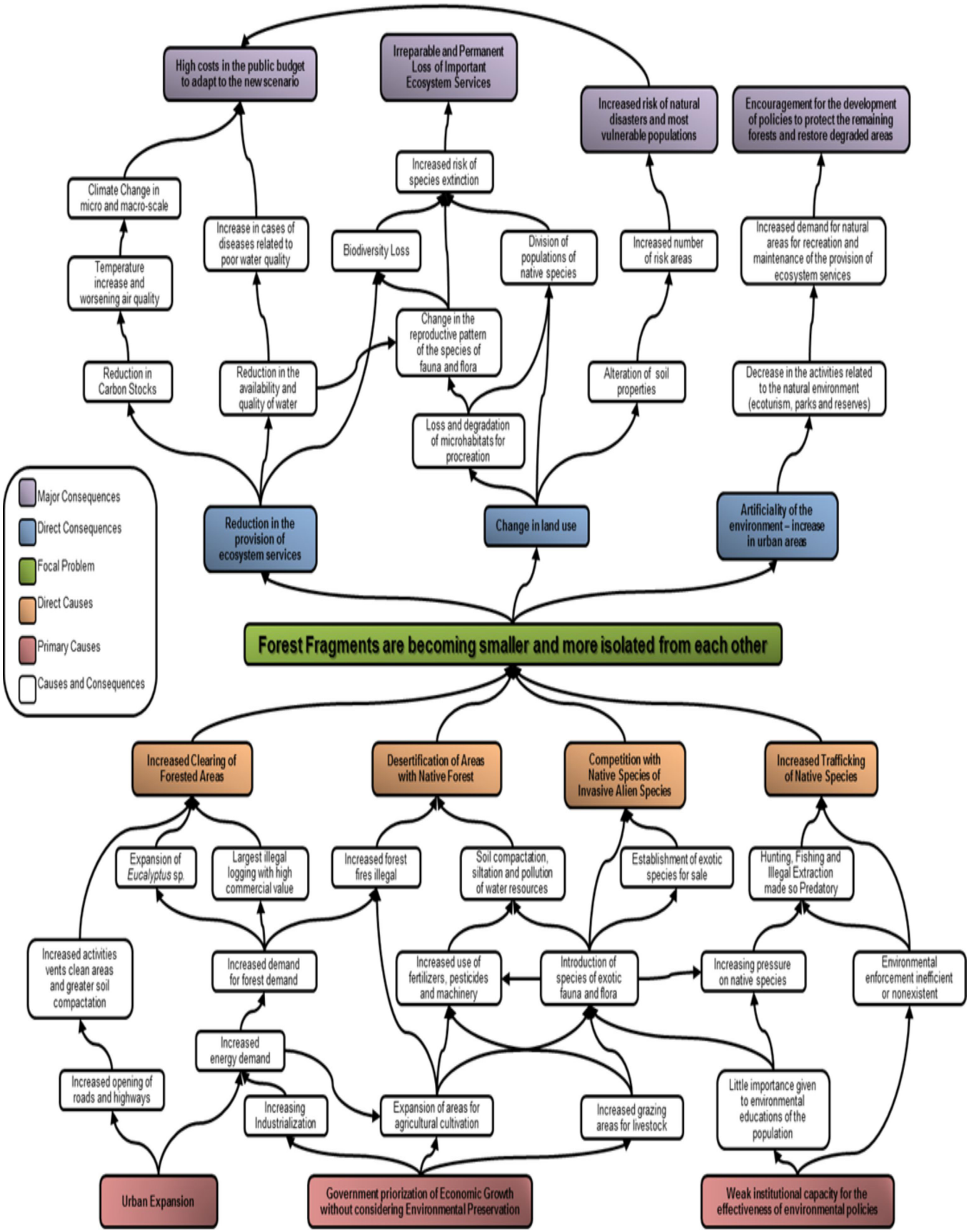


Table 1. Biodiversity in Atlantic Forest: Directly Affected Stakeholders

Directly Affected *Stakeholders*	**Reasons**
Extractive workers and Small-scale farmers	The livelihoods of small farmers come directly from the use of lands that were native forest in the past, or the remained forest as in the case of extractive workers. Biodiversity conservation projects would change the way of production (use of fertilizers and herbicides, pollution of watercourses) and extraction (limited extraction for a time) and would reduce deforestation for the expansion of crops.
Large-scale farmers	As well as small farmers, large-scale farmers will be directly affected because their livelihoods also depend on the use of cleared land, similar to that of ranchers. However large-scale farmers have a much higher influence over potential policies to reduce deforestation. According to each region of Atlantic Forest, the main monoculture crops are: - Northeast: cocoa and sugarcane - Southeast: eucalyptus, sugarcane, coffee - South: *Pinus*, eucalyptus, cotton
Persons involved in the ecologic tourism: visitors, guides tour, hotel owners, sellers and service companies.	The well-preserved areas of Atlantic Forest are highly sought after by tourists and extreme sports practicers, for its beauty and variety of landscapes, as well as by its relatively easy access close to large urban centers. Projects aimed at conserving biodiversity in the biome could restrict the number of visitors per visit, on the other hand these stakeholders would benefit from the preservation and restoration of the landscape, the object of interest from most.
People without land titles (*Posseiros* and illegal residents)	Many protected areas were delimited in areas where there were already some residents living there without land title (*posseiros*) or others who came to occupy it even after the creation of protected areas (illegal residents). Even if new units are not created, projects that strengthen existing protected areas and their Conservation Plans may restrict directly the activities of these communities and even affect their stay in that site. On the other hand, they may be benefited from the formalization of their land and have rights to rural credit, as well as incentives to preserve forest fragments.

People in flood and landslide prone areas	Most residents of flood and landslide prone areas occupied Permanent Preservation Areas (APP), such as areas with slopes greater than 45 degrees and areas on the edge of rivers (riparian), respectively. These people can benefit directly from policies to regularize their situation, from the construction of barriers or being relocated to safer places. The long term preservation policies of the Atlantic Forest would reduce the effects of climate change and extreme events.

The Governmental Stakeholders identified are those involved in implementing and enforcing the sustainable land-use and deforestation policy at the central, state and municipal levels. They are also institutions whose activities and policies may be adversely affected by the policy being proposed and thus they will need to re-evaluate their activities in order to comply with the proposed policy. Table 2 below lists the government stakeholders as well as how they will be affected by the proposed policy.

Table 2. Biodiversity in Atlantic Forest: Governmental Stakeholders

Governmental *Stakeholders*	**Reasons**
President Dilma Rousseff	The creation and strengthening of environmental policies directly depend on the direction that the Executive has chosen to follow. Despite progress in reducing deforestation in the Amazon, the Dilma government has been criticized for measures that weaken the inspection, make flexible the boundaries of Protected Areas and forgive illegal loggers. In her government, it was decided to remove powers of IBAMA to monitor deforestation and a law was approved to empower the president to reduce protected areas already established by other governments. For example, until 2013 were decreased approximately 86 000 hectares to facilitate the licensing of hydropower. The main criticism focused on the change of the Forest Law, which the president had a chance to veto the forgiveness for those who illegally deforested 40 million hectares of forest, but she did not. Thus, policies to reduce deforestation and forest fragments interconnection will be highly influenced and dependent on the direction the president and the Ministries will take.
Ministry of Environment (MMA)	This Ministry is a key government stakeholder for Biodiversity in the Atlantic Forest since it is directly linked to the formulation and implementation of public policies related to the protection and restoration of the environment and biodiversity.

Ministry of Agriculture, Livestock and Supply	On the Problem Tree, we identified the expansion of crop farming as one of the factors that leads to habitat fragmentation and loss of biodiversity. Adopting environmental policies, this Ministry may be negatively affected since that would change the actual policy of expanding agricultural land, overuse of fertilizers and extensive livestock farming. On the other hand, reducing deforestation is one of the criteria for funding small and large farmers and sustainable agriculture could be encouraged.
Federal and State Public Ministry	Acting alongside or overseeing the activities of other government agencies, the Public Prosecutor is now one of the great characters in the protection of the environment, as calling on polluters responsibility as well as interacting and promoting dialogue with social sectors, economic and government. The prosecutor should be well informed about new environmental policies in order to act on behalf of those affected by the consequences of fragmentation and loss of biodiversity.
Environmental Military Police	The Atlantic Forest occupies extensive land area in Brazil from south to the northeast of the country including areas hard to reach mainly in the mountains. The ineffective law enforcement is one of the roots cited for illegal trafficking of animals, forest fragmentation and loss of biodiversity. In this sense, the environmental police would be a stakeholder that could benefit from an environmental project regarding their strength to the effectiveness of environmental policies to become effective and efficient.
Brazilian Institute of Environment (IBAMA) and Chico Mendes Institute (ICMBio)	IBAMA is an important stakeholder for the implementation of national environmental policies, especially those relating to environmental licensing and pollution control. This institute should be empowered so that policy implementation would occur across the breadth of the Atlantic Forest, and will benefit from being able to act with rigor suitable to environmental policies.
	Conservation of biodiversity depends directly on areas being protected from human degraded action so that ecosystem processes can function in its entirety. ICMBio is the institute primarily responsible for the creation and management of protected areas, and will benefit from the expansion and improvement of its activities in the Atlantic Forest biome.

Departments and others Environment Institutes	The Environment Departments and Institutes of the Atlantic Forest States have an important role in the implementation of environmental policies at the state and municipal levels, and makes up an important component in the consolidation of policies for biodiversity.

Lastly, there were various non-governmental stakeholders that were identified and were categorized as private entities, multilateral organizations, advocacy groups and vulnerable populations. Table 3 below lists them and describes how each is affected by the proposed policy.

Table 3. Biodiversity in Atlantic Forest: Non-Governmental Stakeholders

Non-Governmental Stakeholders	**Reasons**
Private Entities	
Hydroelectric industry	These private entities will be affected by an environmental policy since they depend directly on land use for economic activities. Hydropower and mining should be more stricted regarding the areas for exploration, as well as the adaptation of the production chain to this policy rules. Pulp companies might also rethink their areas of monocultures and productivity in order to avoid expansion on the forested areas. Regarding building industry, limited use of land can generate price speculation, which has the potential to generate benefits for the sector from the projects already underway, or disadvantage, if land prices rise. It should be emphasizing, however, the high power of influence that these entities have on the adoption of policies in the country, given the economic importance of each.
Mining industry	
Cellulose industry	
Building industry	
Food industry	A reducing deforestation and fragmentation policy affects farmers, as mentioned in the first table, and will have end effects on the supply chain (suppliers, processors, buyers, transportation, etc.), even for the availability of the product or a possible increase in production cost. In this regard, the whole food industry should have a period to adapt to the new production process and fit on the new policy.
Multilateral Organizations	
UN (CBD, UNICEF, UNDP)	These organizations can raise awareness about the new policy and provide funding for its enforcement.
World Bank	
Advocacy Groups	

NGO SOS Mata Atlântica (SOS Atlantic Forest) and other NGOs/ OSCIPs	The SOS Mata Atlântica is one of the most important NGO in the context of biodiversity conservation due important contributions from environmental education projects, reforestation and ecological corridors. The NGO will serve as monitors of the project, an important partner in developing the project and in policy implementation, as well as other smaller NGOs and OSCIPs also relevant to local actions.
Conservation International (CI)	The CI Brazil contributes to the conservation and recovery of the Atlantic Forest from research on the biome biodiversity and translating their priority actions in a language that reaches and mobilize all sectors of society for their effective conservation. The NGO can help overcome barriers in the design and implementation of an appropriate policy.
Media	The media is a stakeholder that is not necessarily affected by the new policy but has a key role in the dialogue between policy makers, enforcers and the population involved.
Education Institute	The environmental education brings people to discuss current issues and is one of the main fundamental ways for achieving sustainability in a holistic manner resulting in biodiversity conservation from generating initiatives from civil society, private entities and government. That is why educational institutions are important as stakeholders within the context of the Atlantic Forest biome.
Urban population and consumers	As a result of environmental education and the large flow of current information, consumers are becoming more aware and choosing their products more conscious, even if they are in urban centers away from rural production centers. Although these stakeholders are not directly affected, they have various interests associated with conservation and the services generated by ecosystems. Their purchasing power of choice can change the way of production to one more sustainable and encourage conservation projects and restoration of the Atlantic Forest.
Universities and Research Centers	The education and action of researchers provide support to the development of a scientific and socially appropriate policy for each region of the Atlantic Forest. They also provide technology initiatives for reforestation, land restoration, soil and agricultural crops improvement, and other actions that directly or indirectly affect biodiversity.

Civil Society Organizations (CSO)	The civil society organizations are entities of specific groups to raise and attempt to resolve the demands related to the environment. As NGOs, civil society organizations are important partners in the development and implementation of policy, as well as dialogue with those involved.
Brazilian Fund for Biodiversity (FUNBIO) and other funders	The Brazilian Biodiversity Fund is a civil private non-profit association that mobilizes resources and provides services for the conservation of biodiversity. This and other funders are important in the context of joint actors in national and international networks, enabling funding environmental programs and, in this particular case, consolidate conservation policy/projects.

Discussion

Although the central problem seems to be an environmental issue, the causes and consequences from it are in the social, economic and mainly political dimension. Changes in current agricultural policies to develop a more sustainable agriculture, cattle raising and industry activities are necessary. Adopting better practices in production would optimize the use of natural resources and strength environmental policies. Biodiversity and ecosystem services such as carbon stock and water availability would increase, and human population would be less vulnerable, reducing government expenditures, protecting remaining forests and corridors would be created to connect fragments.

Thus, based on the problem tree, one of the priorities is to strengthen the institutional capacity to enforce environmental policies applied in the Atlantic Forest. Governmental stakeholders are directly involved in this issue (Table 2), that is why the municipal, state and federal governments need to improve the relationship between them for the effectiveness of strategic policies.

Also lack effectiveness in environmental education, especially when there are environmental crimes unpunished and poorly planned infrastructure that meets a more sustainable way of life (mobility, recycling, organics, etc.).In this sense, civil society advocacy groups (Table 3) are important stakeholders regarding the dialogue with private companies (Table 3) in environmental awareness, as well as to combine different strategies appropriate to local realities of the Atlantic Forest region. For these reasons and for helping to overcome barriers in implementing a conservation /restoration policy, they should be included in the formulation of new projects/ policies. The private entities are also key stakeholders because the Brazilian government often creates private public partnerships for service provision, such as the construction of infrastructure. The ones that would be most affected directly by a policy to reduce deforestation are small and large-scale farmers, people without land title, people involved in tourist activities and vulnerable populations (Table 1).

Conclusion

The reason why some projects and policies fail is often in its creation and planning. Many of them do not go through a process that includes the opinions and suggestions of the main stakeholders before the policy is created. Usually, the reasons they use to not include them go from the short term projects to the low degree of mobilization of the population. However for the purpose of new goals/policies/projects, the identification and inclusion of stakeholders in the process are essential in order to have a holistic and in-depth understanding of the context specific to Brazil's Atlantic Forest in which these goals are being proposed.

According to the results, the network of actors related to sustainable development in Atlantic Forest described in this paper should concentrate their efforts in search and implement efficient solutions as describe in the objective tree for the future we dream of. They must consider the equity and social problem solving, including environmental conservation as a way to promote sustainable economic emancipation of stakeholders across involved. The second step is to encourage policy-makers to embrace a unified environmental and social framework for future policies, based on analysis of past experiences in a way that advances in development are not lost and our planet resources are used for the benefit of the whole global population.

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Chapter 22

Are benefit-sharing mechanisms fit for tackling water conflicts? lessons learned from the Coello watershed in Colombia

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Abstract

The Coello watershed in the Colombian Andes cuts through a region that represents one of the country's most important areas for rice and beans production. While water resources are intensely disputed between geographical regions, local economic sectors and social groups, they are also highly exposed to anthropogenic pressures manifested through deforestation, intensive and extensive cattle farming, as well as contamination from household and industrial activities. In 2012, extensive consultation with community members and public and private sector representatives culminated with the creation of a range of benefit-sharing mechanisms (BSMs) meant to put an end to existing water conflicts. BSMs have taken different forms, from agreements to buy upstream land for conservation purposes, to the establishment and expansion of protected areas in the watershed. Based on empirical evidence from qualitative interviews and focus group discussions, this study explores the potential of these BSMs to reform traditional water governance and management paradigms, in a context where previous initiatives have failed to promote meaningful participation and solve aspects related to equity in the use and management of water resources. More specifically, the study takes a closer look at the rationale, the methodology, and the process behind these BSMs in order to identify opportunities and challenges associated with benefit-sharing and stakeholder consultation processes. Findings suggest that the real potential to address water problems in complex landscapes rests in polycentric institutional arrangements where the distribution of decision-making power across different poles of power hinders elite capture and institutional laissez-faire. Drawing on opportunities and challenges identified in the implementation of such flexible, adaptable institutional arrangements in Coello, the study provides policy and decision makers with concrete recommendations for the design and implementation of watershed interventions that address complex human-nature inter-linkages.

1. Introduction

Watershed management and governance remains one of the main challenges that mark the post-Millennium Development Goals euphoria. Mobilizing actors and resources towards sustainable water governance has been fettered by intricate linkages between water uses at different scales, but also by highly dynamic social, economic and political contexts that bring about a great deal of uncertainty. Where water is disputed between different interests, values and cultures, conflicts are inherent and wicked, since their resolution goes beyond scientific understandings of the hydrological base, to social complexity (Grigg 1997; Wittmer *et al* 2006).

The current paradigm suggests that mechanisms that guarantee a fair distribution of benefits across various water users and uses would diminish the likelihood of water conflicts and tensions. Therefore, scientists, practitioners and policymakers have piloted and analyzed various forms of institutional arrangements that could ultimately enhance water governance: from compensation schemes, ecosystems restoration schemes - through payments for environmental/watershed schemes (PES/PWS), payments for removing pollution, buying land for conservation, declaration of resource conservation areas, etc., to community development or livelihood enhancement projects (FAO 2004; Mahanty *et al.* 2007; White *et al.* 2011). Likewise, the form of implementation of such mechanisms has varied between highly centralized, top- down initiatives that dominated the last

decade, to more recent stakeholder dialogues, power sharing arrangements and complex multi-stakeholder fora or polycentric institutions. While each of these can contribute to a better management of the resource, none of these should be regarded as a panacea (Faysse 2006; Ostrom 2007, 2010a, 2010b; Ostrom *et al.* 1961; Warner 2007).

In the Coello watershed (Colombia) benefit-sharing mechanisms (BSMs) have been recently designed as a means to address various humanly-induced threats to water quality and quantity. These BSMs have taken the form of multi-stakeholder agreements that aim to guarantee environmental and economic sustainability in the region. While this new picture creates important dynamics between actors, the potential of these BSMs to change instances of conflict and contention into fruitful cooperation has yet to be uncovered.

Therefore the purpose of the study is to discuss the potential of BSMs to act as a viable solution to water governance challenges, via two conceptual lenses: empowerment and integration. While the paper draws extensively on field research conducted in the Coello watershed in Colombia, lessons learned from the design and implementation of the BSMs in the study site can serve as a point of departure for future initiatives to scale-up these efforts. Even though water-related problems are very context-specific, recommendations for future action are general enough to serve to a wider public.

The paper starts with a brief presentation of the Coello watershed and the process of designing and implementing the BSMs. Following this a short description of the methodology is provided. The paper then moves towards a discussion of the lessons learned from the field research, which creates the space for future recommended actions and approaches to watershed management that may fill the identified policy and practice gaps.

2. Introducing the study site: the Coello watershed

The Coello watershed is the most important hydrological network in the Department of Tolima, Colombia, cutting through one of the country's most suitable areas for agricultural production[1], which is also rich in gold resources. It is located on the eastern slope of the Andean Cordilleras and extends over a surface of 190.000 ha. Large variations in altitude (280-5200m), temperature gradients (2-28°C) and precipitation patterns (900-4000mm) create a diverse array of ecosystems: dry tropical forests, high mountain forests and high montane moorland (paramo[2]), especially in the upper node of the watershed (Johnson 2009: 16).

The watershed is inhabited by approximately 41.000 people (Cortolima 2006), most of whom are small to medium-scale farmers cultivating beans, arracacha, potatoes, coffee and fruits on hillsides, rice, maize and sorghum in the lower areas, or raising cattle (especially in the upper areas). The low municipal scores for the Unsatisfied Basic Needs Index reveal relatively high economic dependence, poor living conditions and public services (inadequate efficiency of sewage systems and aqueduct), especially in rural areas (DANE 2011). Rural inhabitants also suffer from poor or non-existent access to water supply, sewage and solid waste disposal systems, public or private healthcare systems and elementary education (Cantillo and Gonzales 2008).

Apart from individual and household decision-making, watershed management is the responsibility of Cortolima, the body that represents the government in environmental matters at regional level. Among others duties, it is responsible for granting water concessions to users and for leading the elaboration of the Watershed Management Plan and other environmental studies. The money yielded from water concessions is invested in environmental campaigns, reforestation activities and acquisition of upstream land. The Municipalities are responsible to ensure, via public or private supply services, such as community-based associations, access to potable water to the population. Usocoello, the water users association of Coello, administers the irrigation

infrastructure in the watershed, which is the property of the Colombian Institute for Rural Development (INCODER), a regional state body.

There is no clear-cut geographical division between socio-economic groups alongside the watershed. The three watershed nodes (upstream, midstream and downstream) blend small-, medium- and large-scale crop and animal farmers, mine workers, rural and urban populations, which makes it difficult to design straightforward watershed management plans that guarantee an equitable allocation of water rights.

Participatory problem-mapping in the watershed reveals that conflicts in the region are rather subtle and oftentimes less intuitive. They do not necessarily follow the traditional pattern of the water flow; instead they are predominantly determined by economic and political power. First, there exists strong competition for water resources between agriculture and mining activities[3] (exploitations of dragging material and gold), giving birth to sectoral and intra- community social and economic cleavages. Secondly, in an absence of clearly defined rules, the free-riding behaviour of upstream inhabitants impacts heavily on upland ecosystems (e.g. invading protected and private conservation areas in the paramo), but also on midstream and downstream water users, by exercising uncontrolled access to the water bodies and polluting them (via unsustainable agricultural practices such as excessive use of pesticides and fertilizers, animal waste, slash-and-burn activities, etc.). Moreover, soil erosion and sedimentation of riverbeds and reservoirs, also originating from unsustainable upstream land use, affects water flow during extreme weather events (e.g. droughts and floods).

For their part, water users associations have been heavily criticized for privileging large- scale farmers, whereas local and regional authorities have been heavily criticized for the lack of coordinated response to these challenges. More particularly, research participants condemned the authority's inability to move away from environmental campaigns and symbolic, unsuitable reforestation activities, to more concrete actions that could put a halt on unsustainable activities such as mining.

3. Responding to watershed challenges: benefit-sharing mechanisms

In the context outlined above, solutions to guarantee a fair distribution of benefits from water resources were deemed necessary. As a response to identified challenges, watershed stakeholders (community representatives, regional and local authorities, private and civil society- actors) signed, in September 2012, several agreements to ensure the protection and conservation of water resources. The initiative has been facilitated by a partnership between international and national actors, via a community-based development project[4]. The resulting agreements were generically called benefit-sharing mechanisms (BSMs) and were primarily intended to solve conflicts around water, to guarantee a more equitable distribution of the benefits gained from water resources and to provide "incentives for the long-term protection of ecosystem services…" (Quintero *et al* 2011).

[1] The downstream node (including the municipality of El Espinal) represents the country's rice basket, while the upper node (Cajamarca) is one of Colombia's main regions for beans and arracacha production.

[2] The paramos are ecosystems found in only a few Latin American countries: – Colombia (60% of total paramos are found in Colombia), Venezuela, Ecuador, Peru and Costa Rica and are located at altitudes higher than 3000m.

[3] 86% of the upstream land (44.000 hectares) has already been leased to national and international mining companies (SIMCO 2012).

[4] The Project, "*Benefit-sharing mechanisms to enhance water productivity and reduce water-related conflicts in the Coello watershed*" has been developed over three years (2011-2013). It has been implemented by the World Wildlife Fund Colombia (WWF), the Stockholm Environmental Institute (SEI), the International Center for Tropical Agriculture (CIAT), the Kings College London (KCL), the National University of Colombia and Semillas de Agua (SA) and financed by the Challenge Programme on Water and Food (CPWF) of the Consultative Group on International Agricultural Research (CGIAR)

In the end, a total of 12 agreements were signed. They cover a breadth of problems, from conservation of upstream ecosystems via establishment and management of private and public protected areas (including co-management schemes), to incentives for sustainable land reconversions offered to upstream and midstream farmers and enlargement of aqueducts coverage in rural areas (Appendix 2). It was assumed that with these initiatives human interventions on natural landscapes would be controlled and institutional gaps in upstream areas filled, thus solving dilemmas of water allocation, access and conservation.

Apart from the environmental concern, these BSMs were aimed to reconfigure the power landscape and give communities a greater voice in the design and implementation of watershed management schemes. For instance, the BSMs regarding headwater conservation aimed to shift the traditional management approach to co-management, where power to control and manage the upstream areas is spread between various actors - civil society (Semillas de Agua), the private sector (the water user association Usocoello) and the state (through the regional environmental authority - Cortolima, and the upstream Municipality. Community representatives, in turn, would be in charge of monitoring compliance to the new co-management scheme.

Three equally important stages have marked the birth and development of the BSMs. The *preparation phase* involved an initial participatory mapping exercise, where the biophysical, socio-economic, institutional and legal contexts were identified, as a point of departure for future intervention. This initial stage was followed by an extensive process of capacity strengthening of watershed actors (from community members to public and private sector representatives) in different areas, such as: a) environmental management: this included a thorough analysis of the hydrological state of the watershed (water resource quality and quantity). Community representatives received training in modeling and interpretation of hydrological data; b) conflict resolution: this involved a participatory mapping of conflicts related to water and of key actors for the effective negotiation of BSMs; and c) civic participation: this process included trainings offered to community representatives regarding rights to water, land, biodiversity protection and community participation, as well as legal instruments to effect these rights.

In the *negotiation phase*, representative of upstream, midstream and downstream communities put forward to watershed Municipalities, the regional environmental authority (Cortolima), the water users association (Usocoello) and the local NGO Semillas de Agua a list of possible BSMs for negotiation. After an open dialogue between watershed actors, BSMs agreements between communities and the other actors were signed. This was a public event held in September 2012.

For the *monitoring phase*, community representatives constituted a Watershed Monitoring Committee to make sure that the watershed actors comply with the commitments under the agreements. The Committee is composed of 30 people (11 of which are part of the coordiantion body) from different walks of life: farmers, engineers, tecnical experts, students, etc. Its activities include regular meetings with watershed stakeholders to follow-up compliance with the agreements, the management and coordination of protected areas that fall under these BSMs, and also possible future watershed projects that aim at integrating environmental management with human and economic development in the region.

4. Brief overview of methods

The research was carried out in the Coello watershed, Colombia, between September 2012 and March 2013. The empirical inquiry relies on data triangulated via semi-structured interviews, focus group discussions and several informal discussions conducted with watershed inhabitants, representatives of regional and local public authorities and civil society representatives. A sample size of 50 persons was generated. The research participants were selected using a stakeholder mapping exercise conducted jointly with representatives of

the local NGO Semillas de Agua and the World Wildlife Fund Colombia (WWF), but also using purposeful sampling and snowball methods. In order to gain a comprehensive understanding of the establishment of the benefit-sharing mechanisms, the data collection process attempted to gather information from both members and non-members of the group that participated in the design and implementation of these mechanisms. Moreover, research participants belong to the four most important municipalities in the watershed Cajamarca (upper node), Ibague (middle node), Coello and El Espinal (lower node). Appendix 1 illustrates the location of the watershed.

5. Power, empowerment and integration: the missing pieces

Community participation has been the backbone of watershed management projects ever since the early 1990s, when the wave of decentralization in natural resource management started to trend around the world. One of the main principles of this mainstream thinking has been the idea that local knowledge and experience will bring decision-making closer to the realities on the ground, will forge more social and institutional trust and thus create more space for cooperation (Berkes 2009; Dietz *et al*. 2003; Oates 1985; Ostrom *et al* 1993). Site-specific research with communities has been observed to not only help communities in identifying and agreeing upon the causes of water problems but it has also increased the likelihood to influence local policies on watershed management (e.g. reforestation, water quality testing, etc.) (Kiersch and Tognetti 2002). Moreover, low-cost local monitoring mechanisms have been regarded as fundamental preconditions for 'robust institutions' to manage common-pool resources (Ostrom 1990).

One way to engage communities in natural resource management is through social, economic and/or political empowerment. It has been believed that empowerment - as a form of transferring ownership to communities - is essential for effective participatory resource management, especially in societies that have been previously stigmatized by extensive experiences of social and economic exclusion and inequality (Swallow *et al*. 2006). Tools to empower communities have ranged from consultation in problem identification processes and design of solutions, space for participation in negotiation and decision-making, pro-poor schemes, as well as social and economic incentives, etc.

In the Coello watershed, knowledge and information has played a crucial role in shifting the power towards communities and in offering community leaders an opportunity to negotiate with decision-makers over solutions to water challenges, departing from a relatively equal knowledge base. Prior to the negotiation of the BSMs, the project had facilitated several trainings to community representatives. These capacity-building exercises were aimed at offering a better understanding of the values of and menaces to water (including the management of GIS tools), the legal tools available to hold institutions accountable in environmental matters (Constitutional rights, existing norms and regulations regarding community participation in natural resource management, etc.), as well as possible technical, economic and political solutions to overcome these challenges and their effects on water resource conservation. It was assumed that once community leaders are equipped with these types of information, the information gap between communities and decision-makers would be bridged and the solutions would better reflect the site-specific reality (Candelo *et al*. 2008).

In this sense, one of the added values of the methodological approach utilized by the intervention has been the emphasis on legal empowerment, via trainings on constitutional rights, right to petition and participation in public affairs. This approach demonstrated once again that solutions to watershed management and governance are far from being purely technical or economical. They involve a much more complex social and political process, where roles and power are constantly redefined and renegotiated.

It is beyond doubt that such a participatory approach created an opportunity to "democratize watershed

management", by engaging multiple community voices who act like "vehicles for democratization and emancipation" (Warner 2007: 1, 6). At the Second World Water Forum in The Hague in 2002, leaders suggested that "democratization of water resources is essential" (Global Water Partnership 2000). Empirical evidence revealed that the power of knowledge and information that has been instilled in community leaders has created a new generation of citizens, more aware about their own acts regarding the use and management of water. It has also created the context for "baking the cake together" (Warner 2007: 6), since actors with different interests in water use were seated at the same table, negotiating solutions to manage and conserve a common-pool resource.

However, a key to understanding empowerment is to question its limits: Where does the real voice of the communities rest? What does their voice mean? How far does community empowerment go? Who is listening? And what does the empowerment lead to?

Undoubtedly, community leaders have been empowered to decide upon the most locally-suited mechanisms to manage the watershed. They have also turned from more or less *powerful free-riders to powerful watchdogs*, able to hold institutions accountable via the Monitoring Committee they have formed. Yet watershed management is not only about making decisions, it is also about engaging in practical actions. Very few BSMs place responsibilities over watershed management on communities, while most of them are focused on the duties and responsibilities of public and private institutions with regards to water management and conservation. Hence, the real power to effect change is voluntarily shifted towards those actors that already possess a high degree of political and economic power in the watershed (regional environmental authority, water users association, municipalities), questioning the actual weight of previous community empowerment efforts in the entire watershed management process. Consequently, it turned out that communities had ownership over the BSMs (as an elusive concept) but not over their actual functioning (as the mechanism itself). Since agenda setting is one crucial component of the decision-making process but not the ultimate one, empowerment that goes beyond the identification and formulation of the solution is an indispensable desideratum for the successful integration of communities in watershed management and governance schemes.

If empowerment provides people with the tools for developing the opportunities and skills for self-sufficiency and well-being, integration is an effect of empowerment, a step ahead. Principles of Integrated Water Resource Management, as laid out at the World Summit on Sustainable Development, refer to the integrated management of resources (land, water, surface and groundwater, coastal and inland areas, etc.), integration and coordination of different water uses and users, including different sectors (agriculture, industry, environment, etc.), coordination of resource management efforts at institutional level (e.g. within governments), as well as a mélange of various types of solutions, from those that are purely technical, to social, economic and institutional interventions (Global Water Partnership 2000).

In the Coello watershed, the creation of the BSMs brought about different types of integration. One of them has been the opportune integration of scientific and local knowledge with decision-making. Hydrological modeling using powerful remote-sensing tools (*WaterWorld*, See Mulligan 2012) served as a point of departure in the design of the watershed management schemes, while participatory resource, stakeholder and conflict mapping have been essential in deciding how these schemes can be implemented, given the complex social, economic, institutional and environmental context.

Moreover, alongside communities, a breadth of watershed voices has been included, ranging from representatives of the five watershed municipalities, the Departmental Secretariat for Agriculture, the regional environmental authority (Cortolima), the Colombian Institute for Agricultural Development (INCODER), the main water users association (Usocoello) and representatives of civil society organizations. Due to a lack of knowledge sharing about each other's role in the watershed, about the menaces to the water resources in the basin and their economic and social costs, these actors were previously difficult to reach. Where mayors, departmental and regional authorities were hard to imagine as part of the same negotiation table with the

communities in dealing with "niche" problems such as the environment, they became partners in the local development process. Interviews with watershed actors revealed that such a multi-stakeholder process not only built social and institutional trust, but also constituted an attempt to distribute benefits of water resources more evenly in the basin. The engagement of a diversity of institutions in watershed management, argued scholars, is key to surpass environmental, social and economic crisis (Thomson 1991).

Discussing the limits of dialogue in watershed management, Warner highlighted the importance of engaging actors with real capacity to effect change: "But is anyone listening? Without a mandate, there is no obligation to do anything with the outcome of the talk. Without an audience, multi-stakeholder processes are dialogues of the deaf…" (Warner 2007). Even though the BSMs negotiation and implementation processes engaged a large variety of actors, the effectiveness of these can be questioned by the real power the audience (represented here by the local public and regional authorities) has in order to produce the desired changes in the watershed. With limited public budget allocated to local environmental conservation activities, with local and regional environmental institutions lacking political power and legal capacity to enforce rules and prioritize sustainable development in front of national economic development strategies (i.e. mining investments), it is highly unlikely that many of the BSMs will be robust enough to stand the test of time, in front of strong political and economic interests. In the end, the success of multi-stakeholder processes lays not so much on the distribution of voices, as in engaging the actors who have real power to change, to reach the policy agenda and influence it (Brogden and Greenberg 2008).

Moreover, the effort to create a biological corridor, via the BSMs designed for the conservation of upstream areas, constitutes an attempt to integrate areas of high ecological and hydrological importance for the watershed. It was assumed that once critical ecosystems are integrated and protected through effective management plans, the negative impacts of human interventions (especially mining activities and cattle farming) on these ecosystems are more likely to be mitigated (Mulligan and Rubiano 2012). However, while these efforts are opportune for the protection and conservation of water resources, they fail to take into account the broader socio-economic landscape that the watershed is part of, the "problemshed" (Mollinga et al. 2007). A closer look at the BSMs reveals that social integration at watershed level has failed. Efforts are dispersed within communities but not across communities. The only link between the three watershed areas is represented by downstream and midstream authorities' efforts to buy upstream land for water conservation, while any cooperation between members of the different communities are absent. In such a situation where social dynamics, inter-community knowledge and experience sharing are all insufficient, it is highly unlikely that tensions occurring between upstream and downstream inhabitants, between small- and large-scale farmers will be solved.

Several BSMs also reflect the need to attach an economic-productive component to the conservation efforts in the basin. These refer to incentives for sustainable land reconversion and clean agricultural production in upstream and midstream areas (organic farming, eco-tourism, etc.). However, at this stage, the content of these economic-productive BSMs remains elusive and it is unclear who is responsible to provide these incentives and who can access them. Moreover, as interviewees pointed out, many of the poverty traps remain unaddressed and social tensions related to access to clean water still exist. The coverage of sanitation and sewerage facilities in rural areas is limited, while many upstream inhabitants lack the necessary financial incentives to switch to sustainable agricultural practice, since their livelihoods depend on the use of pesticides and fertilizers, on cattle farming on hillsides, on slash and burn practices, etc.

6. Benefit-sharing mechanisms: the ways forward

Tapping into the main lessons learned from the design and implementation of benefit- sharing mechanism in Coello can represent a fruitful experience for policy-makers and practitioners interested in watershed

management and governance. While BSMs have not presented themselves as the ultimate answer to current sustainable development problems, there exist opportunities to improve the functionality of these efforts so as to account for complex human-nature linkages, to adapt them to other contexts and to contribute to a change in the watershed management and governance paradigm.

Towards a multi-levelled, polycentric institutional set-up

Studies have shown that reliance on one single type of institution or authority to manage natural resources (be it state-driven, market-based or community-focused) has perverse effects, creating further pockets of power and cleavages between actors (Ostrom and Janssen 2002). In most cases, it is the poor and the marginalized social groups that have to bear the costs of natural resource management and recovery (Watts 1983). Moreover, the limited effective power that communities have in the Coello watershed (in front of much larger economic and political interests) reaffirms the negative effects that bottom-up solutions can have, when taken as an ultimate solution to CPR- problems. But mental models focusing on panaceas for watershed management no longer respond to the complexity of socio-ecological systems. Common-pool resource scholarship has proposed new forms of cooperation, such as multi-stakeholder processes (Cohen 2011; Faysse 2006; Ore 2012; Warner 2007) or polycentric institutions (Borrini-Feyerabend *et al*. 2004; Ostrom 2010a, 2010b; Ostrom *et al*., 1961) that tap into the private sector's innovation and resource mobilization capacity and on also government's responsibility and legitimacy to deliver public goods and provide for environmental, social and economic sustainability.

The functionality of multi-level or polycentric institutional arrangements in practice may vary substantially according to the given context. However, a common-sense principle is the diffusion of decision-making across different scales, in order to prevent accumulation of power and elite capture. Moreover, the presence of multiple centres helps stronger systems compensate for weaker ones: "polycentric system exists when multiple public and private organizations at multiple scales jointly affect collective benefits and costs." (Ostrom 2010a: 355). What makes the approach different from anarchy is the presence of rules and clear division of authority. Trust, knowledge, innovation, cooperation are some important benefits of polycentric institutions (Ostrom 2010b: 552).

Communities cannot be left alone to deal with the management of their water resources, since this goes beyond regulation and technical solutions. At the regulatory level, a series of nationally and locally enacted norms and laws are aimed to contribute to better watershed management, yet their full potential remains unexploited, due to lack of political will, limited local resources and a relatively highly centralized system, where national interest prevails over local interests. However, communities now possess valuable information and are able to produce change, while public authorities have enough legal backing in order to support future decision-making and the private sector has enough economic power to do so too. It is for this reason that benefit-sharing should be reconsidered, in order to make sure that both benefits and responsibilities are equitably distributed across different decision-making power poles, be it individual level, household level and/or institutional level.

Scaling up efforts through communities of knowledge and practice

Information has been proven to be a powerful tool that communities can use when expressing and defending their needs in front of local and regional authorities. However, if its full potential is not exploited, if knowledge is not multiplied across scales and shared with other watershed actors, the benefits remain in the hands of a few and the likelihood of affecting decision making and of maintaining existing conservation efforts is rather small. For this reason, community level replicas of the workshops organized with community leaders are essential for making sure knowledge and experience is shared with watershed groups that may have been previously excluded from the process. These can be voluntary based and organized within communities of practice, where community leaders who have already received training can act as community trainers of trainers.

Addressing "problemsheds" through socio-ecological integration

Experiences around the world have shown that challenges related to water (quantity, quality, access, etc.) gravitate at levels that go beyond the watershed boundaries. Politics of water and land use, competing interests for water (agriculture, industry, households, etc.), dynamic socio-economic context that are not circumscribed within clear administrative boundaries turn watersheds into "problemsheds" (Mollinga *et al.* 2007). This not only calls for close cooperation at different levels, but also for a recognition of the fact that hydrology, ecology and geography are not the only conditions dictating watershed management and that the social, economic and political landscape are decisive for solving watershed dilemmas.

One step towards addressing problemsheds is to surpass administrative or ecological boundaries and think of the watershed as a complex social, economic, environmental and political system. In this sense, upstream, midstream and downstream activities can be better linked via intra- and inter-community projects such as joint campaigns on environmental protection and sustainable agriculture, inter-community producers' organizations, etc. In order to ensure sustainability of BSMs and to keep watershed inhabitants engaged in conservation activities, economic-productive initiatives attached to preexisting BSMs are essential. These can include the facilitation of formal linkages between farmers and markets, financial incentives for land reconversion and water conservation, support for the promotion of eco-tourism via subsidies and micro-finance schemes, etc.

Giving politics a human face

Politics and power are easily confounded with a multi-legged beast in the society. While power is embedded in every sphere of the society (Hornborg 2001), being constantly redefined, negotiated and shifted across actors and spaces (Paulson and Gezon 2008; Robbins 2012), politics is an underlying mechanism to organize society, and in Aristotelian terms, that which distinguishes man from animal. Governmental, political, economic, personal and physical power becomes destructive only when it is concentrated, with no transparent system of checks-and- balances and a lack of accountability (Atlee and Atlee 2008).

For watershed management in general and in Coello in particular, the research revealed that the power of politics and economics plays an important role in elaborating and breaking the rules, in taking action and resuming it. Because those who have effective power are able to act, watershed management initiatives should integrate them and not exclude them from the game. That means, the solution is not to depoliticize the process, but to recognize the importance of politics, to tap into the resources that politicians have to influence decision-making – "sizeable budgets and personnel, special powers, access to mass media, a monopoly on the use of force and democratic legitimation" (Warner 2007: 12). This requires a continuous engagement with public and private authorities at all levels (local, regional and national actors; the mining, agricultural and environmental sector, etc.) through participation in consultation processes, public meetings, integration in community-based trainings and socialization events.

7. Concluding remarks

Complex watershed landscapes require new management approaches that nurture collaboration and knowledge sharing between contentious stakeholders. Empirical evidence from the Coello watershed lays bare the contribution that benefit-sharing mechanisms can make in reshaping a new water management and governance paradigm. It also reveals that as *agreements* per se, BSMs are far from constituting a straightforward solution to water conflicts, since the content of these agreements is oftentimes elusive and since the reconfiguration of power is highly dependent on who is integrated in the process and on actors' continuous commitments. However, the momentousness of the BSMs in Coello has been marked by a strong emphasis on a *participatory*

methodology, where communities constituted the backbone of agenda setting and negotiation process.

Implications for policy and practice are worthwhile mentioning. First, while empowerment seems to be an effective tool to bring communities on the boat, it can only be effective when mainstreamed throughout the entire process. That is, actors who have the capacity (social, economic and/or political power) to produce change need to be provided with the opportunity to take part in the early stages of BSMs development (agenda setting), but also in the actual implementation and monitoring phases, as equal partners and not as mere spectators or watchdogs. This increases the likelihood of sharing benefits and responsibilities, but also sets the stage for more fruitful collaboration.

Second, solutions to water governance challenges are far from being simplistic or purely technical. Watershed management is a phenomenon embedded in larger and more complex social, economic and political processes. Therefore, interventions in watersheds should be accompanied by a comprehensive understanding of the context, and an operationalization of these complex linkages through sustainable economic and productive solutions. Such initiatives should aim at increasing people's wellbeing, while decreasing their footprint on ecosystems. This is to make sure that poverty, marginalization and natural resource protection and conservation are part of a broader sustainable development strategy.

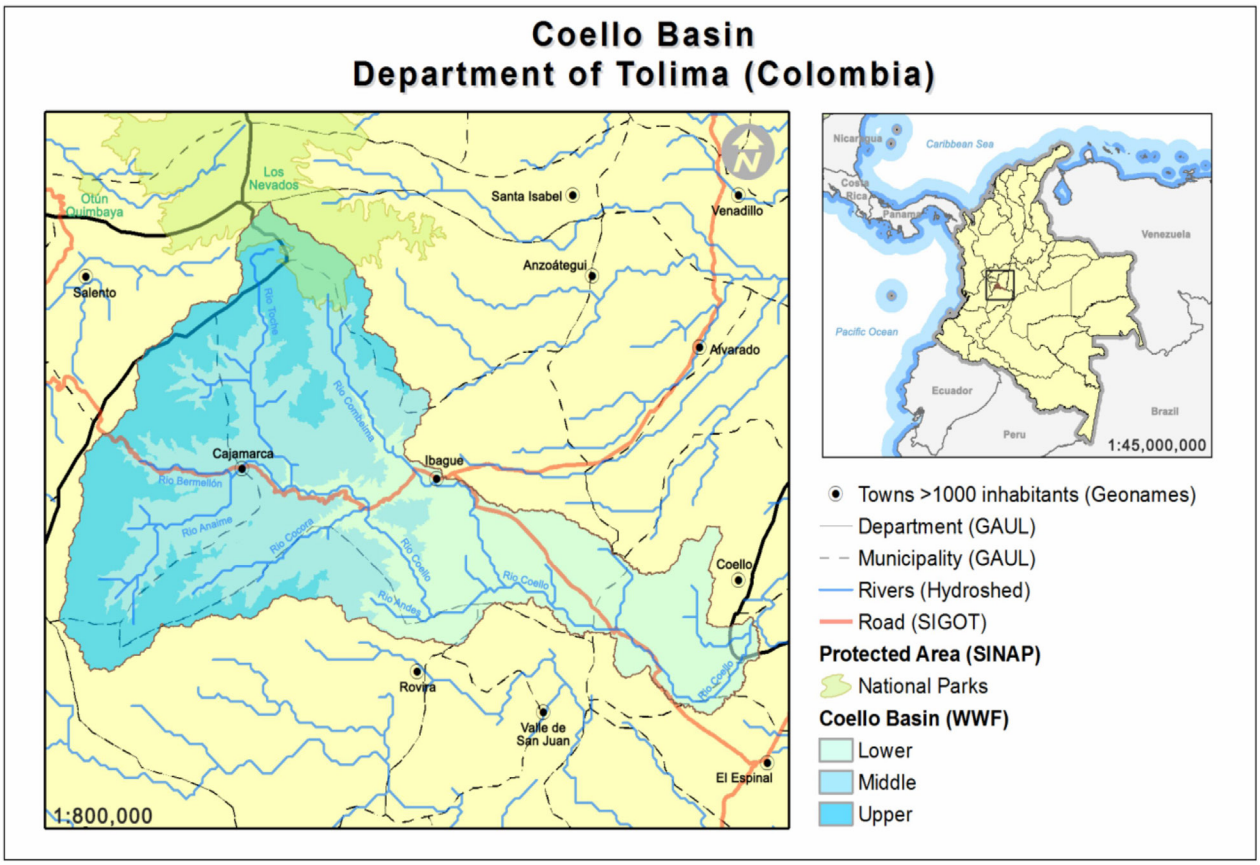
Holistic management will soon become a buzzword if concrete solutions to operationalize it are not provided. Those in search of creative governance designs (Kooiman et al. 2000) need to be aware that an equitable share of roles and responsibilities and a continuous negotiation and shift of decision-making power is essential for institutional arrangements that can adapt to dynamic economic, political and natural contexts.

Appendices

Appendix 1: Locating the Coello watershed

The division of the upstream, midstream and downstream areas of the watershed corresponds to three altitudinal ranges 280m-1000m (lower), 1000m-1800m (middle) and above 1800m (upper).

Figure 1: The Coello Watershed



Source: CIAT and WWF (2013)

Appendix 2: Benefit-sharing mechanisms in the Coello watershed, Colombia

Theme	BSM	Municipality	Stakeholders
Watershed conservation; Rural economic development	The design and implementation of a conservation plan in order to support the switch to sustainable agricultural activities (e.g. organic farming; sustainable irrigation infrastructure, etc); The construction of aqueducts for 600 water users in Santa Helena.	Roncesvalles	Municipality of Roncesvalles; Cortolima; Water users;
Protection of water flow; Rural economic development	The protection of water recharge areas; Construction of aqueducts for three villages in the municipality	Rovira	Municipality of Rovira; Community inhabitants

Watershed conservation	The design and implementation of a management plan for the lands bought by downstream municipality (El Espinal) in the upper areas	El Espinal	Municipality of El Espinal; Departmental Secretariat for Agriculture and Rural Development; Community inhabitants
Watershed conservation	The implementation of a co-management scheme for the La Bolivar Municipal Park; Conservation incentives for the 14.500 water users in the upper municipality of Cajamarca, aimed at strengthening the co-management incentive; Departmental authorities to grant 142 million COP to buy upstream land for conservation (in the neighborhood of the Park)	Cajamarca	Municipality of Cajamarca; Community inhabitants
Watershed conservation	The conversion of the La Bolivar Municipal Park and its buffer zones into a Regional Park, in order to strengthen the conservation requirements. It involves buying land for conservation in the buffer zones of the Park.	Cajamarca	Municipality of Espinal; Departmental Secretariat for Agriculture and Rural Development; Community inhabitants
Watershed conservation	The co-management of 3400 ha areas of paramo (private conservation areas)	Cajamarca	NGO Semillas de Agua Water users association (Usocoello)
Watershed conservation	The design and implementation of a plan for the integrated management of the páramo de Anaime (39 million hectare areas)		Departmental Secretariat for Agriculture and Rural Development; Cortolima; Municipalities of Cajamarca, Rovira, Ibague, Roncesvalles (Tolima) and Pijao (Quindío)
Watershed protection	The formalized integration of community members in the design and implementation of a management plan for the Hato de la Virgen micro-watershed	Ibague	Municipality of Ibague; Community inhabitants
Watershed conservation	The establishment of a co-management scheme for the 9000 hectare areas in the upper part of the watershed that would allow the creation of a conservation corridor, in order to minimize human impacts on headwater ecosystems (via mining activities and cattle farming)	Ibague	Cortolima, water users associations (Usocoello, IBAL, Asocombeima).
Economic and environmental sustainability	The provision of incentives for sustainable agricultural production in climate-vulnerable areas in the Canon de Combeima region	Ibague	Cortolima; Municipality of Ibague

Watershed conservation	The design and implementation of a management plan for the protected areas in the municipality. Negotiation of PES schemes for the protection of these areas.	San Louis	Cortolima; Municipality of Ibague
Watershed protection; Rural economic development	The provision of incentive schemes for sustainable reconversion of lands in water recharge areas, via PES schemes	Coello	Cortolima; Municipality of Coello

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Chapter 23

Tree Planting Strategies: Impact and Application in the Haitian Context

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Abstract

The 2010 earthquake brought the extreme vulnerability of Haiti into international focus. Seemingly caught in an endless cycle of social unrest and natural disaster, the country has effectively become a ward of the international community. At the heart of Haiti's protracted struggle have been poor governance, insecurity and "the gradual destruction of the ecological basis for human habitation."[1] Environmental degradation has been targeted by interventions ranging from local grassroots efforts to top-down-implemented national initiatives. Two of the most established approaches to tree planting in Haiti are reforestation and agroforestry. As part of a field practicum for the Masters of Sustainable Development Practice (MDP) program, two examples of these approaches, implemented by the International Organization for Migration (IOM) and by the Mennonite Central Committee (MCC), were evaluated. This paper reviews the impact and application of these different programs, and discusses their contributions to a comprehensive solution to Haiti's environmental vulnerability. In closing, the paper highlights key lessons learned from the evaluations and their relevancy for environmental programming.

Introduction

The January 12th, 2010 earthquake brought the extreme vulnerability of Haiti into international focus. The earthquake however, was only the latest natural disaster to beset the country. Haiti lies in the center of the Caribbean hurricane belt and is prone to tropical storms. The country's topography and receding tree cover compound the threat of flooding. Deforestation has reduced the environmental services of Haiti's watersheds. Haiti's vast mountain ranges now retain little of the abundant rainfall, as rain and top soil wash down denuded ravines. With the forest cover and topsoil gone in these upper catchments, many of Haiti's rivers are now highly unstable, changing rapidly from destructive flooding to inadequate flow during the course of the year. These drastic fluctuations pose a major threat to downstream settlements during the rainy season and to irrigated agriculture during the dry season.[2]

Support for environmental restoration has been building in Haiti for the last 50 years. Interventions have ranged from local grassroots efforts to top-down-implemented national initiatives.[3] Through out the history of environmental programming in Haiti, no single overarching strategy for reversing deforestation has emerged. Two of the most established approaches to tree planting are reforestation and agroforestry. As part of my field practicum for the Masters of Sustainable Development Practice (MDP) program, I evaluated the impact

[1] Schulz 1997-1998: 82
[2] Foxx 2012: 105-108
[3] White 1994

and application of two examples of these approaches as implemented by the International Organization for Migration (IOM) and the Mennonite Central Committee (MCC).

IOM targets the macro-environmental benefits of *reforestation*. The IOM watershed management program has planted trees and constructed erosion barriers through Cash-for-work labor since 2006. MCC promotes the micro-economic benefits of *agroforestry* livelihoods among smallholder farmers. The MCC program has worked in the Central Plateau of Haiti since 1979 to establish community nurseries and carry out annual tree distributions. Despite the success of these longstanding programs, they have their limitations in addressing deforestation in Haiti, as will be explained in this paper.

This paper commences by reviewing the history and drivers of deforestation in Haiti, including its consequences. This is followed by an overview of environmental programming, which leads to a study of the current approaches employed by IOM and MCC. These approaches are assessed in terms of their environmental impact and sustainability. In doing so, I draw conclusions for their application in different settings and their potential contribution to a comprehensive watershed management strategy. The paper concludes by highlighting the key lessons learned from the evaluation.

Context

The history of Haiti's environmental degradation has origins in its colonial past as an export plantation economy. At its colonial peak, Haiti was the largest exporter of sugar and coffee to Europe. Vast sections of the island were cleared of trees to support production on plantations. After independence, a burgeoning timber industry cleared much the island's mahogany forests in the 19th and 20th centuries.[4] The economic hardship introduced by the eradication of the creole pig[5] and the U.S. trade embargo further contributed to tree cutting, primarily for charcoal production.[6] Deforestation continues today as agricultural plots became increasingly fragmented through inheritance and remaining trees compete with cash crops.[7]

More than 98% of the country's true forest cover has been cleared.[8] Topography has compounded the challenges of deforestation in Haiti. Approximately two-thirds of the country is mountainous.[9] Population growth and declining productivity have forced farmers to clear steeper plots to cultivate crops. Most farmland is on slopes of over 20%, and the majority of farmers have several small plots totaling less than 2 ha. As a result, most hillsides are visibly eroded, and according to USAID, a third of all land is severely degraded.[10] Decreasing tree cover has also reduced the capacity of Haiti's watersheds to capture rainfall and regulate river flows. Haiti receives an average of 1,461 mm of rain annually, with the majority of rain falling during two concentrated seasons from April to May and during the hurricane season from July to November. As rain falls on the upper catchments of denuded watersheds it meets little resistance on its path downstream.[11] Rain runoff strips the slopes of precious topsoil, causing declining soil fertility and agricultural production.

Haiti has a strong agricultural tradition dating back to the colonial era. This tradition has continued in

[4] Library of Congress 2011
[5] Thomas and Fendall 2004
[6] Swartley and Toussaint 2006:4
[7] Smucker, et al. 2002
[8] Swartley and Toussaint 2006:22
[9] FAO 2012
[10] White and Jickling 1995.
[11] FAO 2012

rural areas where 75% of households are engaged in some form of agriculture. Despite this history, Haiti is the most food-insecure country in the Western Hemisphere today. The World Food Programme estimated in 2008 that 25% of households were food-insecure. Most farmers do not produce enough to feed themselves, let alone the whole country: 68% of food items consumed by rural households are bought on the market.[12] National agricultural production covers only 47% of the national food needs. Consequently, access to food is determined more by purchasing power than production. Food expenditure currently represents approximately 59% of household spending in Haiti.[13]

As a consequence of the country's deep centralization of political power, the rural population has been poorly represented in government and decision-making. This has historically led to the omission of agriculture – and by extension, the environment – from the national agenda.[14] The exclusion of the rural population has been reinforced by the reliance on the French language by the government, particularly in the judiciary branch. Land disputes settled by the legal system have generally favored the French-speaking Haitian elite. As such, the insecurity of land tenure and poor access to credit remain significant barriers to private investment for farmers.[15] Despite this, trees *have* found a foothold on informally owned land, as substantiated by studies of several tree-planting villages.[16]

Charcoal remains the dominant source of energy in most urban and town households. It is estimated that over 80% of charcoal is consumed in the capital of Port-au-Prince. Most rural households rely on fuel wood and only produce charcoal for market. Charcoal production has nearly tripled over the last three decades, from 12 million metric tons in 1980 to 32 million metric tons in 2010.[17] Declining soil fertility and falling agricultural commodity prices have led many rural Haitians to intensify charcoal production as a means of securing cash income. Estimates of the national energy need met by charcoal or firewood in Haiti range from 66-85%.[18] The reasons for this reliance are clear: charcoal is cheap, accessible and more reliable than the state electrical system.

History of Environmental Programming in Haiti

Rural poverty and environmental degradation have primarily been combated by interventions funded by external donors and implemented independently or in collaboration with the Haitian government. A growing awareness of the country's environmental vulnerability led the U.S. and other donors to commit to funding reforestation activities in 1973.[19] The major programs during the 1970s were implemented through the state as part of an institution building strategy that channeled funds through the Ministry of Agriculture. These programs were characterized by top-down management that paid farmers in food to outplant trees from central nurseries onto public and private lands. Tree planting activities were reinforced with ecological education that aggressively discouraged tree cutting.[20] While these interventions succeeded in planting millions of trees, few of these trees survived to maturity. Explanations for this failure center around "tree tenure." Trees planted through these programs were presented as state and not private property, providing no economic benefits to participating landowners and raising fears that planting trees would be a prerogative for the state to seize their land.[21]

[12] This could also be understood as a result of the market orientation of Haitain farmers, as opposed to a failure of subsistence agriculture.
[13] WFP 2008
[14] Cohen 2010: iv
[15] Smucker, et al. 2002: 9-12
[16] Murray and Bannister 2004: 7
[17] Van der Plas 2007:21, 30
[18] Howard 1998:18; Van der Plas 2007:3
[19] U.S. Department of State 2008 (This assistance came after a decade long freeze on foreign aid to Francois Duvalier's dictatorial regime)
[20] White 1994: 24
[21] Murray 1987: 219

In the 1980s, mounting congressional pressure for results-based interventions led to a review of all U.S.-funded environmental programming in Haiti. At the same time, chronic and widespread government corruption prompted a shift from channeling resources through state institutions to contracting NGOs in order to directly implement interventions. These conditions gave rise to alternative approaches to tree planting that embraced more participatory methods and benefit-flows.[22]

During the 1980s and early 1990s, an average of 10 million trees were planted each year, primarily by the United States Agency for Development Assistance's (USAID) Agroforestry Outreach Program (AOP), implemented by the Pan American Development Foundation (PADF).[23] The AOP broke with traditional reforestation programming to promote timber trees as a cash crop on private farmlands through their incorporation into agroforestry systems. The approach was unique in that it bypassed the Haitian government and implemented activities through local NGOs. Farmers were engaged in a joint venture in which they supplied land and labor in exchange for capital in the form of tree seedlings.[24]

In 1999, a 15-year Environment Action Plan was approved by the new Ministry of the Environment to curb deforestation by developing alternative fuel sources to charcoal.[25] However, political instability and lack of funding have limited the impact of energy reform efforts.[26] The non-profit and private sectors have taken the initiative to develop more efficient charcoal stoves and to introduce alternative cooking fuel sources, but have met limited success. Everything from animal waste, paper products to organic material have been promoted as alternatives. To this day, these programs have been set back by cultural resistance, prohibitive entry costs of new stoves and the inability to establish national supply chains for new fuel sources.[27]

Major flooding events during the 2004 and 2008 hurricane seasons brought Haiti's environmental vulnerability into focus in national politics. The government of Haiti strengthened its commitment to the environment by issuing a decree on watershed management and soliciting funding from donors for disaster risk reduction activities.[28] USAID, the United Nations Development Program (UNDP) and the Food and Agriculture Organization (FAO) responded by financing water and soil conservation activities in areas watersheds targeted by the Ministry of Agriculture's environmental vulnerability assessment. These massive programs have largely eschewed the participatory processes developed by previous interventions for a cash-for-work approach that pays residents to plant trees on common lands. Since 2010, these activities have been ramped up to meet the demand for employment and cash-transfers in the wake of the earthquake, while continuing to address deforestation.[29]

Overview of Highlighted Environmental Programs

The evolution of environmental programming in Haiti has been far from linear, as illustrated by the return to state-channeled resources and top-down implementation. IOM's reforestation program and MCC's agroforestry programs stand apart from current interventions in their grassroots approach to tree planting. Both programs engage populations to produce trees in community-run nurseries, but diverge diverge in the use of incentives and extension strategies. IOM pays community members to plant trees in the upper catchments of watersheds. MCC distributes trees to farmers to plant on private property through technical assistance.

[22] Murray 1987: 217
[23] White 1994
[24] Murray and Bannister 2004: 2
[25] Cohen 2010: vii
[26] Lea 1995: 33
[27] Van der Plas 2007:21, 30
[28] Cohen 2010: ix
[29] Foxx 2012: 108

These approaches have succeeded in planting millions of trees over the last ten years,[30] but by pursuing different end objectives: On the one hand, MCC promotes trees as a cash crop for farmers to plant, manage and harvest at regular intervals alongside traditional crops. This agroforestry approach has cascading environmental benefits, but the program's thrust is in developing long-term livelihoods. Alternatively, IOM plants trees as a part of a larger watershed management strategy to mitigate erosion and flooding. This takes place on a macro environmental level, but also creates short-term employment for cash-for-work participants and contributes to long-term agricultural livelihoods for landowners by mitigating erosion. Over the long-term the objectives of these two programs are clearly complementary.

Through IOM's reforestation program, community members are paid to construct stonewalls and micro-basins in upper catchments and ravines. Trees and deep-rooted grass species are then planted to reinforce these barriers. These hedgerows capture rain water, nourishing plants and stabilizing soil. Overtime, these hedgerows form productive terraces that can be cultivated. The rationale of this approach is that if you stop rain where it falls then you can prevent rain runoff from reaching the critical mass that causes erosion and flooding downstream. Therefore IOM targets sections of the watershed that contribute the most to flooding.

Since the program was established in 1983, MCC has pursued reforestation by decentralizing tree planting. The organization has established tree nurseries in 23 communities which produce approximately 450,000 tree seedlings per year. Each nursery hosts an annual distribution to supply area farmers with trees. The organization provides technical assistance to farmers in planting and sustainably managing tree stands on these private holdings. Students are educated about the role and importance of trees through an environmental curriculum taught at primary schools in the intervention area.

MCC recently developed a 'micro-forest' component to improve tree density and survival rate in target areas. The initiative has spurred tree sales by requiring participating landowners to purchase large quantities of trees as they plant tree stands. These micro-forests are principally implemented on marginal, eroded land on which trees are not in competition with crops or construction. Participants return these abandoned plots to productive use by planting trees to produce timber and charcoal. Micro forests provide environmental services such as water filtration, stabilizing river flows and maintaining and nourishing top soil. These concentrated plantings create contiguous forests that also provide new habitat for a diversity of wildlife.

Program Analysis

The primary means of implementing tree planting in Haiti is currently cash-for-work activities. While these meet the immediate goal of injecting cash into households and markets, they can undermine community participation and ownership. Paying beneficiaries creates the expectation that planting trees is wage labor and not voluntary labor. If abused, cash-for-work schemes can discourage independent initiative and erode volunteerism. This can be seen in other sectors as well, in the wake of cash-for-work programming after the earthquake. The ubiquity of these activities around the country has created a difficult precedent for future programs to follow.

Despite these drawbacks, paid labor is all but essential in addressing deforestation on public lands and remote upper catchments. Short-employment also meets an important need for cash in rural communities.

[30] Over the last 7 years, IOM has planted over 3.2 million trees in the watersheds of Petit-Goave and Jacmel, which were studied for this evaluation. The MCC agroforestry program has distributed a total of 7.6 million trees in the Central Plateau.

IOM has tried to strike a balance between paid and voluntary labor by requiring participants to contribute one day of 'community labor' per week. MCC has employed the Haitian *konbit* practice of organizing labor by preparing food for participants. While cheaper and perhaps more participatory than cash-for-work, this traditional method has limitations when scaling up interventions. Both organizations currently subsidize the production of trees at community-run nurseries by paying participants a small amount per tree produced.

The long-term outcome of current environmental programs depends on the extent to which they integrate stakeholder participation and ownership. As demonstrated by previous reforestation efforts, it is easier to plant trees than it is to protect and maintain them. Both organizations invest considerable effort in mobilizing communities through planning meetings. This participation is sustained by continued visits, capacity trainings and recruitment of residents to supervisory positions. However, where MCC's private funding allows them to make an open ended commitment to communities; IOM is limited by the deadlines of public donors. The success of the MCC agroforestry program is due in large part to its longevity. The program has remarkably continued its services through periods of immense social upheaval and economic hardship.

For many Haitian farmers, environmental considerations are out of necessity secondary to immediate economic needs. However, the two are not mutually exclusive. Under the right conditions, trees can satisfy both objectives. Resource ecologist Joel Timyan noted in his study of Haitian tree species, "Living on the production of a hectare of land allows little consideration for trees without immediate value to the household economy. Trees must provide myriad goods and services. A tree's failure to do so generally means its elimination, many times in favor of other agricultural activities, mainly grazing and land clearing for annual crops."[31]

IOM promotes trees foremost for their environmental benefits, and not necessarily their economic value. This priority is reflected in the organization's selection and siting of trees. Fruit-bearing species comprise less than 10% of trees planted. IOM also plants trees in the upper catchments to maximize their environmental services. The marginal soil on these steep, eroded slopes rules out planting more productive fruit or commercial timber species. The remote location of these sites poses challenges for harvesting and transporting tree products. Additionally, the rigid deadlines under which IOM operates restrict the organization's ability to conduct the follow-up activities necessary to ensure higher rates of survival of the trees planted.[32]

The "myriad goods and services" provided by trees to farmers include shade, fencing, forage, fruit, timber, firewood and charcoal. While charcoal has been widely vilified as a driver of *deforestation*, it paradoxically has also played an instrumental role in reforesting Haiti.[33] As the size of agricultural plots shrinks in Haiti, trees are increasingly in competition with crops for available land. Charcoal provides farmers with the economic motivation to maintain trees. It is a low-tech, value-added product that can be easily transported to urban markets. MCC has championed charcoal and timber production through its agroforestry program, mobilizing farmers to voluntarily plant trees. These farmers described their tree stands as 'bank accounts,' from which funds can be withdrawn in times of need. Trees also serve as insurance against crop failure, sickness, injury or other emergencies.

Lessons Learned

Agroforestry and reforestation both play an important role in addressing deforestation in Haiti, though neither is sufficient in itself: planting trees for harvest on private lands neglects some of the most vulnerable sections of watersheds; at the same time reforestation does not provide the same long-term economic incentives

[31] Timyan 1996: xi

[32] The Ministry of the Environment has set the target survival rate of trees after three years at 10-15%. My evaluation revealed survival rates of 40% and 55% for IOM and MCC, respect – both exceeding government expectations.

for farmers to maintain trees on their lands. Therefore a comprehensive watershed management strategy might draw on the most promising elements of these approaches. The MCC and IOM programs represent successful examples of each approach. Studying these programs provides us with important lessons learned to apply to future tree planting efforts in Haiti. These lessons are as follows:

- **Community Nurseries:** Decentralizing seedling production from professionally-run to community-run operations can reduce the cost of production and transport while still delivering high-quality seedlings. Engaging communities to produce their own seedlings builds the capacity of participants to do so and ensures that preferred species are produced. In order to maintain high-quality production standards, nursery committees must be trained, monitored and paid. In that regard, IOM and MCC have demonstrated the most effective means of paying participants is to subsidize the cost of production.

  These programs also supply nurseries with all of the necessary tools and inputs to produce seedlings. IOM currently is making the transition to producing seedlings in root trainer trays. MCC uses durable plastic cones stacked in crates. MCC has developed a cost-effective approach to providing inputs such as seeds, fertilizer and pesticide by issuing them on credit to nursery committees. Committees also access credit to cover other costs associated with production such as labor, transportation or land rental. This credit is subtracted from the final amount the committee is paid at the end of the season for the seedlings they produce. Committee members also participate in the distribution of trees to area farmers. These provisions are laid out in a contract that MCC enters into with participating communities.

  There are challenges inherent in this arrangement. The amount MCC pays nursery committees for production is not enough for their members to work exclusively at nurseries. In some cases, this has led to the neglect of the nursery responsibilities in favor of other income-generating activities. Additionally, requiring (or charging) nurseries to collect their own seeds can create shortfalls in desired species. While these measures may make nurseries more financially independent, they create a trade-off in terms of quality and quantity of seedlings. Overall however, the MCC and IOM nurseries observed during the study met production standards: the majority of nurseries produced, or exceeded, the agreed upon number of seedlings. These seedlings were healthy and mature at the time of outplanting. In sum, professionally-run nurseries may provide more consistent results, but at higher operating costs.

- **Voluntary Labor:** MCC has mobilized farmers in 23 communities to voluntarily plant trees on their property through its agroforestry program. This success can be attributed to a number of factors: providing large quantities of free seedlings through annual nursery distributions[34]; giving communities control over the type of species produced; guaranteeing tree tenure and harvest rights to participants (producers have full permission to manage trees as they see fit); demonstrating the economic value of planting trees through planning meetings; providing technical training to plant and manage tree stands; and most recently, introducing silviculture methods that support trees alongside traditional crops.

  Each nursery hosts an annual tree distribution in their community. The distribution coincides with the rainy season to give trees the best chance of survival. The date is widely publicized in the community

[33] Lea 1995: 42

[34] The number of trees distributed per person ranges from 50-80 trees, depending on availability. This includes a variety of fruit and forestry species. Children also participate in distributions, but receive fewer trees.

to attract as many participants as possible. MCC staff demonstrate correct planting procedures at the distribution, and conduct follow-up household visits to ensure they are followed. In this way, the program is able to plant some 450,000 trees annually on a minimal budget.

IOM has developed a mixed system of paid and voluntary labor that requires cash-for-work participants to contribute one day of unpaid labor per week – essentially being paid five days for working a six-day week. While this system accomplishes more work for the same amount of money; the primary purpose of volunteer days is to create a sense of personal investment in the project among participants. This sense of investment is part of a larger 'community ownership' strategy pursued by IOM to encourage beneficiaries to protect trees.

- **Cash-for-Work:** As indicated earlier, it is necessary to compensate participants for planting trees that they themselves will not be able to harvest. This has been done by supplying food stocks, paying cash wages and providing other services. Putting cash in the hands of participants empowers them to make their own decisions on how to meet their household needs. Cash-for-work tree planting meets the immediate need for wage labor in rural communities with few opportunities for employment while accomplishing long-term ecological objectives (that would otherwise be impossible without such collective action).

  IOM has developed a rotation system to provide the opportunity for employment to as many community members as possible. Each participant works for two weeks (including the two volunteer days) during their rotation on the project. While this may not amount to very much money, the households interviewed were still able to use their income to make long-term investments such as paying school fees, purchasing livestock and purchasing merchandise for resale, in addition to meeting daily needs for nutrition, shelter and health care.
- **Appropriate Plant Selection:** Returning to IOM's reforestation sites in Petit-Goâve revealed the importance of selecting tree and grass species adapted to site conditions. While the overall survival rate of trees was relatively high at 40%, this figure was buoyed by a handful of resilient species, namely eucalyptus, casuarinas, cassia and *fwenn* (bitter damson). Species less adapted to marginal soil and drought conditions fared much worse; with those that did survive showing signs of stunting. These highlighted species are also the most resistant to predation. In contrast, fruit species appear to be the favored forage for livestock. Most of the fruit trees that remained showed signs of grazing, contributing to their much lower survival rate. Wind is another environmental threat which must factor in species selection. At one exposed mountain site, only casuarinas showed sustained growth due its needle shaped leaves. The leaves of other species at this site had been shredded by the wind.

  This consideration extends to the grass species used in hedgerows as well. Vetiver fared dramatically better in drought conditions and showed fewer signs of predation than did gautemala or elephant grass. Given this experience, the selection of tree and grass species may be the single most important indicator of survival at reforestation sites. The contour canals and check dams constructed at sites provide some measure of support to vulnerable species, but they are still more likely to fail.

  Conversely, concentrating on a few hardier species has drawbacks for biodiversity and long-term resiliency. Another reforestation program, implemented by the Presbyterian Church over the last 20 years in Leogane has attempted to address this challenge by planting tree species in succession. The mission plants eucalyptus as a frontline to stabilize soil and reduce wind, followed by nitrogen-fixing species such as lucena, before finally planting fruit trees. These fruit trees are often accompanied by agriculture as soil fertility is restored. The trees planted in the stages one and two are thinned to make more space once they have fulfilled their roles. The resulting landscape encompasses a much more diverse species. [35]

[35] CODEP 2013

- **Diversified Funding:** The priorities and means of donors change constantly. Competent programs close prematurely due to funding deficits. This has been borne out in the history of Haiti's environmental programming. The USAID-funded Agroforestry Outreach Program (AOP) referenced in this paper as one of the few success stories in tree planting is one such example. Funding for the AOP was not renewed after twenty years of implementation despite the program's unprecedented success.[36]

  MCC was one of the original NGOs contracted under the AOP by the implementing partner, the Pan-American Development Foundation (PADF). While the other local NGOs contracted by PADF closed or changed course after the AOP concluded, MCC continued its agroforestry activities. MCC was able to secure private funding for operations through international fundraising. This example highlights the importance of diversified funding for a program's longevity. Such sustainability is critical in promoting the behavior change necessary for introducing agroforestry practices. The director of MCC also attributed their program's success to "starting small, growing slowly and listening to the people [it serves]."[37]

- **Sustainability vs. Impact:** When considering the financial sustainability of activities, it is valuable to review the trade-offs in pursuing this objective. MCC developed a demand for tree seedlings through many years of free distribution. In recent years, MCC has started to capitalize on this demand by reducing the number of trees distributed and encouraging participants to purchase trees. The proceeds from tree sales go directly to sustaining tree production as part of a long-term handover strategy to make nurseries financially autonomous.

  This shift has had some success in raising funds, but it has come at the cost of participants taking home fewer trees to plant. At the same time, MCC still subsidizes 95% of the trees produced. Anthropologist Gerald Murray, who designed the AOP, noted "A project in which peasants pay for 10% of the seedlings is no more sustainable than one in which the project simply donates seedlings. What you do by imposing a per seedling cost is reduce by 90% the number of farmers who will plant trees." Since the trees serve secondary ecological and public functions, no single farmer should be required to pay the cost of producing them. Instead they should be widely subsidized by governments and other donors.

- **Household Permaculture:** One of the main barriers to planting trees identified by survey participants was the time required for trees to mature for harvest. IOM works to address this concern by promoting backyard gardens to provide income and nutrition in the interim. Participants are supplied with materials and trained in permaculture methods to intensively cultivate these small plots. Since the Haitian lakou is traditionally separate from larger farm lands in Haiti, these backyard gardens do not compete for space with trees or other crops. Their proximity to the house also makes maintaining gardens less labor-intensive.

- **Separate Approaches:** A final lesson learned in studying the IOM and MCC programs, is that agroforestry and reforestation are viable but distinct approaches to tree planting. While their objectives and impacts overlap at certain levels, implementing both activities as part of the same program has the potential to be counterproductive. Agroforestry provides trees for cultivation. Reforestation provides cash to plant trees. Confusing these two benefit flows has consequences for the sustainability of activities. People traditionally paid to plant trees are less likely to continue to do so voluntarily. The trees planted through these two approaches also serve different purposes and should be managed accordingly.

[36] See Murray and Bannister 2004 for a discussion of the circumstances of AOP's closure.
[37] Hildebrand 2013

The IOM and MCC programs as they stand today represent the evolution of countless lessons and applied. Their approach to tree planting has been refined through years of field implementation – and *continues* to be refined as illustrated by MCC's recent experiment with selling trees. The programmatic lessons highlighted in this paper fall on this continuum of refinement. They are presented here to contribute to the ongoing development of best practices for planting trees in Haiti. These lessons also call attention to the need for multiple approaches to address deforestation. Many such practices have been already been tested and proven in this context. Environmental partners would be wise to build on what has already been accomplished and learn from the mistakes made over the course of our 50 year venture in reforestation in Haiti.

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Chapter 24

The Social Flows of Water: Mainstreaming Gender in the Global South

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Abstract

Women and men interact with water in different ways, and at different times in the water use and water management processes, whether these interactions occur at the global/supranational, national, or local and household socio-political level. This chapter uses those levels as a framework for discussing issues of water economics, water politics, formal water management institutions, and localized and domestic water management. In particular, it uses a methodology in which case examples from each level are reviewed in detail, with a specific eye towards their applicability as illustrations of the scope and significance of the challenges and opportunities related to gender and water. Afterwards, these cases are used as the basis for a discussion of the relationship between gender and health that is embedded in every level of the socio-political system, from global to local. It is the aim of this paper to demonstrate that water use and management are nested and mutually reinforcing at all levels, and to draw examples of best practices from an examination of the successes and failures of current management efforts. Finally, the discussion and conclusion formulate a set of recommendations for best practice that address the most effective points of intervention.

Water is vital to human life. With it, we thrive, along with our crops, our domesticated animals, our societies, and our civilization. Without it, we die in as few as three days. For humanity, water is both a biological and social imperative, and both our history and our current geopolitical landscape are shaped by it to an extent that is seldom recognized or acknowledged.

What makes water unique among all other natural resources is its universality: whether a person is rich or poor, they nonetheless require access to water on a daily and continuing basis. Unlike food, it cannot be easily stockpiled, hoarded, or condensed for long-term storage against a time of need. Instead, it is a quintessence in and of itself: forever necessary, forever renewing itself, forever beyond our ability to fully comprehend or control. It was with this idea in mind that the UN Human Rights Council adopted a binding resolution in 2010 that affirmed that access to safe, clean drinking water is a right due to all humanity, and that it is incumbent upon all governments, societies, and peoples to do their utmost to uphold this provision (Panda, 2007).

As water is vital to human life, water management is an issue that necessarily concerns all people equally. However, water resource management has historically been afflicted by a gender imbalance that has impacted the development of both its management discourse and practices. Although women and men interact with water in different ways and at different times in water use and water management processes, water resource management has generally failed to acknowledge or compensate for this fact. Consequently, women have frequently been shut out of the process, resulting in a gender imbalance. The differences in the ways women and men are involved with water are indicative of deeply rooted, systemic power relations that have significant implications for the ways in which the resource is handled. As such, any discussion of water resource management would be incomplete without a thorough gendered analysis.

Since the relationship between water and gender has different effects at different governmental levels, any

review of the problem must necessarily incorporate examples from the global/supranational level, the national level, and the local level and household level. An analysis conducted in this fashion is advantageous, because it clearly highlights the ways in which water issues are addressed at different socio-political levels, as well as how they are impacted by various social and governmental structures. Within these sections, issues of economic water, formal water management institutions, water politics, and localized and domestic water management will be addressed and case examples will be discussed in each section in order to illustrate the scope and significance of the challenges and opportunities related to gender and water.

In addition to these three divisions, the relationship between water, gender, and health will be addressed in a fourth section, which will discuss how the relationship between gender, water, and health is embedded in all levels of the socio-political system. It will also illustrate the nested and mutually reinforcing levels of water use and management, and provide important lessons in best practice through the successes and failures of current management efforts. As with the previous sections, water and health related case examples will be explored. The analysis presented within these sections will be used as the framework for a set of recommendations for best practice that address the most effective points of intervention.

The evidence is clear: current water management practices in the Global South are defined by pronounced gender imbalances, and those imbalances inevitably tend to favour men. What is less clear is the best point of intervention and the best practices to use to rectify the situation. This paper will employ a number of case studies in an attempt to identify both of those things.

Theoretical Framework

When discussing gender, it is first necessary to define the terms being used. Although gender may seem, at first glance, to be a clear and unambiguous term, there have been varying conceptualizations of what gender, as a term, represents. For the purposes of this paper, gender refers to the socially constructed expression of behaviour, most commonly expressed through the self-identification of "man/men" or "woman/women" (Fausto-Sterling, 2000). While it is acknowledged that gender exists on a spectrum and is often expressed outside of this dominant binary, in terms of the societies in question herein, it is the traditional male/female dichotomy that generally applies. Accordingly, this paper will work within the framework of the dominant gender binary as it pertains to how women and men interact in water use and water management processes.

This foundational understanding of gender is complemented by the utilization of an analysis that frames women as a class of people whose oppression is linked to categorization of women as a class similar to the Marxist conception of the proletariat as a class. As such, women and men have had different experiences with water as a result of class formulations based on socially defined genders rather than being rooted in biological sex distinction (Kennedy and Lapidus, 1980). This analytical framework is adapted from the work of socialist feminists such as Zillah Eisenstein, who argued that the liberation of women would have to be accompanied by the social liberation of all people (Kennedy and Lapidus, 1980).

Part One: Gender and Water at the Supranational and Global Level

The recent history of the relationship between women and water has been one of considerable change on a global level. Prior to the 1980s, policies tended towards a welfare approach, wherein women were the primary beneficiaries of improved water supplies. During the 1980s, this began to move towards a focus on efficiency, effectiveness, and reducing the role of the state. In the 1990s, this evolved into a focus on managing water at the lowest appropriate level and involving women in the process (UN, 2005). This was accompanied by an increased emphasis in all global forums on the need for a mainstreaming gender into water management.

Since the turn of the millennium, water has become increasingly gender inclusive. The Second World

Water Forum in 2000 identified women as prime users of "domestic water," crucial users in food production, and along with children as the most vulnerable population to water disasters. Furthermore, it proclaimed that, as women were the primary victims of poor water management, they should be empowered to more effectively participate in the process (UN, 2005). This idea of a gendered approach was reiterated at the 2001 International Conference on Freshwater and at the 2003 Third World Water Forum in Kyoto. At the United Nations Conference on Sustainable Development in 2004, water was described as having a woman's face, a somewhat poetic acknowledgement of the role that women play in sustaining households, communities and economies (Panda, 2007).

Today, the idea of female inclusion in all water management discussions is normative, and gender mainstreaming has advanced to the point that women necessarily play an important role in all global forums on the issue. In fact, 'gender mainstreaming' is currently a development buzzword for how to achieve equality (Panda, 2007). It is an approach that looks at the implications at all levels of a project, from design and implementation through monitoring and evaluation (UN, 2005). Gender mainstreaming holds that, when projects are implemented through a participatory process that is gender-sensitive, it is more likely than not that they will be technically appropriate, well used, and maintained. It allows for both genders to bring different concerns and knowledge to the discussion, which in turn can lead to better health outcomes, more productive potential, and less time spent on water related activities (UN, 2005).

Perhaps the most well known recent initiative for water access is Millennium Development Goal (MDG) 7C of halving the number of people without sustainable access to safe water by the year 2015 (Singh, et al., 2008). In international policy, women without sustainable access to water are identified as "a group traditionally facing difficulties in exercising the right [to water]" (Singh, et al., 2008, p. 186).

An example of best practice in integrating gender in water practice at a regional level that is more focused than these global conventions can be seen in the Southern African Development Community (SADC). There has been a movement from gender-neutral to gender inclusive and integrated policies, protocols, and budgets at the SADC level. Women are often the primary managers of environmental resources, so are being integrated into water management institutions within SADC countries (Kwaramba, 2001). Recognizing that water resource management is lacking equality in power relations, that there is low participation of women in decision-making, and limited control over water resources and information about water, various regional initiatives have been formed. SADC has determined that the most serious issue is that women are the main managers of environmental resources, so women are instrumental in water and sanitation projects and should be included at all levels. In order to carry out this involvement, regional activities include strategic partnerships between networks and organizations, capacity building for stakeholders such as gender training, and consultative forums. The Global Water Partnership- Southern Africa (GWP-SA), a network of organizations involved in water management carries out affirmative strategies, and forces a balance in representation by mandating 30% of those participating are women in order to shift the balance that formerly existed (Kwaramba, 2001). Another GWP-SA initiative is working with the Zimbabwe Ministry of Water resources to coordinate mainstreaming efforts at the regional level (Kwaramba, 2001). Ultimately, the role of women as users of water and part of the decision making process is an integral focal point if regional efforts for water management are to be successful.

Part Two: Gender and Water at the National Level

The power of the sovereign state to make decisions that impact all water stakeholders is largely unparalleled. As an authority, sovereign states rarely acknowledge any structure as being more powerful than the state itself. State actions and national level policy decisions have a significant impact on gender dynamics of the country due to the oft-times structural nature of these policies. Within policymaking processes, government bodies are central in the creation and implementation of programs and policy efforts that, while they may be designed for the benefit of the citizenry, often do not adequately address gender inequalities inherently present within the national context.

Large-scale development projects have a significant environmental and social impact on the communities where they are implemented. This is particularly true of water-related projects like dams and reservoirs, which can have national or even international effects. As such, governing bodies often consider these impacts as a way to establish a compensation package designed to offset the losses sustained by members of local communities (Braun, 2010). At a national level, however, existing gender inequality is often not considered. As a result, these projects can intensify the challenges associated with gaining access to water for household use as well as water as a productive resource (Braun, 2010).

In Lesotho, the Lesotho Highlands Water Project (LHWP) is an example of how the systemic inequality that exists in patriarchal societies impacts even the most well intentioned national policy efforts. The multi-level dam included a mitigation policy that was intended to offset the material losses of households (Braun, 2010). In Lesotho, however, society is patrilineal and patrilocal which results in household finances being organized around the lineage of men, and women's access to money being limited (Braun, 2010). Given that a woman's primary responsibilities are to take care of the household and to be the main farmer in the family, this represents a significant obstacle. As such, women's access to water is imperative for the health of families as well as a way to earn an income through selling surplus crops (Braun, 2010). When the LHWP took effect, households that lost agricultural income received a lump sum compensation package. Consequently, men were made responsible for monies that rightly should have gone to women, given their respective relationships to the lost water in question (Braun, 2010). This policy is an example of how national policy decisions often neglect existing gender dynamics and result in an unintended worsening of gender inequality. It is also an example of how a development project that would appear by all outward measures to be an unqualified success can nonetheless contribute to limited opportunities for women and a reinforcement of the traditional male-dominated power structure.

National water policy can also impact women's access to clean water and adequate sanitation at the most basic level. In Brazil, national water policy has been largely inadequate in working toward achieving gender equality. In a similar situation to that in Lesotho, Brazil's national water policy has done nothing to address the differences in the ways in which men and women interact with water (Leite, 2010). At all levels of Brazil's national water and sanitation policy, there is typically no consideration for how programs and policies will have different implications for men and women (Leite, 2010). The water needs of men and women are often different and, in Brazil, economic and social power are dominated by men, leaving women's interests to be largely overridden in rural communities where water is scarce (Leite, 2010). Economic and politically driven scarcity has become a primary obstacle for many Brazilians, as power remains in the hands of men and national policy does little to counteract this. However, some smaller efforts in Sao Joao D'Alianca and Sertao Central have shown that when there is a conscious effort to give women leadership positions, water has been more equitably managed. Fostering women's active participation is, therefore, expected to improve the efficacy of Brazil's national water and sanitation policy (Leite, 2010). Brazil's case is important as it highlights the role of national policy in ensuring equal access to water.

Brown (2010) makes a similar argument in relation to water policy in Tanzania, where water privatization has become a national discussion. She argues that the Tanzanian government has to make a more concerted effort to ensure access to water as a human right (Brown, 2010). Privatization, she argues, has not improved access for poor women and girls. Consequently the state should work to implement a water policy that takes a human rights approach to guaranteeing access to safe, accessible, and affordable water for every man, woman, and child (Brown, 2010). The Tanzanian case is interesting, and builds upon the idea of women as a social group facing challenges often perpetuated by national policy.

While there continue to be significant challenges related to gender and water on a national level, there have been cases where progress has been made and lessons for best practice can be learned. Building on the argument that water privatization has had negative impacts for women, the case of the Bolivian water wars is an important one. This case demonstrates how social movements can empower women to change their national context. The water wars took place from November 1999 to April 2000, when women in Cochamba, Bolivia initiated a social movement in response to their dissatisfaction with the government's water policy. In just

six months, they trigged a real change, in which women took on more leadership positions and promoted a more equitable gendered perspective (Laurie, 2011). The result of this movement was the overthrow of a newly privatized water company and the consequent easing of gender imbalances with regards to water in the region (Laurie, 2011). The class-consciousness displayed in the Bolivian case illustrates an important lesson for best practice: the power of a unified and progressive stance can lead to action that improves equality in water use and water management.

A different case of positive progress in water policy reform can be found in Zimbabwe. Mainstreaming gender at the ministerial level in Zimbabwe has been a considerable part of a water sector reform program that began in 1995 (Manase, Ndamba, & Makoni, 2003). Two of the program's goals were to broaden women's access to water and to enhance their participation in water management. While the progress has not been entirely successful in creating a gender sensitive water management scheme, this case illustrates important ways in which national policies have attempted to integrate gender issues (Manase, Ndamba, & Makoni, 2003). The Zimbabwean national policy was successful in its mandate to achieve gender equity, and made goals that addressed unequal access to water as well as encouraged all stakeholders to be more participatory (Manase, Ndamba, & Makoni, 2003). To be certain, these goals are admirable and are illustrative of a desirable national policy; however, Zimbabwe's government fell short by failing to reach these goals through the active participation of most poor men and women and by failing to address strategic gender needs. Lessons for best practice can be taken from the willingness to mainstream gender and the continued commitment to do so. The Zimbabwean case exemplifies a move toward increased awareness and fewer obstacles to discussing and implementing gender provisions in national policy and that represents an important step forward.

Part Three: Gender and Water at the Local and Household Level

The relationship between gender and water is particularly relevant at the local and household level in the Global South. Unfortunately, the household is also the most complicated site of intervention, and it is unclear if other interventions – including those at the local level – have any effect on household norms (Panda, 2007). In particular, water management at the local level is far more driven by traditional gender roles and expectations than are regional or national policies. Consequently, it is necessary to focus on the ways in which gender roles within the familial, household structure impact the distribution of water management tasks.

In most parts of the Global South, women are less likely to have rights or ownership over resources, including water. As this is both an indicator and an underlying cause of inequality, it has led to recent moves by many states to give resources back to local groups and communities. The hope is that this will allow cooperatives and associations to compensate for some of the state failings that have happened in recent years. As decentralization often opens doors for women, feminist and mainstream water management scholars generally view this trend in a positive light. It also leads to women promoting both social and environmental sustainability through their role as key users (Zwarteveen and Meinzen-Dick, 2001). Unfortunately, this is still not a complete fix: both those scholars like Shiva, who view women as symbolic keepers of the Earth ("gender and environment"), and those who are more development focused ("participation") agree that privatization and nationalization of land ownership generally favours men. Worse, since land has only been divided as such since colonial times, these practices now have some degree of historical legitimacy (Zwarteveen and Meinzen-Dick, 2001).

This problem is compounded by the fact that women and men have different uses for water. Makoni et al (2004) surveyed 16 villages in Zimbabwe and found that men and women rank uses and priorities for water differently. In keeping with their role as local managers of water, men prioritize clean drinking water; on the other hand, women tend to prioritize reducing the distance necessary for water transport and improving health and hygiene, which reflects their role as managers of household water and family hygiene (Makoni et al., 2004). However, despite the fact that women generally transport, use, and dispose of far more water than men, it is the men's priorities that have tended to take precedence. This is partly due to the patriarchal tendencies of traditional societies in the Global South, and partly a result of the 'managerial' role that men maintain.

There is also some complication created by the fact that there is no clear consensus on just what the exact role of gender should be, in terms of water projects. Over the years, water projects have focused on different aspect of gender involvement, with mixed results. For example, some projects have used participation methods, where the water knowledge of both genders is collected to better the project. Other projects have focused on efficiency, by incorporating women as a means of garnering free labour for the project. Only occasionally has there been true gender empowerment resulting in lasting social change through the participation of women in water projects (O'Reilly, 2006). Ultimately, the most common driver in most situations is simple economics: as water becomes commodified, women move from household caretakers to village level participators and modern consumers (O'Reilly, 2006). However, this change does not necessarily represent progress, as women remain consumers, not managers, and modernization serves to crystallize, not alter, the underlying gender imbalance. This runs counter to modernization theory, which enshrines the ideals of women's empowerment and the restructuring of inherently disadvantaged traditional systems.

There are numerous lessons for best practice that can be taken from examples at the local and household level. Gender sensitivity has often meant involving women in water projects and in management institutions such as community water committees, but it is also clear that this is no panacea (Cleaver & Hamada, 2010). For example, at the local level, hierarchies among women mean that even when interventions are aimed at women, they are not necessarily meeting the needs of all women. When high caste women in India are on water committees to represent marginalized women, they frequently meet the needs of just their social class rather than those of all women, and may even deliberately exclude the poorest caste, the Dalit (Cleaver & Hamada, 2010). From this example, we learn that perhaps gender sensitive water policies are not enough unless accompanied by an understanding of the wider social structure.

In order to understand how to intervene at a broader level, it is imperative to understand how gender roles and expectations are created and negotiated at the household level among family members. In Peru, ethnographic studies of women illustrate the challenges relating to accessing and controlling water and land without the help of men. In the town of Coporaque, Lupe and Illa, two separated women struggle to get the water rights for their land, since local cultural norms dictate that even when women inherit land, it is typically registered to their husbands (Delgado and Zwarteveen, 2007).

One example of poor practice in the Hile Village of Nepal was in the construction of tubewells and tapsands right by a major road. Because women did not want to be seen bathing publicly, this project increased women's time fetching water and bringing it home to bathe by hours simply because they were not consulted on location or design (UN, 2005). This example shows that without minimal consultation, projects frequently fail.

Meanwhile, there are also true local successes. In El Salvador, Watersheds and Gender a CARE project helped to not only incorporate women into water management, but to empower them. They trained women as managers of small companies, and to be leaders and sit on boards. They gave them the technical knowledge to fully participate and speak in water discussions (UN, 2005). This is a great example of women's empowerment through water management.

Additionally, men and women have different tasks and perspectives at the household level. Domestic water provision, particularly in household farming systems, remains a key gender issue and women and men experience this household economic activity differently. Mens' roles frequently involve construction and maintenance of water wells, tanks, and reservoirs, while women bring water into the home. Obviously this is not true of all places. For example, in Punjab, Pakistan during canal closures water cannot be accessed locally, so men are responsible for biking and getting water from further away (Van Koppen, 2001). In the majority of developing areas however, women tend to play the bigger role in domestic water. One lesson from Punjab is that female-managed and dual farming systems can be a viable solution if the barriers to accessing land and water resources can be adequately addressed.

Part Four: Water, Gender, and Health

The importance of addressing the relationship between water and health as a gendered issue is so significant that it warrants a separate analysis. Particularly within the Global South, women often face obstacles in accessing water at the expense of their health. These health factors are often inherently gendered and, as a result, women are faced with health concerns that are directly and indirectly related to their access (or lack thereof) to water. Women have a unique experience with health issues due to the combination of biological differences and a male-dominated system of power relations.

Women's reproductive health care and menstruation are experiences that are uniquely feminine and have direct links to water. Women are also frequently constrained by social structures that define acceptable feminine behavior (Water and Sanitation Program, 2010). For instance, social pressures often relegate women to defecating only before dawn and after nightfall to maintain privacy (Water and Sanitation Program, 2010). As such, women often drink and eat less during the day, which can lead to other health problems (Water and Sanitation Program, 2010). Furthermore, women in the global South are often tasked with the collection of water and providing for the household which can cause indirect health effects such as stress and injury due to travelling long distances for water collection (Stevenson et. al., 2012). These women's health realities are shaped by policy decisions and systemic social norms that are influenced by every level of management and therefore require a discussion that crosscuts these various levels.

One of the most pressing concerns facing women and girls is having access to water and sanitation services to manage menstruation in a hygienic and dignified manner (Mahon & Fernandes, 2010). The needs of menstruating women have been neglected by the dominant water, sanitation, and hygiene development sectors, which are often brought together as WASH (Water, Sanitation, and Hygiene) (Mahon & Fernandes, 2010). While WASH programs have acknowledged the link between access to water and sanitation and achieving health development goals, women and girls have often been excluded from meaningfully participating in decision-making processes and the management of programs (Mahon & Fernandes, 2010). By not being able to participate in WASH programs, millions of women and girls struggle to realize their rights to gender equality, education, health, and dignity (Mahon & Fernandes, 2010). Focusing WASH projects on menstrual hygiene can significantly contribute to achieving global health targets and WaterAid in India is an example of how this can occur.

In 2007, WaterAid site visits resulted in the realization that women and girls in rural India were being denied access to communal sanitation services during menstruation, and there was a lack of feminine hygiene products (Mahon & Fernandes, 2010). Consequently, WaterAid collaborated with regional NGO partners to assess prevalent local beliefs, behaviours, and the prevalence of diseases related to poor menstrual hygiene (Mahon & Fernandes, 2010). The results of the assessment concluded that approximately 14 percent of women reported suffering from menstrual infections, 89 percent of women used cloth for the absorption of menstrual blood, and the majority of respondents gave responses that reflected a lack of correct information that was influencing how menstruating women could manage their hygiene (Mahon & Fernandes, 2010). WaterAid then worked to develop community strategies that attempted to reduce the stigma surrounding menstruation and raised the level of discussions on menstruation while also empowering women to access community self-help groups that help women learn about themselves and their unique health and sanitation needs (Mahon & Fernandes, 2010).

This initial work has led to all participating NGOs to formally include menstruation in their WASH efforts (Mahon & Fernandes, 2010). WaterAid has since integrated menstrual hygiene within their Indian programs at various levels while targeting different groups including men and boys (Mahon & Fernandes, 2010). This WaterAid initiative is an exemplary model of how to address menstrual hygiene within WASH projects. WaterAid was effective in opening up a dialogue that improved women's health while working to reduce the stigma and shame that has been associated with menstruating women and girls.

The WaterAid case study is illustrative of the need for best practices to be active in local communities. As an example of best practice, this action-based case is an important model for development project. Best practice, however, can also be found through researching new ways to understand how women experience water scarcity and what that means for their health. In Ethiopia, women have been found to suffer psychosocial distress due to the stress water insecurity (Stevenson et al., 2012). One study was concerned with how women's experience with water scarcity influenced their mental health in addition to the largely emphasized impacts on physical health. Stevenson et al (2012) established that most Ethiopian women were responsible for collecting water. This task increases the likelihood of women experiencing greater physical and health problems than men.

The longer distances women travel to access water, the use of heavy earthenware containers, and the rugged terrain make water collection an extremely physically demanding task. When water is scarce, women's health risk is increased (Stevenson et al., 2012). The study found that while women were still at risk for physical health issues, women who experienced water insecurity challenges reported more symptoms of common mental disorders (Stevenson et. al., 2012). This type of research into quantitatively conceptualizing and scaling water insecurity experiences in cultures is warranted to measure and predict the effect of water insecurity as has been done more widely for nutrition interventions to measure effectiveness.

Discussion and Recommendations

Discussion

As has been evidenced through the discussion of numerous case examples, there are important differences in how men and women are expected to use and manage water. This difference in behaviour is attributed to the decisions made by people, most often men, who have been given social and structural power. The case examples shown throughout this chapter are indicative of how entrenched this power system has become. The case studies were chosen as they illustrate how the roles and behaviours of individuals are defined within a gendered and inherently unequal framework. As a class of people, women have been defined in relation to men in a way that has negatively influenced how women are able to access and manage water for their optimal use. This construction of women as domestic labourers and caretakers has resulted in women being cyclically relegated to these tasks and being largely excluded from any formal management or leadership positions. It is important to note, however, that men are also defined by the construction and dissemination of normative gender roles. Within this chapter, the case examples have illustrated how men and boys have been largely defined as the breadwinners and, therefore, have been given a managerial role in establishing how and when water is used. As such, men have been responsible for many of the large decisions made at each socio-political level. This expectation placed on men can be just as limiting as the constructions of gendered behavioural norms that define women.

While these gender norms have been entrenched in the foundation of each socio-political level, this chapter has emphasized how incorporating a gender-sensitive analysis to water management policies can improve how women, and men, interact with water. At each level, there have been examples of how this gender imbalance is beginning to be addressed. While there is still a long way to go, each case study illustrates the ways in which progress is being made. Highlighting these examples is imperative to continuing progress toward mainstreaming gender in water resource management circles, since by opening up a dialogue, a new discourse can form.

In addition to the socio-political divisions, this chapter has emphasized how women are often removed from discussions entirely and their gender-specific needs are largely ignored in water policy development. The focus on women's health in relation to water reflects the manifestation of multiple sources of exclusion on women's experience. The cases discussed within this section emphasize how the experience of women can be vastly improved by the mere consideration of how women need water in a different way than men. Furthermore,

by including men and boys in the education of health needs and how access to water impacts health, the stigma and ignorance surrounding women's health issues can dissipate.

The focus on emphasizing examples of best practice throughout this chapter has made a gap in existing literature identifiable. Much of the current literature pertaining to gender issues in water use and water management conceptualize the relationship as problematic, yet, do not frame these challenges as opportunities. In order to effectively and progressively address the deeply-rooted, systemic, and cyclical nature of the power dynamics which shape the ways men and women access and use water, a new discussion that promotes what is working and why these efforts are effective must develop.

Recommendations

The importance of such a discussion of gender and water is, ultimately, to draw out examples of best practice and determine how to move forward from here. The recommendations herein have been categorized in terms of the major sections identified in this paper.

Global:

Given that the majority of water policy decisions occur at the regional level and below, there is no single specific policy that should be enacted at the global level. Rather, existing international forums should take a leadership role in gender equity by expanding their current levels of support, promoting the creation of linkages between existing networks, creating further forums, and emphasizing gender equity whenever possible.

National:

Best practices at the national level are highly dependent upon regional gender and economic norms. In those areas such as Yemen, where gender equity is all but nonexistent, almost any policy encouraging a more balanced approach to gender and water would be beneficial; in those areas such as Brazil, where development is progressing apace and the gender gap is closing rapidly, policies need to be more specific. Generally speaking, all nations should further the best practices mentioned at the global level: encouraging dialogue, establishing forums, and promoting internal equitable access to water for both genders whenever possible.

Local and household:

Because local interventions are generally the most feasible and the most successful, more attention should be paid to best practices at this level. An obvious first step is the inclusion of both men and women in decision-making. Zwarteveen and Meinzen-Dick (2011), found that often one of the challenges in determining rights and access over time is a lack of documentation tracking gender and socio-economic information. In many instances, simply collecting this type of information would do much to accurately identify what the differences and challenges truly are. Furthermore, since water intervention policies are necessarily data driven, these collection practices can help policy makers drive broader intervention strategies at both the regional and national levels.

Health:

Given the inextricable linkages between public health and clean and accessible water supplies, the establishment of gender equity in water policy is of particular importance. Currently, there are a number of interventions being undertaken, and they all have some merit. However, many of these practices overlook the fundamental differences in the water needs of the two genders, and they especially overlook the additional personal needs that women have for clean water due their unique physiological demands. With this in mind,

the recommended best practice in this area is to balance gender norms with personal needs. Particularly, it is necessary to take into account the additional burdens that water frequently imposes on women, such as the need to transport water long distances, the risks entailed in that travel, and the stress and psychological burdens created by being forced to work in a framework that does not take their needs into account. These hurdles need to be overcome at all levels, but the first step is most easily enacted at the local level and public health levels.

Furthermore, there is also a need for data. Rather than discuss a specific best practice, it is more important to recognize that there is a need to quantify water insecurity experiences in cultures to predict the effects of water scaling. This type of research into quantitatively conceptualizing and scaling water insecurity experiences in cultures is warranted to measure and predict the effect of water insecurity, as has been done more widely for nutrition interventions to measure effectiveness.

Conclusion

Although women and men interact with water in different ways and at different times in water use and water management processes, water resource management has generally failed to compensate for this fact. Instead, men have held disproportionately dominant roles, while women have frequently been shut out of the process and suffered the worst consequences of mismanagement. All this, despite the fact that women utilize and manage most water resources at most levels in those societies. These imbalances are indicative of deeply rooted, systemic power relations that have significant implications for the ways in which the resource is handled.

Fortunately, there are opportunities to change the systemic problems. At the global, national, and local levels there are interventions that are effectively creating systemic change that can be adapted and replicated to other contexts. The example of WaterAid's menstruation intervention in India demonstrates how one good idea can be multiplied. Ultimately, there is potential for sustainable global change in the gendered dynamics of water management with a comprehensive action plan and understanding of what has worked.

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Chapter 25

Seeing 'Invisible Water': Green Water in Agriculture and Food Production

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Abstract

During the second half of the 20th century, the world population has dramatically increased, agriculture has doubled in terms of food production and developing countries are increasing per capita food consumption by 30 percent. The issues of food security, food production, agriculture and water security have all gained global attention. As the demand for water for food production and agriculture increases and there is concurrently a general increase in competition for water, how to manage the intense relationship between water and agriculture needs more attention. The discourse for water and agriculture must broaden and begin to explore new explanations and perspectives on water and agriculture; more specifically, the productivity of green water. How we think about green water and productive green water is important. Green water is commonly defined as the sum of the amount of water that has evaporated from the soil, plus the amount of water that has transpired through a plant. Furthermore, evaporation is considered non-productive, whereas transpiration is considered productive green water. This paper argues that this perception and definition of the productivity of green water is problematic, and that the productivity of green water is not just a biological physical process. This paper argues that the productivity of green water is subject to human intervention, and that humans play a large role in determining when green water is productive and when it is not; it is determined by a holistic system involving plant physiology, climates, agricultural practices, crop choice, governance, and international trade. The understanding of green water is the basis for agriculture and food production. The occurrence of droughts and famines has not decreased in recent history, perhaps proving that it is time for an introduction of new definitions in the discourse. This paper presents a novel conceptualization of green water productivity, in which the actions and choices of humans are inextricably linked.

Introduction

During the second half of the 20th century, the world population has dramatically increased, agriculture has doubled in terms of food production and developing countries are increasing per capita food consumption by 30 percent. The issues of food security, food production, agriculture and water security have all gained global attention. As the demand for water for food production and agriculture increases and there is concurrently a general increase in competition for water, how to manage the intense relationship between water and agriculture needs more attention. Unfortunately, the discourse on water for agriculture (currently caught within 'the nexus' of food-energy-climate-and-water-security) places inordinate emphasis on freshwater availability defined largely as run-off and easily accessible groundwater. For Falkenmark and Rockstrom (2004), this constitutes a 'blue water bias' as well as a 'water blindness', for why is it that all of our systems are based on about 14% of all the rain that falls on land and turns into run-off? What about the other 86%? In our view, achieving food security – particularly across the arid and semi-arid regions of Africa and South/Central Asia – requires new thinking regarding resource availability and the uses to which that available resource shall be put. The discourse for water and agriculture must broaden and begin to explore new explanations and perspectives on water and agriculture; more specifically, the productivity of green water.

Green Water

Green water is commonly defined as the sum of the amount of water that has evaporated from the soil, plus the amount of water that has transpired through a plant (Falkenmark and Rockstrom, 2004). In this definition, evaporation is considered non-productive, while transpiration is considered productive green water. This paper argues that this perception and definition of the productivity of green water is problematic, and that the productivity of green water is not just a biophysical process. This paper argues that the productivity of green water is subject to human intervention, and that humans play a large role in determining when green water is productive and when it is not; it is determined by a holistic system involving plant physiology, climates, agricultural practices, crop choice, governance, and international trade. The understanding of green water is the basis for agriculture and food production. The occurrence of droughts and famines has not decreased in recent history, perhaps proving that it is time for an introduction of new definitions in the discourse. This paper will present a new, holistic definition for the productivity of green water, in which the actions and choices of humans are inextricably linked.

Continuity and change

When it comes to food production and consumption, and sustainable agricultural production, most of the human-related factors are constant irrespective of where the crop is grown or where the livestock are grazed. Farmers are the same everywhere. They are interested in access to land and water, pest and disease management, drought and flood mitigation and control, and increasing yields either for own consumption or for sale in the marketplace or most often, both. Pastoralists, too, are the same: they are most interested in the health of their animals, access to water and grazing land and mobility, i.e. the ability to move their animals with the shifting seasons. Men are also all the same: obsessed with technology and control. Consumers are all the same: cheap food of good quality when and where they want it and to their taste. Capitalists, especially financial capitalists, involved at every stage of the global food chain are all the same: profit before people. However, the biophysical conditions are not the same. Many parts of the world have bimodal or trimodal rainfall regimes. Rather than the relatively constant precipitation that falls across the temperate zones, the tropics see a great deal of rainfall over a very short period of time. The tropics are areas of high evaporative demand, although during the rainy season this demand may in fact be quite low. Their soil profiles too are quite different from temperate zones. Yet these areas have inherited European ways of seeing water and doing something with it.

States also differ quite dramatically. Whereas the United States and the European Union protect their farmers, advance their interests globally, and push an offshore neoliberal agenda, African states, keen to avoid urban unrest, generally protect their consumers as well as their elites. As is well known, these elites control the land and what is grown on the land is often destined for overseas markets. Put differently, while Western democracies are turned inward (with 14-20% of their GDP generated by exports), African states are extroverted, deriving the vast majority of their often meager revenues through the exportation of what Mazrui (1986) long ago labeled 'beverage economies'.

All of these factors combine as food security for the few, food insecurity for the many. What to do? In our view, at minimum we must start with a new way of thinking, in particular of the relationship between rainfall, biophysical location, and evaporative demand, i.e. we must concentrate on achieving a vapour shift: encouraging infiltration at the point where the rainfall hits the soil, so that water is available to plants in their growth cycles. Moreover, we must also think about what sort of plants we are growing, where, when and why, if we are truly to achieve food security locally and globally.

'Productive' and 'Non-Productive' Green Water

The terms productive and non-productive green water[1] are understood as a differentiation between

transpiration and evaporation. This definition may lay a firm starting point for understanding how water is cycled through the Earth's atmosphere, but in doing so, can limit one to viewing water productivity as based solely on a biological, physical process. There is growing recognition today of how the productivity of water can be influenced by human intervention, as revealed by talks of vapor shift – the conversion of non-productive evaporation losses into productive transpiration – amongst water experts. Specifically, humans can increase the ratio of transpiration to evaporation based on their decisions and behaviors: ranging from what types of plants are selected to be grown in certain climates, to the farming practices utilized in the cultivation of crops to achieve higher yields. Larger actors' decisions, such as those made by government or private business involved in international trade, exert a particularly heavy influence in determining how 'productive' water is utilized in the agricultural sector. Regardless of the extent new and wiser decisions improve water utilization by humans for food and agriculture, though, management of water must also take into account the key role water plays in maintaining the health of ecosystems for interrelated services (e.g., maintaining species diversity). To address the limitation of their current definitions, then, this paper presents slightly more nuanced definitions of productive and non-productive green water, by recognizing the direct influence human behaviour has on green water productivity, and the balance that must be struck between humans and ecosystems over water utilization.

Toward a Holistic Definition

Humans exert a powerful influence over the quantity of water that is directed towards various means. Technological advancements have enabled the damming, diverting and draining (Conca, 2006) of entire water bodies, thereby controlling how much, to where, and to what end uses water should serve. What water is used for, though, is highly politicized, rendering it to flow towards means that do not always consider environmental impacts, or utilize the resource efficiently nor in an equitable way for all peoples. A confession to be made at this point is that the definitions to be presented regarding productivity of water are thus value-laden, whereby the authors believe water as a human right should take precedence over its use as an economic good. Furthermore, by framing this paper within the context of water for food and agriculture, productive and non-productive green water will be defined accordingly.

The new proposed definition to **productive green water** retains the notion that water is transpired through vegetation, but asks the question 'what sort of vegetation, for what benefit and for whom?' This definition requires green water to be used efficiently in the production of food and agricultural products *that are physiologically-suited to the climatic zones which humans decide they should be grown in*. In other words, it is not enough to say green water is productive if it transpires: the *water use efficiency (WUE[2]) in growing a product should be both considered and maximized*, and this is more likely to be realized if a plant is cultivated in the naturally-occurring climate to which it is adapted. Other human factors which contribute to increased WUE are the choice of irrigation methods (e.g., drip irrigation), or the time of year in which crops are grown. Indeed, shifting planting periods to cooler periods of the year can produce a higher transpiration to evaporation ratio (Sinclair, Tanner & Bennett, 1984: 37).

[1] Green water is defined by Falkenmark and Rockstrom (2004, pp. xxii) as vapor flow from infiltrated rainfall. It is considered the 'invisible' flow of vapor to the atmosphere, in contrast to the 'visible' blue water flow which comes in the form of rivers or surface runoff. This green water flow can be further divided into productive and non-productive flows. Productive green water is the portion which contributes directly to biomass growth. Specifically, this green water infiltrates the earth to form the soil moisture in the root zone of vegetation, and is there taken up by the plants. This water eventually returns to the atmosphere by transpiration. Non-productive green water, in comparison, is the evaporation of water from foliage, open water, or soil moisture that is not absorbed by roots. Together, the productive and non-productive flows of green water can then be coined with a single term: evapotranspiration (Falkenmark & Rockstrom, 2004, pp. 6).

[2] Water use efficiency (WUE): a ratio of biomass accumulation (expressed as carbon dioxide assimilation, total crop biomass, or crop grain yield) to water consumed, expressed as total water input to the system (Sinclair, Tanner & Bennett, 1984, pp. 36).

By asking what sort of biomass is produced through green water productivity, we are encouraging debate regarding the best use to which not only green water, but blue water is put. As an example, while growing oranges and lemons in the desert may demonstrate state power to hostile neighbours, it is an unsustainable way to use blue water. When these fruits are produced mainly for export, unsustainable practices are then simply foolish, as a dry country chooses to export its water to countries with more stable flow regimes (Allan, 1998). Food security should begin with growing crops for local human consumption, before, say, maize for biofuel production. In an era of climate change, where hydrological cycles are unpredictable and perhaps destabilized, it makes far more sense to grow drought resistant crops in arid environments based on vapour shift – i.e. concentrating on where the raindrop hits the soil – as opposed to engaging in expensive blue water engineering projects for sugar cane or wheat or cotton production, thereby tying national economies into virtual water dependency relations. Finally, the water that is utilized through the pursuit of growing food and agricultural products can only be categorized as productive if its share of the green water *flow considers the sustainability of the surrounding ecosystem*. This includes ensuring that sufficient water is left available for ecosystem services (e.g., for groundwater recharge), or that the water is not utilized to grow invasive species, or to cultivate plants which degrade the soil.

Whereas Falkenmark and Rockstrom (2004) define **non-productive green water** as water that evaporates, we prefer to treat evaporation separately (as even evaporation processes may perform ecosystem services). In our definition, non-productive green water is that which transpires but either (i) negatively impacts the environment through, for example, invasive species; or (ii) involves the commandeering of blue water for large-scale, non-food purposes that may involve a bio-engineered plant that would otherwise be unable to grow where it is (e.g. cotton in the arid Syr Darya and Amu Darya basins; or (iii) is devoted to cash crops that benefit only a few individuals while enslaving an entire population in its production (like much of the cash crops grown across the tropics). In Table 1 below, we put forward some possible criteria for defining green water as either productive or non-productive.

Table 1. Some Possible Criteria for Productive and Non-Productive Green Water

Productive Green Water	Non-Productive Green Water

• **transpires through vegetation**
• **maximizes transpiration, or water use efficiency (WUE), in growing an agricultural product**
  ◦ is used to grow plants in climates they are physiologically-adapted to
  ◦ is used in efficient irrigation methods (e.g., drip irrigation)
• **is used first as a human right, to meet basic needs, before an economic good**
• **contributes to the sustainability of the ecosystem**
  ◦ ensures ecosystem services are maintained with sufficient amount of water
  ◦ is not utilized to grow invasive species, or to cultivate plants which degrade the land
	• **transpires through vegetation**
	• **does not maximize WUE in growing an agricultural product**
	  ◦ is used to grow plants in climates not suited to their physiology, thereby creating a higher water input
	  ◦ is used in inefficient irrigation methods which lead to high evaporation rates, particularly in commercial agriculture
	• **is diverted towards economic gain before addressing human needs**
	• **compromises the sustainability of the ecosystem**
	  ◦ is utilized in activities which do not leave a sufficient amount of water for ecosystem services

When an agricultural product is grown in a region not suited to its physiology, the environmental preconditions - such as droughts or evaporative demand of the climate - can pose a huge limitation to its yield size (Falkenmark & Rockstrom, 2004: 140). Overcoming this barrier would thus require a much larger

input of water than if it were cultivated in a region where it naturally grows. This can be seen as an example of non-productive green water. Worsening this problem is the potential of human intervention to influence the severity of these environmental preconditions. For example, behaviors related to poor soil management or irrigation practices (e.g., sprinkler irrigation), can lead to excessive soil compaction, which results in limited root expansion (lessening transpiration) and a higher evaporative demand (Falkenmark & Rockstrom, 2004: 34). Green water is also considered non-productive when it serves economic interests before meeting basic human needs. This can be exemplified by the capture of water by business interests to grow cash crops in a region where food availability is low. Last but not least, non-productive green water is that whose use compromises the sustainability of ecosystems. As humans continue to attempt increasing vapor shift to ultimately increase agricultural yields, they must remain conscious of the water trade-offs between water for food and nature. Indeed, water use efficiency and transpiration may increase with better management and wiser decisions, but this increased water use for agriculture may negatively affect water dependent ecosystems further downstream.

Food Security in relation to Green Water

It is important to begin this section by first defining food security, and then differentiating it from food self-sufficiency. According to the Food and Agriculture Organization (FAO) of the United Nations, food security is "a situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life" (FAO, 2002). Food self-sufficiency, alternatively, is the extent to which a country can satisfy its consumption needs from its own domestic production rather than through purchases or imports (Thomson & Metz. (1999). Since this paper includes the use of water in both food and agricultural production (e.g., cotton grown for money, which is then expended on imported food, possibly even processed foods containing cottonseed oil), food security, rather than food self-sufficiency, is the issue to be addressed through improving the productivity of green water.

Green Water for Food Production

Currently, around 1200 m^3/person/year of green water flow originates from rainfed food production (Falkenmark & Rockstrom, 2004: 69). When the expected population of 2050 is brought into the picture, the amount of water required to produce sufficient food for the world is estimated to range between 8,500 to 11,000 km^3 per year (de Fraiture *et al*., 2007). Where this additional water is to come from becomes a controversial topic when trade-offs between ecosystems dependent on green water are included in the picture. Yet even before the massive population growth expected is taken into account, the current existence of a perverse number of people living in situations of food insecurity suggests a potential problem of food production in particular regions. Upon closer examination of semi-arid and dry sub-humid regions, one will also see a high prevalence of malnutrition, as the success of legume growth is highly vulnerable to water availability.

Green water plays a prominent role in the production of horticultural crops, specifically, through rainfed agriculture. There is a misconception that the majority of the world's food is produced through blue water withdrawal by irrigation, since 90% of direct water needs are used to produce food, but in reality, most food is produced with rain at the point where water hits the soil. Indeed, 80% of cropland on a global level is rainfed, with rainfed agriculture contributing to 60-70% of world food crops (Falkenmark & Rockstrom, 2004: 67). With food production's high dependence on rainfed agriculture, then, water management must not be quick to overlook this form of agriculture and focus solely on how best to increase yields through hydraulic-mission-style commercial farming, as is currently the norm across much of South Asia (Allan, 2004). With the multiple ecological, political, and economic limitations of enlarging large-scale irrigation at a global level, rainfed agriculture is here to stay.

Despite popular belief, much research has shown that it is not water scarcity due to low cumulative rainfall

that is to blame for crop failure. Rather, it is the poor distribution of rainfall over time that hinders crop yields (Rockstrom, 2000). In tropical and sub-tropical regions, the climate tends to alternate between dry and wet seasons. Within these regions, are semi-arid zones where rates of evapotranspiration tend to be higher than precipitation: i.e., a majority of the water that falls evaporates immediately, or simply runs off, leaving little to none for infiltration into the soil. Worsening the situation are man-made disturbances to the land surface: conventional agricultural practices, such as inappropriate tillage, can compact the soil, lowering the ratio of how much water is infiltrated versus that which becomes surface runoff (Falkenmark & Rockstrom, 2004: 34). With decreased infiltration, the amount of water necessary for the most crucial times in crop growth – germination, flowering, and filling – is compromised. Ultimately, management of water resources for food must take into account these environmental pre-conditions. Proposed solutions to meet the water demand of feeding an immense population have included vapor shifting green water in present cropland, adding more local water to crops through supplemental irrigation, and capturing surface runoff generated from adjacent non-agricultural land (Falkenmark & Rockstrom, 2004: 62). In all situations, the water utilized must be productive: maximizing efficiency by producing more crop per drop, while maintaining the surrounding ecosystem.

Defining C3 and C4 Plants

According to academia, all water that is absorbed through the root system of plants and consequently transpired through their leaves is considered to be productive green water. There is a linear relationship between a plants transpiration level and the amount that it grows (Falkenmark & Rockstrom, 2004: 51). However, different plants require varying amounts of transpiration in order to reach their full potential and productivity (Falkenmark & Rockstrom, 2004: 51). Requirements for a plant to reach its full productive stage is further complicated by how it takes up carbon dioxide, as well as whether or not transpiration occurs continuously or intermittently, and what ecosystem the plant is growing in. These differences dictate the classification of a plant as either a C3 plant, or a C4 plant, and knowing the classification of various plants, and how they interact with the water and carbon dioxide surrounding them, can make a great deal of difference in knowing what plants will be naturally more productive, in terms of their yield, and will be more water efficient, in particular climates.

C3 crops are physiologically designed to be most productive in temperate climates. In temperate climates the vapor pressure difference between the interior of the plant's leaf and the surrounding air is high. There is more moisture in the interior of the leaf compared to the surrounding air. As a result, the stomata in the leaves are constantly open and moisture from within the leaf is escaping to the external atmosphere. A consequence of having the stomata open continuously is that the C3 plant is able to take in carbon dioxide continuously, resulting in continuous transpiration within the plant. The physiology of C3 plants is designed to be able to handle continuous carbon dioxide intake and transpiration (Falkenmark & Rockstrom, 2004: 52).

C4 plants, comparatively, are physiologically designed to be most productive in tropical climates. In tropical climates the vapor pressure difference between the interior of the plant's leaf and the surrounding air is similarly high, except that there is excessively more moisture in the surrounding atmosphere compared to inside the plant's leaf. As a result, the stomata in a C4 plant's leaf will open and close, and carbon dioxide in-take and transpiration will occur intermittently (Falkenmark & Rockstrom, 2004: 52). Plant physiology matters and must be taken into consideration in order for sustainable agriculture and food production to be achieved.

Why Plant Physiology Matters: Climate and Irrigation

If crops are biologically able to achieve higher crop yields in particular climates and ecosystems, due to their plant physiology, then one would expect to find particular crops grown specifically in particular climate conditions; this however is not the case. In some cases, crops are genetically modified (GM) and their genetic material has been altered so that the crop is able to not only survive, but reach a high level of productivity in conditions that would not typically be natural to the plant species (Kvakkestad & Vatn, 2011, p. 524). Although

GM crops have enabled regions of the world to produce harvests that otherwise would be impossible, or would have low levels of productivity, they raise questions and issues about responsibility, legality, genetic property, and the modification of the species regionally and internationally. The choice to engage in the production of genetically modified crops, therefore, should be the decision of government, private sector and civil society (Kvakkestad & Vatn, 2011, p. 531), but this decision is another topic within itself. What matters in the differentiation between productive and non-productive green water, is primarily, whether the plant's physiology is suited for the climate that the plant is growing in, and therefore whether or not it is achieving maximum water productivity. If the plant's physiology is not designed for maximum productivity in the climate that it is growing in, then the amount of water that it consumes, minus the amount of rainfall that it consumes, must be examined. Furthermore, the methods being used to ensure that the plants have sufficient water must also be examined, because of the great variety of water provision/ efficiency techniques and methods, some are not only more sustainable than others, but some are more productive than others in terms of productive green water. To illustrate this point, we will look at the example of global cotton production, and more specifically cotton that is grown in Uzbekistan.

Cotton is the most important and heavily used fibre in the global textile industry (Chapagain *et al.*, 2006, p. 187). Table 2 illustrates the main cotton producing countries of the world, the amount of water required by the cotton plant, in each country, in order for maximum cotton production, the amount of rainfall received, the amount of blue water required to supplement the rainfall and finally the percentage of the growing area of cotton that is irrigated (Chapagain *et al.*, 2006, p. 190). It is important to note that in this table 'blue water' is understood as the amount of water that the cotton crop will require in order to make up for a shortfall of rainfall; this water is provided as irrigation (Chapagain *et al.*, 2006, p. 191).

Table 2: Consumptive water use at field level for cotton production in the major cotton producing countries (Chapagain *et al.*, 2006, p. 190)

Table 3 – Consumptive water use at field level for cotton production in the major cotton producing countries

	Crop water requirement (mm)	Effective rainfall (mm)	Blue water requirement (mm)	Irrigated share of area* (%)	Consumptive water use		
					Blue water (mm)	Green water (mm)	Total (mm)
Argentina	877	615	263	100	263	615	877
Australia	901	322	579	90	521	322	843
Brazil	606	542	65	15	10	542	551
China	718	397	320	75	240	397	638
Egypt	1009	0	1009	100	1009	0	1009
Greece	707	160	547	100	547	160	707
India	810	405	405	33	134	405	538
Mali	993	387	606	25	151	387	538
Mexico	771	253	518	95	492	253	746
Pakistan	850	182	668	100	668	182	850
Syria	1309	34	1275	100	1275	34	1309
Turkey	963	90	874	100	874	90	963
Turkmenistan	1025	69	956	100	956	69	1025
USA	516	311	205	52	107	311	419
Uzbekistan	999	19	981	100	981	19	999

* Sources: Gillham et al. (1995), FAO (1999), Cotton Australia (2005), CCI (2005), WWF (1999).

Under the heading 'crop water requirement', in Table 2, the amount of water required for growth in each country is listed. This list indirectly indicates the relationship between the physiology of the cotton plant and the climate of the country. Globally, it is estimated that 198 Gm^3 per year of water is used for the production of cotton (Chapagain *et al.*, 2006, p. 189). Cotton is a C3 plant, meaning it is biologically best suited to grow in temperate

climates (Falkenmark & Rockstrom, 2004: 55), and the global consumption of water for cotton production is a reflection that water is not being used productively in the production of cotton. Globally, the ideal climates for growing cotton are found in the southern states of the United States of American and in the eastern states of Brazil, such as Paraná and São Paulo (USDA Economic and Statistics System, 2000) (Chapagain *et al*., 2006: 190), and the 'least attractive' climates for growing cotton are in drier climates such as Syria, Egypt, Turkmenistan, Uzbekistan and Turkey (Chapagain *et al*., 2006: 189). Despite having poor climates for high cotton production, based on plant physiology, all five are among the top cotton producing nations in the world (Chapagain *et al*., 2006: 190). Based on the misalignment of crop choice and climate, these five countries have to resort to additional water supplies (irrigation) in order to produce cotton; based on the criteria in determining whether green water is productive or not, this would be a factor towards it being non-productive green water. Although genetic modification is possible a possibility in these areas, based on the cotton crop water requirements, it is evident that transgenic crops are not being planted; if they were, the levels of water required by the cotton would be significantly lower, and the "crop per drop" would be higher.

Globally, approximately 53 percent of cotton fields are irrigated, and they produce about 73 percent of the global cotton production (Chapagain et al., 2006: 187). Considering this high statistic, it is important to examine further, what methods of irrigation are being used and what is the water efficiency of those systems; high water efficiency and water productive irrigation methods are important factors in productive green water, whereas irrigation methods which result in high levels of water loss, evaporation, salinity and waterlogging are factors of non-productive green water.

Irrigation not only increases crop production but it also stabilizes it, and this is why in the past three decades great investment from governments and private institutions have been made into irrigation methods (Smith, 2000: 100). Where irrigation systems are in place, there are high consumption levels of blue water for crop production (Liu & Yang, 2010: 192). For example, this is clearly seen in Uzbekistan, where 80 percent of farmers are mandated to grow cotton and winter wheat on the land that they lease from the government (Mohan Reddy *et al*., 2013: 133), despite the fact that Uzbekistan does not have a prime climate for the growth of cotton and thus must irrigate almost 100 percent of their cotton crops (approximately 4.3 million hectares) (Mohan Reddy *et al*., 2013:133). The main method of irrigation in Uzbekistan from about 1960 until about the late 2000's has been furrow irrigation. By the 1970's they were already experiencing waterlogging and salinity problems (Mohan Reddy *et al*., 2013). Furthermore, they were consuming huge quantities of water; this is a result of the fact that the government owned the land and leased it to civilians, on which they mandated they grown cotton and winter wheat. Then they provided bulk water, for free, to the Water User Associations (WUA) who then distributed the water to civilians who leased the land, for irrigation. Civilians were only charged a service fee, by the WUA, for supplying the water, and were charged based on the area of their crops and not the amount of water they actually used; thus farmers had no incentive to practice water efficiency or monitor their water consumption (Mohan Reddy *et al*., 2013).

Realizing that this was unsustainable, the Government of Uzbekistan has recently been encouraging improved methods of irrigation and water management (i.e. short-furrow irrigation, laser land leveling) (Mohan Reddy *et al*., 2013). Drip irrigation is slowly increasing in popularity and short furrow and alternate furrow irrigation are quickly becoming the dominant forms of irrigation (Mohan Reddy *et al*., 2013). Cotton being grown in Uzbekistan is a situation of a C3 plant being grown in a climate unnatural to the plant's biological physiology, but considering the fact that GM seeds are more commonly used the water involved in this green water scenario cannot be immediately classified as unproductive. Ultimately, there are other influencing factors that help to determine whether or not the green water is productive or not; two of those include the amount of water that is being captured and infiltrating the soil, and the water efficiency (productivity) (Rockstrom *et al*., 2010: 546). Therefore, as cotton production in Uzbekistan moves towards more water efficient irrigation methods such as drip irrigation, cotton production is taking steps from generating non-productive green water, towards productive green water. What remains to be considered in this case, however, is who benefits directly

from this high dependence on cotton production, and what sorts of societal and environmental vulnerabilities does it enhance?

Green Water Relationships in Crop Choice

Biologically, it is logical to grow certain crops in certain regions of the world, based on the scientific understanding of C3 and C4 plant physiology; and yet, there are many instances where crops are grown in climates that are not optimal for their physiology, and thus require irrigation, to make up for the lacking climates, for maximum production. The relationship between governments, private sectors and civil societies, to some extent, plays a substantial role in determining what grows where. According to plant physiology, a C4 plant such as cotton should be growing in a tropical region and yet one of the highest producers of it is the temperate climate country of Uzbekistan; so why is it grown there? Why is Brazil the second largest biodiesel producer (Bergmann et al, 2013: 412) in the world? And finally, why has Malawi become the "golden child" for successful maize production in the Global South?

Understanding why certain crops are grown in certain locations, sometimes involves looking back into history and the relationships that existed then. The history of Uzbekistan has resulted in it being one of the top exporters of cotton in the world today. When the Soviet Union collapsed, the State Agricultural Cooperatives collapsed as well, and the land which it used to own was distributed to individuals. The government, however, held onto ownership of the land, leasing it out to citizens for fifty year contracts. Today, 80 percent of land is mandated to grow strictly winter wheat and cotton, 20 percent are used to grow fruit crops and a mere 10 percent are used to grow household gardens (Mohan *et al*., 2013:133). The government has established Water User Associations, into which farmers are organized into 1486 Water User Associations. The government works through these associations to deliver water for irrigation, and to ensure that what is mandated to be grown, is grown (Mohan *et al*., 2013). In Uzbekistan, the government plays a large role in what is being grown.

Similarly, in Brazil, the government's relationship with farmers greatly influences what is grown. Brazil is a country with a variety of climates. In the Center West region of Brazil, the climate is ideal for growing soy, and for various reasons, the government of Brazil capitalized on this, increasing its soy production from about 1 million hectares in 1970, to about 23 million hectares in 2010 (Garrett, *et al*., 2013: 385). Brazil uses its soy crops for the production of biodiesel fuels. The push to increase soy production for biodiesel fuel production can be explained by looking at global economics, fuel security and international politics. In 1980, Brazil created the National Program for Vegetable Oil Production for Energy Purposes, which aimed to replace 30 percent of petro diesel with biodiesel fuel. Despite National investment into research on vegetable oils, the program was cut in 1985 after petro diesel prices dropped and petro diesel became more readily affordable (Bergmann *et al*., 2013: 413). In 2002, the issue of trying to replace petro diesel with biodiesel, due to high petro diesel prices, was reborn when the Ministry of Science and Technology created the program Probiodiesel. Probiodiesel not only aimed to replace a portion of petro diesel with biodiesel in response to high petro diesel import prices, but the investment in biodiesel would expand the market and would decrease Brazil's greenhouse gas (GHG) emissions; this step towards decreasing GHG emissions was seen as crucial as Brazil was a signatory country on the Kyoto Protocol (Bergmann *et al*., 2013: 413). In 2003 the Ministry of Mines and Energy created the Green Fuel Program whose goal was to create more farm jobs (Bergmann *et al*., 2013, p. 413), which would enable high production of biofuel crops. In 2004, arguably the most important program, was launched, the National Program for Use and Production of Biodiesel (PNPB), which aims at 'reducing Brazil's dependence on imports of petro diesel and to seek sources of renewable energy' (Bergmann *et al*., 2013: 413). It also encourages small and family farms to grow crops for biodiesel by offering special credit lines (Bergmann *et al*., 2013). Furthermore, biodiesel producers are given incentives to purchase biodiesel crops from these small and family farms by offering a 68 percent reduction in federal taxes. Also, producers can purchase oil from small and family farms at specific percentages, by participating in the Social Seal, which aims to ensure that both farmer and producer are experiencing a win-win transaction (Bergmann et al., 2013: 413). Today, the government of Brazil,

private companies, non-governmental organizations and universities, are collaboratively researching 'improved crop varieties, domestication of more exotic species, information about pathogens and [the] optimization of crop management practices' and are developing agriculture technology (Bergmann *et al*., 2013: 418, 414), in an effort to diversify their crops available for biodiesel, and develop biodiesel crops that are efficient and most productive within certain regions of the country. This is important because by being able to develop biodiesel crops that are specific to the climate and soil to one of the many climates of Brazil, the use for extensive and inefficient irrigation will be minimal; hence practicing the agriculture of productive green water instead of non-productive green water.

It is not possible however to increase acreage of crop production without enlisting the cooperation of farmers. In Brazil, this was done by offering special credit lines to farmers. Small farmers, globally, tend to be risk averse in their business decisions, as their operations face high levels of risk and uncertainty, such as, weather, insect infestation, crop disease and price fluctuation within the economy (Perret & Stevens, 2006: 470). Therefore, they need a guarantee in order to invest in something new, such as technology, or move in a new direction in terms of crop choice; credit is an example of a guarantee (Perret & Stevens, 2006). When governments engage in agricultural endeavors, such as Malawi's endeavor to increase food self-sufficiency, the 'guarantees' they put forth, such as offering vouchers for fertilizer and seed (Chibwana *et al*., 2012: 124), have great impacts on farmers, and in turn the overall crop production of the entire country; in Malawi, farmers were encouraged to focus on maize and tobacco (Chibwana *et al*., 2012). The vouchers for seed and fertilizer, which were meant to reduce risk for small farmers, in the end increased their risk over the long term as monoculture agriculture is highly vulnerable to climate change and variability (Chibwana *et al*., 2012: 125). Furthermore, with regards to food self-sufficiency, a lack of crop diversity, results in a lack of food diversity, and while the crop yields of maize may be able to satisfy the caloric intake of its citizens, it will not satisfy the full nutritional intake of its citizens.

Productive green water is green water that is used to satisfy the basic human needs, including food and income security, before it is used for economic gain by a limited number of beneficiaries. By this logic, one wonders whether green water in Uzbekistan and Brazil is productive, as cotton and biodiesel are grown for economic gain that may or may not enhance household (food and income) security. Similarly, is Malawi's water use productive green water because the maize that it grows aims to address food security and sovereignty for its people? At minimum, our conceptualization of 'productive green water' should initiate serious debates about best use and best practice in the policy making arenas of these countries.

The concept of productive green water is multi-dimensional. One dimension of this is that water is traded, and moves great distances, on a daily basis in the form of virtual water; the trading of food, clothes, timber etc. (Allan, 2004). While a country, like Uzbekistan or Brazil, may produce green water for economic growth, the extent and distance to which its 'virtual water' travels, will be a factor in determining whether or not the crops that it grows in country are productive or not. A country that produces green water for economic growth, and engages in extensive virtual water trade from the furthest distances possible, is an example of a country whose green water is, to some extent, unproductive, whereas a country who engages in agriculture for economic growth, as well as personal consumption and engages in geographically closer virtual water trade is an example of a country whose green water is productive.

Definition of Virtual Water

Virtual water is a relatively new concept, in terms of water utilization, in the food and agriculture sectors; water consumed in the production process of an agricultural or industrial product is called virtual water (Allan, 1998). For example, it has been estimated that to produce one kilogram of wheat, about 1000 liters of water are required. This concept was first introduced by Professor John Anthony Allan in the 1990s. Since then, it has received more and more attention from people concerned with water management and in particular with water

related to food production (Renault, 2002). Virtual water is also referred to as "embedded water" or "exogenous water", the latter referring to the fact that 'the import of virtual water into a country means using water that is exogenous to the importing country' (Hoekstra, 2003).

Hoekastra (2003) states that virtual water has a more precise quantitative definition through two approaches; the first approach, defines virtual water (from a production aspect) as the volume of water that is, in reality, used to produce the product. The second approach, which is from a consumption aspect, states that the 'virtual water of a product is the amount of water that would have been required to produce the product at the place where the product is needed' (Hoekstra, 2003).

The Value of Virtual Water in the Productivity of Green Water

According to Renault's (2002) research water requirements for food are the highest and 'it takes 2 to 4 litres per day to satisfy the biological needs of a human being and about 1000 times as much to produce the food' (Renault, 2002). Thus, the virtual water concept is important when discussing food and agricultural production and consumption, and it is also crucial that governments, the private sector and civil society will realize how much water, both endogenous and exogenous, is actually needed to produce different agricultural products

As Allan (1999) notes, food imports are "virtual imports" due to the fact that they are the equivalent of a transfer of water to the importing countries. Based on this definition, virtual water not only relates to food production and consumption but it is directly connected to the global trade of food and agriculture. 'International trade links the fortunes and resources of countries, providing potentially important conduits for geographically limited water resources to be transferred to water-stressed regions' (Konar *et al*., 2011). Generally speaking, virtual water trade consists of three types: international, inter-regional and intercontinental. Take international trade in virtual water for example, this kind of virtual water trade is conducted between countries. According to the data generated from Hoekstra and Huang (2002), the global volume of crop-related virtual water trade between nations was 695 Gm^3/yr on average from 1995-1999. Compared to water use for irrigation and total water use by crops, it was concluded that 13% of the water used for crop production was not used for domestic consumption but for export (virtual form). During that period, the top exporting countries were the USA, Canada and Thailand, and net virtual water import countries were Sri Lanka, Japan and Netherlands. Major global export crops, or major virtual water crops, are wheat, soybean and rice.

Virtual water as a part of the global agricultural industry, suggests that it is possible to transfer water, embedded in food, into other uses by not importing and exporting food crops with large amounts of virtual water (Renault, 2002), and that virtual water through food imports is a way to open national markets and ensure that appropriate use of virtual water is profitable (Allan, 1999). Furthermore, 'virtual water [can] help implement an approach of rural resource management, and redirect production to areas where the natural conditions are best to match efficiency as well as sustainability' (Turton, 2000).

To some degree, the virtual water concept provides water-scarce nations with the opportunity to achieve better food security by being able to knowledgeably select which crops should be imported, thus domestically saving and diverting the amount of water which was required to grow these products, towards the production of a different crop or to another use, such as industry. All in all, the value of virtual water in the food sector cannot be neglected. It links water, food and trade, and is a factor in determining whether or not a country's agricultural production is engaging in productive or non-productive green water; productive green water, with regards to virtual water, has to do with a virtual production site with a growing period that is closer in space and time (Renault, 2002). Thus, with regards to virtual water, productive green water is agricultural and food products that are traded that have minimal exogenous water.

Implications, however, of virtual water trade also should be taken into account. For politicians and

decisions makers of water scarce economies, virtual water trade may provide a reasonable means to achieve food and water security. Therefore, the country will rely on it but ignore water resources domestically. Meanwhile, when the virtual water trade is "invisibly" solving problems, politicians and decision makers may ignore the need to reform water-use practices to achieve efficient, productive and environmentally considerate water use as well (Zeitoun, Allan & Mohieldeen, 2010). Furthermore, rapid increase in food imports will result in the decline of self-sufficiency of food; this is what has happened in the Middle East and North Africa (MENA) countries (Allan, 1998). These characteristics of virtual water contribute towards the categorization of non-productive green water.

Virtual water as a determining characteristic of the productivity of green water has factors that contribute to both productivity and non-productivity. Virtual water that is used to supplement a country's agricultural and food production is expected, but must be a supplement in order to be considered productive green water. Virtual water that substitutes over 50 percent of what a country consumes, and is highly intensive because it is being traded in such huge quantities (e.g., staple crop imports in the Middle East; water-intensive cash-crop exports in Eastern/Southern Africa) is unsustainable and creates vulnerability, and thus is non-productive.

Conclusion

In conclusion, green water is everywhere; we eat it, we wear it, we use it in daily activities. How we use green water is important because it is intrinsically tied into the very functioning of societies. As the global community becomes more aware of the importance of environmental responsibility in consumption and the fact that Earth is a finite planet, it is important to include green water in both the water and food discourses. Hunger, malnutrition and poverty persist, and that is why this paper calls for a new approach towards addressing food, agriculture and green water, through the concept of productive and non-productive green water. By understanding the productivity of green water based on criteria including plant physiology, climate, agricultural technology, methods and practices, societal relations between governments, the private sector and civil society, and policies, the new definition of whether green water is productive or not may help contribute to more environmentally sustainable practices, less food vulnerability in terms of food security, and the emphasis of all humans basic needs before economic gain. Productivity of green water is multi-dimensional and holistic, just as issues facing farmers, policy makers, governments, and those without food security are multi-dimensional; the actions and decisions made by citizens, farmers, governments and the private sector are inextricably linked to the concept of green water and therefore must be considered in determining whether green water is productive or not, how it contributes to the agricultural, water and food discourses and how it influences everyday lives. In semi-arid and arid environments, it also encourages us to see 'invisible water' and to begin to question the uses to which both rainfall and run-off are put in the name of 'security'. At the very least, one hopes it will help us to see water differently, and to critically reflect on systems of practice born of societies that wish their rain would 'go away'.

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Section 9

Sustainable Cities Inclusive, Resilient and Connected

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Master's in Development Practice Programs

Sustainable Development Practices: Advancing Evidence-Based Solutions for the Post-2015 Agenda.

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Chapter 26

Environmental Education in Integrative Waste Management: Case Study of Favelas in Rio de Janeiro

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Abstract

Access to basic sanitation is considered to be a problem around the world, especially in regions where lack of rights to the city and to citizenship are also issues. This paper looks specifically to the issue of waste management in the *favelas* (slums) of Rio de Janeiro, using the case study of an innovative public policy, the Vamos Combinar uma Comunidade Mais Limpa Program (PVC). The innovation of the PVC resides not only in providing equipment adapted to the geomorphology of the *favelas*, but also in the participation of this historically marginalized population in the elaboration and implementation of this new public policy. These aspects are important to Critical Environmental Education (CEE), which aims to promote interaction with and intervention in one' s own reality in its multiple dimensions through the construction of critical knowledge and the consequential development of relevant and real action. In this sense, this article analyzes the effectiveness of the PVC through the lens of CEE. We present the utilization of CEE along with the other strategies of this new public policy adopted in the *favelas*, as an innovative tool in the search for solutions for problems of waste generation and management in sustainable cities.

Introduction

The search for sustainability and the fight against poverty are two of the largest challenges our society faces today. In the year 2000, the international community showed its commitment to these issues through the creation of eight Millennium Development Goals (MDGs), the first of which works towards bringing 500 million people out of extreme poverty and reducing by 300 million the number of people who suffer from hunger by 2015[1]. The seventh goal deals with environmental sustainability, working towards significant improvement in the lives of at least 100 million slum dwellers by 2020[2].

This paper focuses on the specific issue of waste management in the *favelas* of Rio de Janeiro, but the main themes that permeate throughout the analysis – poverty and urban sustainability – are globally relevant. The reflections and the practices that are presented here have the goal of providing a basis for the creation of more inclusive and sustainable public policies in other cities in Brazil and across the world.

Brazil has shown great strides in meeting the first MDG, surpassing its national target numbers[3], and receiving international recognition for poverty reduction policies[4]. But, the vision that the world has of a

[1] PNUD. Available at: http://www.pnud.org.br/Docs/4_RelatorioNacionalAcompanhamentoODM.pdf. Accessed in August, 2013.
[2] Millennium Development Goals. Available at: http://www.un.org/millenniumgoals/environ.shtml. Accessed in August, 2013.
[3] Available at: http://agencia.ipea.gov.br/images/stories/PDFs/100408_relatorioodm.pdf. Accessed in July, 2013.
[4] PNUD. Available at: http://www.pnud.org.br/odm/objetivo_1/. Accessed in April, 2013.

prosperous emergent country has been recently challenged by the various protests taking place across the country. These protests are characterized by a lack of leadership and political party identity and by the diversity of the demands that are difficult to categorize or simplify, but that represent a profound dissatisfaction with a country that is marked by injustice and inequality. Many of the topics are eminently urban, dealing with the fight for the right to the city. The youth that are on the street, demanding their rights to quality services, are fighting for a more inclusive urban space, with more accessibility and mobility and are showing their empowerment as citizens, looking to construct more sustainable cities[5,6]. Among the protests that have taken place, one is especially pertinent to our discussion. Residents of Rocinha, a *favela* with a population of 71,080[7] located in an upper-middle class area of Rio de Janeiro, have taken to the streets to protest against the construction of a high-tech lift in their community when investment in basic sanitation is lacking[8].

In a country the size of Brazil, with its profoundly different realities, the city of Rio de Janeiro has historically been a showcase for the world as a place known for its fantastic views and vibrant culture in constant clash with the chaos of unregulated urban growth, poverty and violence. Since its foundation, the various social classes of the city have vied for livable areas, since the city itself is established between the swamps, marshes and mangroves. The elitist occupation of the best living areas and utilization of natural resources influenced the poorer citizens to establish themselves in higher-risk areas, where floods and landslides are common. Adding to the vulnerability of this population is the historical lack of presence of the local government, including lack of public services, such as basic sanitation, as is offered to the rest of the city. The Brazilian Institute for Geography and Statistics (*Instituto Brasileiro de Geografia e Estatística – IBGE*) shows a 27.5% population growth between 2000 and 2010 in so- called subnormal agglomerations (the official name used for *favelas*) in comparison to a 7.4% growth rate in the city as a whole. Currently, the city has 763 *favelas*, 48% more than in the year 2000, when there were 514, which shows an increase of 38.6% in the last 10 years[9].

In recent years, Rio de Janeiro has represented the country to the world through increased international media attention due to its status as host-city for various mega- events, such as the United Nations Conference on Sustainable Development (Rio+20), World Youth Day, the World Cup and the Olympic Games. Especially because of these last two, the city is currently going through a process of urban renewal that has resulted in significant changes but whose investments have not been applied to mitigate the inequalities found between areas of the city. Of the public investments that have taken place, those dedicated to changing the image of Rio de Janeiro as a city marked by violence are important for the context of this paper. Since 2008, the State Secretary of Public Safety has installed Pacifying Police Units (*Unidades de Polícia Pacificadora - UPPs*) in *favelas* in specific areas of the city, with the goal of diminishing violence through the continued presence of the Military Police in these areas. Since the installation of the first UPP in the Morro de Santa Marta favela in 2008, the local government has claimed that such "pacification" would finally allow for social inclusion and integration of the *favelas* with the rest of the city (RODRIGUES and SIQUEIRA, 2012). More than four years after the installation of the first UPP, however, the social-environmental problems of the *favelas* continue, thus reflecting the contradictions of the urban renewal taking place across the city.

[5] Revista Piauí. Available at: http://revistapiaui.estadao.com.br/outras-edicoes/edicao-82. Accessed in August, 2013.
[6] Le Monde Diplomatique Brasil. Available at:http://www.diplomatique.org.br/edicoes_anteriores_det.php?edicao=72. Accessed in August, 2013.
[7] Instituto Pereira Passos, based on information from the Census of 2010.
[8] UOL. Available at: http://noticias.uol.com.br/cotidiano/ultimas-noticias/2013/06/25/na-rocinha-rj- moradores-protestam-contra-construcao-de-teleferico.htm. Accessed in August, 2013.
[9] O Globo. Available at: http://oglobo.globo.com/rio/area-de-favelas-reduzida-mas-crescimento-vertical- nao-contido-4947339. Accessed in July, 2013.

The precariousness of the waste management system in the *favelas* is one of these problems and is the focus of this paper. Due to lack of access and investment in these areas, waste has progressively accumulated, culminating in the exposure of the population to diverse environmental risks such as landslides; clogging of sewage systems, resulting in floods; proliferation of rats and mosquitos, which carry disease; and pollution of soil and water.

For these reasons, a new, integrated waste management system, based on the specificities of the favelas of Rio de Janeiro, involving participative management and environmental education is fundamental for the promotion of right to the city. In this context, the waste management Program *Vamos Combinar uma Communidade mais Limpa* was founded, and is the focus of our paper. Historically, Critical Environmental Education has been successful in working with and analyzing this type of public policy (QUINTAS, 2004; SORRENTINO, 2005; GAHL, 2007). The goal of this paper is to present this public policy as an innovative solution and to discuss its effectiveness in the search for sustainable cities through the perspective of Critical Environmental Education.

The Vamos Combinar uma Comunidade Mais Limpa! Program

The Vamos Combinar uma Comunidade mais Limpa! Program (PVC) is a waste collection and urban cleanup model adopted in some of the favelas of Rio de Janeiro that have received Police Pacification Units (*Unidade de Polícia Pacificadora – UPP*). It is implemented through the program UPP Social, in conjunction with the Municipal Secretary of Conservation (SECONSERVA) and the company responsible for urban cleanup in the city of Rio de Janeiro (COMLURB). It is based on the establishment of shared commitments and responsibilities between the local government and the community, with the goal of improving the quality of waste management in these areas. Agreements are made through dialogue, mainly focusing on eliminating critical points of incorrect waste disposal, creating new waste collection points and utilizing specialized collection equipment correctly[10].

The idea of implementing new forms of waste collection came about in response to complaints made by the *Rede Social do Borel*, a group representing residents of the Borel favela, in 2010 (FERREIRA, 2011). The fact that the PVC was initiated from this moment shows that local participation has always been valued throughout the creation and development of this public policy. Waste management has been shown to be a priority issue for many *favelas* during the elaboration of periodical Management 10 UPP Social. Available at: www.uppsocial.org. Assessed in: August, 2012.

Reports sent to the Mayor and municipal secretaries. For this reason, the PVC has been planned and implemented in 11 groups of *favelas* so far[11]. The city initiative responsible for implementing the PVC, *UPP Social*, is present in 169 favelas, meaning that the PVC has the potential to grow and expand into other areas as well.

An important aspect of the PVC contemplates the implementation of new cleanup and waste collection logistics due to the need to define a solid waste management model that attends to the topographic and social-spatial particularities of each region. Special equipment must be found and acquired in order to overcome the logistical challenges of the layout of the *favela*, different from the rest of the city. The majority of *favelas*

[10] UPP Social. Available at: www.uppsocial.org. Assessed in: August, 2012

[11] Groups of favelas are defined by the limits of the UPP in these areas. According to the Vamos Combinar a Comunidade Mais Limpa Report, these 11 favelas include areas where the PVC has been completely or partially implemented or where implementation is planned. Completed implementation: Borel, Formiga, Pavão-Pavãozinho/Cantagalo, São Carlos, São João; Partial implementation: Fallet- Fogueteiro/Coroa, Macacos, Salgueiro; Planned implementation: Escondidinho/Prazeres, Mangueira, Providência, Tabajaras/ Cabritos.

are located on hills and all of them are densely populated and have narrow streets that make circulation by motorized vehicles difficult. Examples of the specialized equipment are mini-compactor tractors and motor-tricycles. Collection routes, strategies and specialized equipment are defined to attend exclusively to each one of the *favelas* based on the mapping of each area during the initial survey and the information collected during community meetings.

The PVC is implemented in seven stages: (1) Initial survey: the goal of this stage is to identify the collection points that should be created or improved, the areas used for inadequate disposal that should be eliminated and the compacting centers that should be installed; (2) Mapping: the data collected during the survey is geo-referenced on a map during this stage; (3) Strategy: this stage is responsible for the alignment of the timeline and the methodology of the program with the particularities of the area; (4) Community meetings: during this stage, the PVC is presented, the strategy is validated, the priority areas for emergency actions are identified and the Commission of Environmental Multipliers is mobilized; (5) Execution: the new equipment is installed and any needed construction is implemented during this stage; (6) Program Launch and Formal Environmental Education Actions; (7) Continuity.

These stages show that the PVC is wide-ranged and, by acknowledging the particularities of each *favela*, looks to legitimate these areas as providers of their own solutions. Dialogue and community participation is present throughout the whole process. In this way, the PVC aims to bring the population of the pacified areas and the local government closer, allowing for debate about rights and shared responsibilities.

Critical Environmental Education

Environmental Education (EE) is a kind of education that contemplates various environmental elements, including nature, people, cities, relationships, culture, history, among others, as defined in the objectives set forth by the Tbilisi declaration in 1978 (HUNGERFORD & VOLK, 1990). With this ample definition, various versions of EE have arisen over the years in Brazil and around the world. According to Sauvé (2005), there are 15 currents of EE in the world, while in Brazil, six "Brazilian identities" of EE have been identified (LAYARGUES, 2004).

The concepts of "environment" and "environmental education" have various definitions, viewpoints and approaches. Sauvé (1996) indicates that all of the definitions of the term "environment," from environment as the natural world, as a problem or as a community project, should be used when the goal is to develop a comprehensive educational proposal. Since few pedagogical projects have the capacity to work with all of the definitions of environment at one time, it is important to define and understand which definitions are in fact being used (SAUVÉ, 1996).

The specific line of Critical Environmental Education (CEE) is pertinent when working with the issue of solid waste in the context of the *favelas* of Rio de Janeiro (GUIMARÃES, 2004; LOUREIRO, 2007; LIMA, 2009). This concept taken from Portuguese (*Educação Ambiental Crítica*) has also been called Socially Critical Environmental Education in English (ROBOTTOM & HART, 1993; SAUVÉ, 2005). Based on the survey of conceptions of the term "environment" produced by Sauvé (1996), we can see that this type of educational approach is based on two different conceptions. The first is: "Environment as a „place to live"...to know and learn about, to plan for, to take care of" (pg. 11). According to the author, the pedagogical approach that combines best with this conception is one that works with the transformation of each person as a necessary element in the transformation of their own reality, becoming a "creator of, and actor in, his or her own environment" (pg. 11). The second conception: "Environment as a community Project...in which to get involved" (pg. 12) combines best with the pedagogical approach that teaches that "solidarity, democracy and personal and collective involvement" (pg. 12) are fundamental aspects for the evolution of community.

From this conceptual foundation, we can introduce CEE as it is developed in practice. The goal of this kind of EE is to promote interaction with and intervention in one"s own reality in its multiple dimensions, by recognizing and acting on co-existing socio-environmental aspects (GUIMARÃES, 2004; LIMA, 2009). The proposal is to create an understanding of this reality as complex and provide instruments so that participants can intervene and transform this reality through the construction of critical knowledge and the consequential development of relevant and real action (BERTRAND & VALOIS *apud* SAUVÉ, 1996). Elements such as conflict, interpersonal, spatial and power relationships are fundamental to the educational development of participants in the search to understand the intricacy of their relation to the environment (JACOBI, 2005; COLE, 2007).

It is important to highlight the difference between this kind of EE and conservationist EE. The conservationist line of EE focuses on conservation of the natural environment, without contemplating the social, economic and political dimensions (LIMA, 2009). This type of EE is not capable of working with an issue as complex as integrated waste management. Critical Environmental Education, on the other hand, works with the understanding of environmental issues as *complex, trans and interdisciplinary*[12] (LOUREIRO, 2004) and is committed to the power of education to transform the world and its diverse elements, not only the natural ones.

Results and Discussion

When analyzing the effectiveness of the Programa Vamos Combinar (PVC) as an innovative solution, the fact that there has been considerable improvement in waste management and implementation of the new waste management logistics in 11 groups of *favelas* is, in itself, evidence of the success of the PVC through the perspective of CEE. The fixation of the changes that have occurred in these *favelas*, however, is seen through a variety of actions. The fact that CEE permeates all of the stages of the PVC, as presented below, is evidence of the success of this approach.

The survey stage is the initial stage of the PVC. It is in this moment that the physical space of the *favela* is mapped. This is the starting point of the involvement of local actors, where the problem is diagnosed and evaluated by those who are affected by it. The fact that the initiative to develop this public policy came about because of a demand of the residents themselves in the Borel *favela* exemplifies the value put on participation in the development of the PVC. From the perspective of CEE, if the residents don"t feel that they are a part of the process, they may perceive public policies of this kind as an imposition and therefore not be interested in participating (SORRENTINO *et al.*, 2005).

The strategy definition stage is the moment where the methodology and timeline for implementation of the PVC is aligned with the specific reality of each area. It is crucial that local actors and entities that already work in the area are consulted to base the chosen methodology on knowledge of the area. This knowledge is not only of the physical space but also of the people, movements, territorial dynamics and existing relations. According to CEE, it is important that projects that work with local management involve and value this knowledge in their planning and implementation (JACOBI, 2005).

When the capacities and actions of local leaders are recognized, the probability that they will perceive their role in and power to transform their own reality increases. "Perceived skill," as explained by the authors Hungerford and Volk (1990, pg. 262) is important to generate self-perception as "human beings believing that

[12] Original phrase in Portuguese: "complexa, trans e interdisciplinar" taken from Loureiro, 2004, page 70.

they have the "power" to use citizenship strategies to help resolve issues." This feeling is translated into increased self-confidence and of greater incorporation into society, which, in turn, generates the will and the capacity to demand rights to the city and to citizenship.

Although CEE is present throughout all of the implementation stages, there is a specific stage dedicated to formal environmental education actions that focusses on the spreading of information. Before this stage, a workshop is held to define the strategies that will be adopted, being through a formal course, already existent educational actions or other possible initiatives. The topics that will be covered are also defined. This flexibility and consequential variation of actions developed and used in its implementation is one of the strongest points of this public policy. Each area chooses and develops the strategies that best meet their reality, as is required by CEE.

Some topics are universal and are covered, in different ways, in all of the areas where the PVC is implemented, including: the current state of waste management in the area; the problems that waste can cause (including health problems and environmental risks); and the difficulties and possibilities of solutions for local waste management. According to Hungerford and Volk (1990), there are various factors that influence people´s behavior in regards to environmental and citizenship issues. As expected, one of the most important factors is information, but, information alone is not enough, people must have "in-depth knowledge (understanding) of issues. When individuals have an in-depth understanding of issues, they appear more inclined to take citizenship responsibility toward those issues" (pg. 261). Residents are provided with the tools they need to demand action from those responsible for each stage, as well as to recognize their own responsibility in this process. With information and consequent development of knowledge through the PVC, it is more probable that they will take action.

One of the ways that CEE has been carried out is through the realization of a formal course called the Environmental Multipliers Course - *Curso de Multiplicadores do Cuidado com o Meio Ambiente*. This course stimulates perception of the connection between the issues existent within the favelas and the consequential importance of integrated actions and has been responsible for the establishment of solidarity networks in some areas. One example of this is in the Formiga *favela*, a community that has 4,312 residents[13], and where the residents had identified the issue of waste management as a priority action issue by the residents before the Environmental Multipliers Course began. Floods and landslides that occurred in the area had brought about community action and mobilized the residents in regards to the problems caused by lack of attention to environmental issues.

In this context of a population already aware of and organized in regards to environmental issues, the Environmental Multipliers Course introduced the idea of interconnectedness with other issues and inspired the formation of a network between the ICOS NGO, the PVC representatives and the *Comunidades Verdes* Project. In other words, a multi-sectorial articulation was generated between different local government agencies (Environmental State Secretary and Instituto Pereira Passos, a city research institute), between these agencies and residents, and, lastly, between local government, residents and NGOs. The perception of the connection and interrelation between the elements that exist in the society and with this, the generation of change is exactly the transversality that CEE encourages (LOUREIRO, 2004). The existing context of local mobilization, along with the development of in-depth knowledge through the Environmental Multipliers Course resulted in the continued involvement of the residents in environmental issues that will have long-lasting effects even after the PVC.

From the beginning of the implementation of formal environmental education actions, a menu of best practices is created in each area to support the exchange of ideas and innovative solutions to similar problems between *favelas*. Each area is stimulated to search for solutions and strategies that work with their specific public, testing and modifying each one to attend to their necessities. This strengthens the exchange between

communities, the spreading of knowledge and of successful strategies in the continuous process that is CEE, thus potentializing and being potentialized by the actions of the PVC around the city.

An important aspect in guaranteeing the continuity of the actions of PVC is the Environmental Multipliers Commission - *Comissão de Multiplicadores do Cuidado com o Ambiente*. The formation of this commission is the starting point which formalizes the interaction between entities, actors, networks and residents interested in committing to continued involvement with environmental issues in their community. One of the biggest challenges of CEE, especially in the context of this kind of public policy, is the capacity to last after the implementation of the policy is over.

The Commission provides for continued interaction in order to make the value brought to initiatives last. The creation of new spaces for dialogue through the actions of the Commission is one of the most lasting results of the PVC, from the viewpoint of CEE. The São João *favela* is an example of this process. The *favela* is inhabited by 7,035 residents[14] and was characterized by lack of community involvement and lack of spaces for dialogue, common in other communities. After the creation of the Commission, the periodic meetings evolved to include representatives of health, residents associations, official entities and important social actors. The action network created from this space strengthened each one of these entities on their own as well as the dialogue between them, thus creating a basis from which future actions and entities can come about, as well as stimulating the continuity of existing actions.

Although the PVC has reached positive results, it is important to note the challenges that the program faces. The recurrent delay in delivery of the equipment needed for the new waste management system has compromised the implementation of the system in some areas. This, in turn, has effected local mobilization as the residents begin to lose faith in the commitment of the local government in actually solving the problems faced by the *favelas*. One challenge faced from within the government itself is the development of integrated actions between government agencies, which can compromise the multi-sectorial approach that integrated management requires, especially when considering the complexity of *favelas*, where various urbanistic, socioeconomic and environmental issues coexist. Finally, policies such as the PVC face challenges due to the characteristic lack of continuity of public policy in Brazil, in which special interests often take precedence over technically sound solutions.

Due to these challenges, the PVC was suspended in April 2013. The history of the program, with its wealth of knowledge, was left behind by the new management of the company responsible for urban cleanup in Rio de Janeiro. This change represents not only a loss of public money but also a regression for the process of waste management in the *favelas* and thus, in the city.

The local teams, however, those that execute the actions and understand the challenges of execution from within the communities, continue to work together, and, in practice, carry out the participative management started by the PVC. They have come to acknowledge the benefits that participation and information can generate in the efficiency of the development of an integrated management policy. The results of the PVC continue to be multiplied, its methodology continues to be used and therefore CEE continues to be a part of the public policy within the favela and within local public administration.

The results obtained during this process and their effects continue to be seen in community actions, strengthening of existing networks, activation of new networks, awareness regarding waste management and in the valorization of local knowledge through participative public policies.

[13] Instituto Pereira Passos, based on information from the Census of 2010.
[14] Instituto Pereira Passos, based on the 2010 Census.

Conclusion

Based on the information presented here, we can conclude that the PVC was successful through the lens of Critical Environmental Education. The development of strategies based on CEE is fundamental to guarantee the success of effective changes in local management (QUINTAS, 2004; SORRENTINO, 2005; GAHL, 2007). Collective and collaborative practices, using open and participatory dynamics, have been shown to be important in the construction of a community of dialogue, of participation, of mobilization, of action (JACOBI *et al.*, 2009). The case-study presented here is focused on the specific issues of waste management in the *favelas* of Rio de Janeiro but it can be seen that the larger issues and the proposed solutions are globally relevant. The universality of the need to find integrative solutions to complex problems means that public policies such as the Program *Vamos Combinar uma Comunidade mais Limpa* implemented and understood through Critical Environmental Education can be applied across the world in the search for sustainable cities.

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Chapter 27

Third Party Investment Operators: Leveraged Financing Vehicles of Sustainable Cities

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Abstract

The sustainable city model conception entails developing innovative approaches to provide leveraged financing. Lack of adapted financial resources due to long term return on investments and numerous economic priorities in developing countries hinder the achievement of energy efficiency and independence in cities. In order for cities to be sustainable and reach the "Factor 4" by decreasing GES emissions, there is a need to develop new scaled up funding mechanisms. Solving this issue lies in the ability of urban actors to combine long-term and short-term needs and to find alternative and unconventional methods for massive financing of urban projects. The problem is complex because involved actors are very diverse and the most innovative of them are often more limited in equity and debt capacity to fund sustainable energy and smart grid investments. This can limit long-term market growth and competition among new arising startups with good technical expertise (e.g. small and/or new ESCOs with no previous experience in borrowing). This paper presents state of the art innovative sources of financing of a sustainable city and new funding mechanisms, including, collaborative and participatory financing. It presents European practical and academic insights on how diverse private capitals and new actors - specialized third party financing operators in sustainable energy could provide alternatives to the insufficiency of available funds to cover retrofitting and renewable energy needs and ensure an economy of scale for massive financing of urban sustainable energy. Based on firsthand pioneering experiences of authors in conception of public-private vehicles, the paper describes current and envisaged types of interventions of operators. They include a delivery of energy performance-based contractual models for comprehensive refurbishment in the built environment, participation in capital of small and medium renewable energy projects, and attraction of citizens' funding for these types of initiatives etc. These new urban actors possess financial engineering expertise to mobilize all available sources of funding including subsidies and external aid, but not only. They play the role of "assemblers" by bringing global organizational, legal and technical solutions to urban sustainable energy projects. Paper's valuable contribution lays in the novelty of such approach as well as in the analysis of first operators' experiences emerged in the beginning of 2013 in France (SEM Energie Positif in Paris area) and envisaged metropolitan climate funds (Grand Lyon) that pool small and medium sustainable energy projects. Cases presented in the paper demonstrate how current energy efficiency practices in cities could be revamped in order to develop models that would boost massive refurbishment of the building stock, introduction of RET, and sustainable transport and how these practices could be transposed to similar other contexts, in particular for developing countries.

Introduction

Sustainable urban finance is a vast and complex subject, it includes financing of green buildings, energy efficient transport, Renewable Energy Technologies (RET), city water systems, green spaces, and related smart grids to connect, stock, transfer energy harnessed from mentioned sectors. Building and transport sectors contribute the most to the air pollution in cities and have the largest energy/fuel saving potential, suggesting a good fit for their prioritization in sustainable urban policy[1]. Given the context of rising energy prices, a fuel

[1] In U.S and in Europe, buildings account for about 40% of total energy and use slightly over one third of CO2 emissions, outflanking road transport that contribute nearly to 30% of total CO2.

poverty[2] affecting millions of citizens across the world (only in Europe between 50-115 million), and the need to mitigate climate change, it appears crucial to adopt clean and accessible energy patterns in nowadays energy-intensive cities. In order to put this into effect, a primary need is to secure funding to massively refurbish existing building stock, shift to electric carbon free fuel cell and battery vehicles, as well as to fill in an existing potential of RET at strict energy consumption standards (anticipating that urban population, its welfare and respective energy needs will increase exponentially).

The lack of massive funding mobilization represents a major barrier on the way of sustainable energy scaling-up in cities. As stated by Janci and Quinet (2011), the main challenges of sustainable financing we face these days include (a) absence of financial markets supporting long and risky projects, (b) difficulty of valuing risk of investments to be carried by private or public actors (c) limited capacity of direct actions of public actors to catalyze sustainable financing. Considering current relatively low renovation rates, conservative penetration of electric car market and the fact that energy efficiency (EE) market practices are affordable mainly to big energy operators, reaching "Factor 4" pursuant to 80% reduction in Greenhouse gases (GHG) before 2050 will require development of new tailor-made funding schemes, in addition to required technological breakthrough.

This paper intends to introduce new financial schemes for massive sustainability up-take in cities. It showcases European practical and academic insights on how diverse private capitals and new actors - specialized third party investment operators in sustainable energy - can provide alternatives to insufficiency of available funds to cover urban needs, by bringing technical and financial expertise, and ensuring an economy of scale for massive financing of sustainable projects.

In the first part, we present bottlenecks of sustainable urban financing linked to a short term profitability approach and limited funding capacities of urban actors. In the second part, based on state of the art of some pioneering practices, we frame principles of innovative investment schemes in sustainable cities, highlighting the role of special purpose entities and third party public-private operators to secure a leveraged funding. We conceptualize general possible modalities and interventions of a third party investment operator as a new public-private vehicle of urban financing. The third part highlights first hands-on practices and envisaged evolution of pilot metropolitan operators emerging in French market.

1. Bottlenecks of Sustainable Urban Financing: Short Term Profitability Approach and Limited Funding Capacity of Urban Actors

Technical and financial needs of sustainable urban projects are not often translated into investment due to a still limited capacity of actors to catalyze these projects. Actors of urban development projects usually have a fragmented knowledge of financial engineering and alternative forms of funding (EIB, 2007). In addition, capital markets for urban finance are not always transparent, efficient and well developed.

1.1 Public Actors in Need of External Capital for Urban Financing

Currently the most robust and frequent source of city funding is public funding. But, practice shows that public funding available is often weakened due to the risk of sovereign debt. The fragility of local communities in the world, increasing difficulties of access to loans and general lack of appetite for investment of financial institutions may distort the financing capacity of local public agencies (Paulais, 2010). According to Siemens (2011), contrary to weak and insufficient tax revenues, contributions from external capital will be required to finance future infrastructure needs. For instance, the authors estimate that the United States urban economies will

[2] Households are considered fuel poor if they spend more than 10-15 % of their total income on energy needs.

require a total of about 3,5 billion $ investment[3] in infrastructure between 2011 - 2020 to remain economically competitive.

Furthermore, available public funding policy to support sustainable projects is not overwhelming and may not last very long, as it represents a high cost for the state banks. For example, in the French building sector, the planned budget for energy retrofitting loans until 2020 (1.2 billion Euros), represents roughly 10% of the needs (ECEEE 2013). SDSN (2013) recognizes that public resources have become increasingly strained in and that significant funding progress is grossly dependent on possibilities of leveraging private financing.

1.2 Private Actors Face Long Paybacks and Difficulties in Securing Financing

Despite the need of involvement of the private sector at a scale and a pace to finance green growth, mobilization of private capital still remains a challenge. Most of private actors seek a short-term profitability, and a number is relatively reluctant to integrate Environmental, Social and Governmental (ESG) factors to their activity. Theurillat (2011) considers that, for some urban actors, sustainability can be seen as an obstacle to progress their projects since: (i) it reduces private transport by transfer to non-motorized traffic, (ii) decreases commercial areas in order to secure green public spaces, etc. Perception of sustainability by various actors also varies depending on their size. For example, Boisnier (2010) observes that, financial factors mainly compel large property owners to value sustainable urban development: e.g. the index of linear correlation between market capitalization and their sustainable development is equal to 0.91. Yet, modest size property owners are held away from sustainable development. Following the same reasoning, according to Ingrid Nappi-Choulet survey (2011), listed big-size companies value more green buildings than non-listed in the stock exchange. The OECD report (2012) highlights still a marginal private sector involvement in Paris metropolitan area for financing green growth. The limited private sector involvement is impacted by not easily achievable profitability in these relatively new markets. Indeed, investments in green infrastructure, sustainable transport and energy efficiency require relatively long payback periods. For example at current energy prices, deep energy retrofits present payback time between 15-30 years, which is not in line with the time horizon of most private property owners.

Long cost recovery periods are partially explained by not enough mature sustainable energy markets and a fragmental view of low carbon projects by the banking sector, that tend to be evaluated only according to financial cash flow without taking into account sustainability criteria (e.g. energy savings, green value…). In addition, projects with a lower credit rating initiated by small /medium sized and/or new actors with scarce resources and lack of previous experience in borrowing (despite solid technical expertise) are unable to have a fully-fledged participation in urban sustainable development in cities. Practice shows that only big operators (e.g. utility backed companies) can intervene in energy efficiency by investing their own funds or attracting external financing (e.g. Jonson Controls…). This represents another obstacle on the way to market uptake and consequently limits long-term market growth and competition between private actors.

Besides long cost recovery periods, another general hurdle for energy efficiency investments (both for a project developer or a service company)is the high amount of funding needed in such projects that very quickly limits the urban actors' equity and debt capacity for further projects' replication. Moreover, considering the risk of innovative projects in transport and uncertainties on actual energy savings in the building sector, banks and financial institutions usually require traditional guarantees to cover all debt, which also curbs urban actors' funding capacity.

One efficient and promising solution facilitating funding for a sustainable city that is gaining popularity can be secured through Energy Performance Contracts (EPC). This mutually beneficial partnership is currently

[3] Converted from EUR with 2013 exchange rate

promoted by private actors - Energy Service Companies (ESCO) - involved in management and financing of building stock renovation. However, energy savings that they estimate and guarantee is difficult to realize in practice and to achieve a desired result is sometimes unrealistic, in particular the target of "100% investment costs refinancing by energy savings". It should also be noted that even in countries with a significant EE market as in the US and Canada, these actors target specific niches (e.g. energy management systems, lighting), mostly in industry, and to less extent in the public sector buildings, while the residential sector remains almost overlooked (refer to Box 1).

Indeed, the overall lack of funding and not embraced market, as a result of the myriad of factors mentioned above, are major obstacles on the way to improve sustainable urban practices.

Box1. What hinders financing of green buildings in cities?

As most of the building stock has been already built in existing cities, "greening" of buildings is one of keystone urban priorities. Moreover, old buildings, more prevalent in cities than sprawl suburbs, are energy inefficient. Ambitious energy and climate policies require saving up to 80% energy in buildings in comparison to current consumption patterns, can only be reached through structural interventions (insulation of facades, replacement of windows, optimization of equipment, installation of RET).

Such deep energy intervention in a building is not a major technical challenge and key obstacles are financial. Presently, building owners and investors tend to focus on "low hanging fruits", i.e. measures with short payback periods (less than 10 years), which usually generate less than 30% savings and to secure themselves tend to underestimate the potential achievable savings (can be 80% after 15-25 years). Alternative approach is therefore needed to unlock the potential for comprehensive renovation and increase yearly refurbishment rate with high energy savings targets.

Another issue at stake for this sector is an achievement of an economy of scale. It is important that one single actor manages a pool of building or large housing stock and is in position not only to gather several small refurbishments in pools, but has the technical capacity to negotiate complex contracts with ESCOs. This is not the case for example with residential sector where building owners are isolated, lack of upfront investment capacity or willingness to invest. Moreover hurdle of "split incentive" arises when building owners must bear investments and tenants pay energy bills. In Europe, ESCOs have expanded towards residential sector very recently. Nevertheless, the residential sector in the cities remains overlooked due the difficulty to target. The offer of services and approaches needs therefore to be widely adapted for specific urban projects.

Authors, ECEEE 2013

2. Innovative Urban Financing Models

One of the solutions for total market penetration of sustainability projects is, to some extent, to find a model to outsource debt and to channel significant investment capacity and technical expertise of urban actors. Undoubtedly, different kinds of learning effects may lead to cost reduction of technologies, and thus decrease payback periods (e.g. process improvement, R&D expenditures, diffusion of knowledge, interactions between various stake holders and, finally, the economies-of-scale), increase profitability and favor more actors to enter the market.

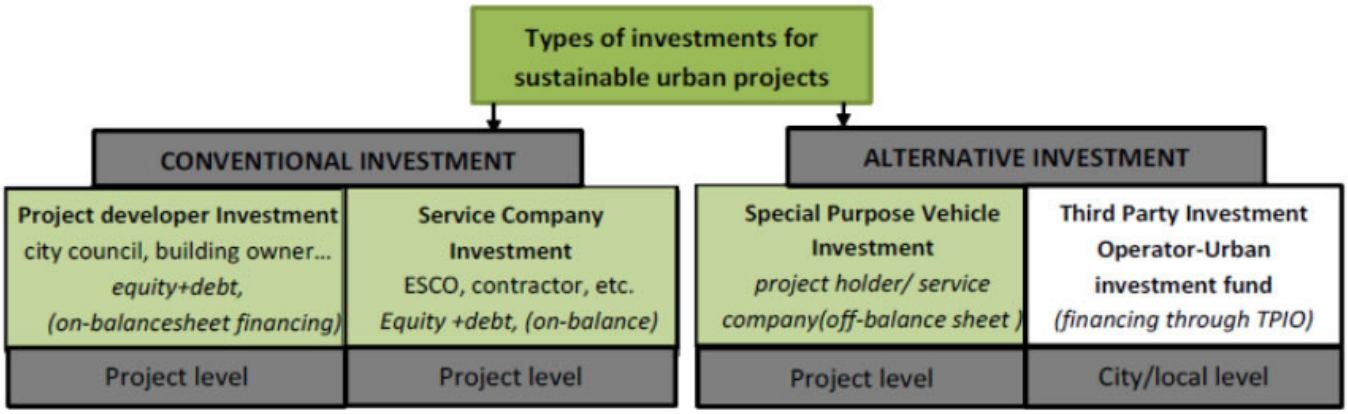
Alongside technical innovations, drastic and rapid changes are needed in the financial engineering field to shift to a low carbon economy in cities. To render sustainable city projects scalable and cost-optimized and to guarantee an adequacy of funds, access to private sector funding is required using leveraged financing techniques. Despite hurdles mentioned earlier, there is a certain interest of private actors seeking to invest in sustainable cities, particularly in view of potential tangible benefits of these interventions, generally advantageous to the private sector in particular to share the risks within Public Private Partnership (PPP) energy savings and the green value. According to Mor (2011), new systems of multi-stake holder cooperation, via involvement of

individuals, companies and local authorities, will contribute to ambitious policies on energy and reduction GHG in cities.

Nevertheless, conventional methods of urban investments prevail in current practices, e.g. investments carried by project holders (local municipalities, property owners…), or service companies (ESCOs…). Either of the parties can bring investments, frequently through equity and debt, and less commonly through leasing or other financial schemes accessible to big operators. However, these conventional practices are not always accessible, sufficient and remain single, project specific. Certainly, if financing of energy efficiency by urban actors continue to be practiced on the basis of current low-leveraged models by targeting only large-scale projects and focusing on the most profitable investments, it will jeopardize possibility of ambitious energy efficiency funding (ICE, 2012).

We suggest recourse to two alternative models to support a leveraged funding, (i) a Special Purpose Vehicle (SPV) to manage and finance sustainable large projects where investment sources are multiple, **(ii) a Third Party Investment Operator (TPIO), a new urban vehicle with a possible massive funding capacity for different size projects.**

Figure 1: Types of investments for sustainable urban projects



Source: Authors

2.1 Special Purpose Vehicle (SPV): Leveraged Funding for a Particular Urban Project

SPVs in the past were usually considered appropriate for large scale energy supply projects, and to lesser extent in cogeneration and solar photovoltaic projects. In transport sector PPP modality projects, a SPV can be particularly beneficial as it replaces direct contracts between a government agency sponsoring the project and multiple suppliers involved in delivering a project.

The financing under this model is off-balance sheet (project finance-based), where funds can be secured and "injected" in the SPV by consortium partners, and eventually completed through mobilization of other investors, allowing flexibility in financing. Analysis by Ibmec (2003), for the Work Group on EE Financing suggests the SPV scheme for EE projects arguing that transaction costs for establishing SPV are reasonable if they are standardized and if the financing source is identified upfront. According to IFC (2011), the only real financing mechanism that has been successfully used by ESCOs to build a sustainable EPC business is a project-based funding mechanism, where a majority of the credit risks are assumed by entities other than ESCO. SPV as a tool to finance sustainable city projects is in its embryonic stage and its establishment and intervention mechanisms are still to be explored.

An example of the SPV model in France is an energy retrofitting project between two private urban actors - housing operator ICF North East and an Energy Service Company SPIE in a city Schiltigheim, who

signed a first EPC in social housing, focusing on renovation with massive investment on the envelope and 19 years energy performance guarantee with expected 47% energy savings. Among other sources of funding, SPIE ensured financing of energy renovation works through creation of a SPV. The costs were reimbursed gradually by ICF with the condition that energy guarantee is achieved.

Since financing of EE projects under this model is not project developer/service company asset-based but is grounded on project's merits (e.g. energy savings), its development needs a very well established financial engineering expertise and can be adopted only by strong urban actors. This approach, even if it can provide a leveraged financing for urban projects, remains a single project specific, thus provides a limited impact for the market uptake. We advocate an intelligent utilization of SPV model. At the same time, for urban projects financing, we put forward a new "third party" investment scheme conceptualized below, which would allow embracing sustainability on a broader level.

2.2 Third Party Investment – Financial Innovation for Market Uptake of Sustainable City Projects

To guarantee a high penetration of sustainable projects of various natures (e.g. different scales, payback periods…) in cities, new tools and partnerships are needed. One of them can be the third-party investors -"assemblers of skills" - as new public-private players on the urban scene. Indeed, comprehensive sustainable urban projects are complex and require technical, financial skills and capacity to coordinate multiple economic agents (auditors, contractors, equipment vendors, banks, insurance companies...).

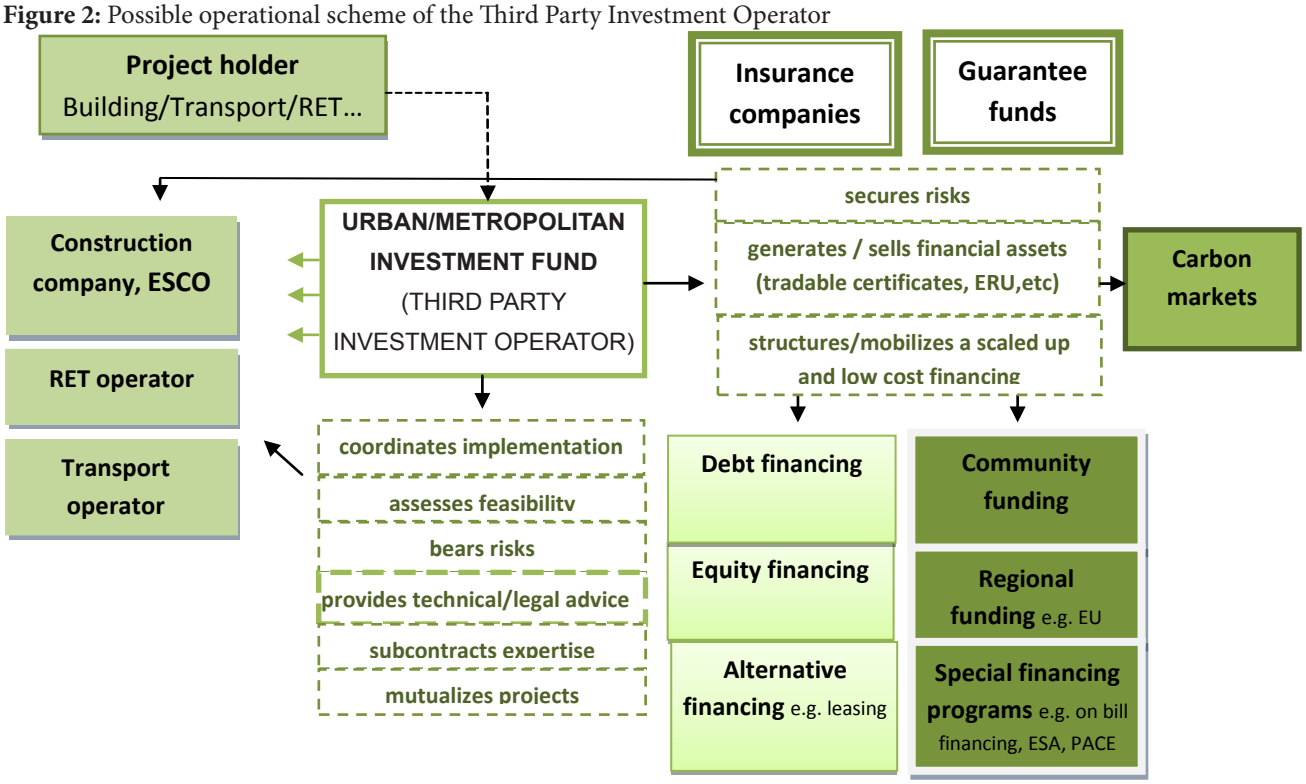
Several authors have framed a theoretical approach of the emergence of TPIO. Janci and Quinet (2011) present TPI as "financial innovation", contributing to develop alternative schemes capable to serve a common goal of Factor 4. On the example of the building sector (that so far started to test TPIO schemes in France), CDC (2010) suggests that TPI vehicles operating in the field of EE should possess a triple expertise: technical knowledge, financial engineering and provide energy performance guarantee. The EEB Hub (2013) highlighted the need to include financing of EE measures for smaller buildings under the umbrella of a larger organization with the necessary access to credit, at least until an adequate track of performance is available. However, the majority of concepts and academic insights were not supported by practical applications and are limited mostly to the building sector.

On a broader level, SDSN (2013) appeals for a city or region investment fund strategy to support regional objectives combined with climate adaptation funding and social enterprise bonds. This background paper for Post-2015 Development Agenda proposes to build leveraged investment finance via an institutional structure exemplifying PPP that would deliver social, environmental and economic outcomes to the region.

In ECEEE (2013), we analyzed and conceptualized a TPIO model to massively finance energy efficiency projects in the built environment. In this paper we deepen our previous analysis and extend the scope of a third party investment to all sustainable urban projects (RET, buildings, transport). The territorial scope of the model is justified by required interventions in highly energy inefficient old buildings (prevalent in cities than in sprawl suburbs), potential smart grids, and electric vehicles viable primarily in dense urban zones, etc. The model is based on first theoretical inputs and tested pioneering examples of these initiatives.

The TPIO model implies transferring of project "ownership" (fully or partially), i.e., design, implementation, investment and exploitation to a third party. TPIO in cities would provide a global solution, i.e. organizational, legal, financial, technical (not only pooling of funds as in case of SPV), bearing coordination function on multiple sustainable urban projects. In order to reduce transaction and financing costs, these specialized investors will fund large portfolios of projects that meet certain criteria (mutualizing principles), through mixing public and private capitals. The role of the TPIO is critical to manage large investment returns with low profitability and long-term commitments.

Figure 2: Possible operational scheme of the Third Party Investment Operator



Source: Authors

An emergence of such TPIOs with prevailing sustainable development objectives over a pure financial logic should allow overcoming hurdles that hinder market uptake of sustainable practices listed in Section 1 of the paper, namely, the conception of such vehicles could:

- foster capital leverage and debt mobilization at a low, not too burdening cost
- facilitate an access for small/medium sized companies to take part in sustainable urban projects by:

  - TPIO subcontracting of small companies (e.g. ESCOs, architects, construction companies). This type of intervention is relevant for green buildings retrofits.
  - TPIO's participation in the capital of new, emerging companies: (i) creating directly structures by injecting capital (as a major stakeholder) into sustainable development projects, (ii) providing a minor public participation in capital by inducing multiplication of such initiatives through private funds leveraging. This type of interventions can be more relevant for RET and transport projects. Whereas a minor injection of capital can be valuable for small/medium sized projects in need of support, the "major stake holder" status can be secured for week and/or emerging projects (not likely to be profitable without TPIO intervention). For example, a business plan of an emerging operator in the French region Picardie focuses primarily on RET sectors with high growth prospects (wind, biomass), which afterwards is to be extended to less mature sectors through reinvesting income released in the first phase of investment.

One of the principal roles of a TPIO, along with technical and legal advice, is the mobilization of funds necessary to finance transactions on behalf of its clients. The creditworthiness of the TPIO is the major determining factor for the financing terms. Since the TPIO can have a higher "credit rating" than beneficiaries and achieve more privileged funding, financial sector could perceive sustainable energy measures more attractive, opening the way for massive investments. Being a specialist in financial engineering, TPIO may look for multiple financing sources that can be centered on: (a) mobilization of soft loans (from public financial institutions, regional investment banks) (b) creation of investment funds with a lower yield, but higher environment benefits, based on the concept of socially responsible investment (SRI), (c) mobilization of community funding, (d) debt

securitization and emission of bonds for refinancing, (e) participation in carbon markets, by generation of financial assets such as white certificates or Emission Reduction Units (ERU), etc.

In French region Nord Pas de Calais, project developers consider separating financing and technical functions of the TPIO. They envisage a "dual" structure under the auspices of one operator, i.e. a public-private company for services/technical expertise and an investment fund with a funding prerogative.

TPIO could represent an excellent model to attract citizen financing. Community financing is characterized by their support to own economic and local development, exemplifying an important source of alternative sustainable development financing. For example, Copenhagen city electricity is partially financed by its citizens; "Energie Partagée"[4] RET company in France are based on significant contributions from local community. Citizens' participation through TPIO structure could bring a modest contribution to its diversified funding to meet challenges of local development.

It should be noted, that to ensure longer-term approaches to proliferate sustainable city projects, a guiding and unifying role of local municipalities is essential. The presence of public entities as stake holders contributes to a greater credibility of the structure. For example a business plan of the RET third party operator in Picardie region of France envisages a total equity of 12 million EUR, including 6 million EUR of public funds mobilization against 6 million EUR to be raised from strategic economic actors in private sector. Such equity structuring should facilitate inception and acceptance of long term projects in emerging, still risky sectors.

The legal status of these entities should allow a combination of public and private funds, with preferably predominant public governance, management flexibility and certain autonomy. Finally, legislation in some countries may require that activities of such an operator are subject to banking monopoly constraints, since it may carry credit transactions on behalf of its clients. Before establishing such structure, a prior consultation with the Banking Commission is required.

3. Evidence Based Examples: New Vehicles to Finance Green Growth in Cities

Pilot third party operators are emerging in French market (Paris metropolitan area, Nord Pas de Calais, Picardie, Rhône Alpes), with an initiative of regional authorities who play a leading role in encouraging emergence of these vehicles. Many structural elements of the TPIO model are in their embryonic phase, but have all prerequisites to be fully implemented and prosper. Promising urban examples can be the Paris metropolitan operator "Energies Posit'if" and Energy and Climate Fund in Grand Lyon (the second is in its very early conception phase). These first reflexions and experiences serve as firsthand examples to bring forth a general structure of TPIO.

3.1 Paris Metropolitan Energy Operator "Energies Posit'if"

Energies Posit'if is a very demonstrative pioneer example of TPIO. The company was operationally launched in January 2013 by Paris metropolitan area (Ile-de France) with the support of Caisse des Dépôts et Consignations, a public long term investor group and a national saving bank Caissed'Epargne Ile de France. Energies Posit'if has a public/private ownership structure. It intervene in deep renovation of residential / public buildings and supports small/medium RET operators. More specifically it targets:

- Collective housing. In this segment, the operator focuses primarily on addressing condominiums

[4] Energie partagée develops citizens' projects in the field of RET (solar, biomass and wind) allowing to keep citizens control over the projects.

but also small social housing operators by engaging them in energy renovations to reach "low energy building" label. The operator provides technical expertise, coordination of work, guarantees energy efficiency and a viable financing offer.

- Local government buildings. The operator will be providing primarily consultations on attainment of "low consumption building" label.
- Renewable energy. The operator will offer advice and secure financial participation (minority or majority stakes depending on the size of renewable energy projects). Mostly it targets projects of heat production (deep and shallow geothermal heat, biogas ...) and green electricity (cogeneration, solar, wind ...) initiated by the companies of Paris metropolitan area (local private-public companies, private developers involved in regional projects, etc…).

Surveys show that in France energy prices spikes and negative perspectives on the purchasing power of households lead to fuel poverty of the ones most at risk. Therefore, the goal of Energies Posit'if as a pilot project in Paris metropolitan area is to help households to optimize energetically and financially their renovations. Operator's intervention in the residential sector is particularly interesting. Energies Posit'if undertakes EPCs in private condominiums as well as for small social housing operators. The operator's intervention need is justified by their spread out nature and consequent difficulty to mobilize funding for rehabilitation, as well as still non-attractive nature for classic financial institutions. Operator assesses the feasibility for an EPC, structures financing, coordinates EPC implementation and bears risks of contracts, operational components of which are outsourced to various relevant actors: construction companies, ESCOs, operators, etc...

Energies Posit'if signs contracts with project developers in two phases: initially, for consulting services and after, for the financing of works. When a condominium association is ready to launch the process of energy renovation, Energies Posit'if proposes a contract in which it is mandated by the general assembly of co-owners the feasibility study and its modalities for energy retrofit operation. Energies Posit'if presents to the next general assembly of homeowners a complete project, with technical specifications but also a financial engineering plan adapted to each individual situation. If the project is accepted, a second phase is launched when an operator subcontracts implementation of the works to relevant companies, and is responsible for maintenance of installations in order to guarantee a certain level of energy consumption.

Energies Posit'if is initially capitalized with 5.3 million EUR for the period 2012-2014. In the longer term (2020), capital should increase to 15.5 million EUR. The initial business plan envisages 40 million EUR investments for the period 2013-2015. The expected rate of return in multifamily buildings is expected to range between 4 and 9% over a 15 to 20 years term. Financing schemes will be adapted to each situation and secured through owner's equity, access to low interest loans provided by Caisse des Dépôts and other public banks, subsidies, tax rebates, direct financing provided by Energies Posit'if, the sale of energy savings certificates (white certificates) generated by the activity supported by the operator. Once a track record is established, Energies Posit'if intends to assign contracts to financial institutions looking for long-term investments. A key challenge it may face is refinancing and maintaining the structure highly efficient after all equity has been invested and no more debt can be mobilized. Currently, Energies Posit'if is followed by most market actors, and has already inspired several other regions and metropolitan areas to take actions, including Grand Lyon.

3.2 Grand Lyon Climate and Energy Fund

Grand Lyon Metropolitan Climate and Energy Fund is presently in a very early conception phase in France. The main objective of the approach that can be adopted by the Grand Lyon is to support the development of sustainable projects that aim to reduce GHG emissions, lower energy consumption by local actors and at the same time generate financial assets recoverable in carbon markets. Specific projects are still to be discussed but considered options are: residential and commercial buildings, low-carbon transport, RET, urban agriculture. In other words, the engine of action is to support projects that fail to materialize today (likewise for the Energies

Positif') and additionally to generate tradable certificates (ERU, white certificates) as a sub-product contributing to refinance projects activity.

The fund is supposed to trade financial assets generated by its supported projects to local big "obliged companies" subject to quotas or to volunteer enterprises willing to support urban market of sustainable projects. However, the business model of the future "climate and energy fund" is currently impacted by (i) a significant decline observed in the price of carbon markets (1.25 Euro in 2012, per ton of CO2 against Euro 30-50 per ton initially planned), that may not be sufficient to cover up-front costs of the fund's projects, (ii) recent regulatory developments in the European market emission allowances (in particular; the limitation of the trade of financial assets only to actors subject to quotas) and (iii) uncertainties about future developments in international carbon markets. Given the market conditions in January 2013, the economic equilibrium of activity centered on purchase / sale of ERU assets in compensation for emissions reductions by these urban actors seems a priori difficult to establish. It can prosper, if big companies of Grand Lyon value local purchasing concept and agree to acquire projects generated financial assets at higher than market prices, instead contributing to viability of local projects. The preliminary results of a survey to test a willingness of companies to pay and respective feasibility of a carbon fund showed insignificant interest to purchase locally produced financial assets.

Given current market conditions, the carbon component of the fund remains under question. At the same time, the pursuance of the initial target can remain unchanged – the role of the "skills assembler" that mobilizes funds, creates and/or supports sustainable urban projects, than cannot take form on their own, with or without generation of financial assets tradable in local and European carbon markets.

While first metropolitan and regional experiences include a delivery of energy performance-based contractual models for comprehensive refurbishment in the built environment, participation in capital of small and medium operators of RET projects, and attraction of citizens' funding, the practical channels are to be explored to transpose this "financial innovation" to other sustainable development projects of the city, i.e. establishment of smart grids, electrification of vehicles, etc.

It should be noted that there is no one-size-fit-all approach to mobilize investments in sustainable cities. Although the elements of TPIO framework and first practices highlighted in this paper are likely to be similar for developed and developing countries, country contexts do matter and policy approaches and legal preconditions need to be customized to a specific context and adapted to regulatory framework. The emergence of TPIO model would need in particular a solid financing architecture as well as legal and market preconditions for encouraging the creation of these operators to finance sustainable energy and transport projects. The model is relevant in markets with actors of small and medium sizes, which cannot recourse to debt financing and other financing schemes and/or do not have enough capacity to process complex operations. Amongst framed investment schemes, the TPIO can be a viable and promising solution in triggering market uptake for clean energy projects, to ensure large adaptations to address various priorities, though its business model is still largely to be explored and tested. Developing countries that confront a rapid urbanization have a more significant privilege to shift directly to energy efficient buildings and sustainable transport (as most road transport infrastructure is yet to be built and new green constructions are to be erected) and subsequently adopt best financing engineering practices of alternative leveraged financing.

Conclusion

Urban infrastructure needs are constantly changing, and require increasingly innovative, intelligent, low carbon emitting technologies. Despite technical breakthrough and an economy of scale that will allow sustainable projects to be more cost effective, funding needs will be covered only if innovation is accompanied

by a financial engineering break-through. Solving the problem of funds mobilization for urban projects is anchored on: (a) a need of combination of long-term investment priorities with short-term logics of financing; (b) an ability to innovate and enter into alternative/unconventional financing schemes on a large scale, and finally (c) an availability of specialized financial institutions with specific financial and technical expertise and consciousness on the nature of sustainable urban projects.

To attain a leveraged effect of urban financing on a single project level, when a project involves multiple investors and there is need of various expertise (especially in PPP), an intelligent recourse to a Special Purpose Vehicle via project-based financing modality can exemplify a viable financing option for urban actors.

However, to secure long term massive investments and to gain an access to low-profitable and non-bankable segments, we propose to underpin the third party investment model. Third Party Investment Operators are new private-public urban actors that serve to provide alternatives to insufficiency of available funds by mutualizing various projects, participating in their capital, sub-contracting technical expertise and mobilizing public, private and community financing. The model can be a promising solution in triggering market uptake for deep energy retrofits, renewable energies and a shift to low carbon transport in cities.

Research efforts could be reinforced towards exploration of right viable financing patterns of private-public solutions for innovative, intelligent, low carbon emitting technologies that will cover urban sustainability needs. New emerging pilot projects can bring "demonstration and multiplier effect" and accelerate the pace of economic profits generation by urban actors and make cities more livable and climate friendly. Local governments in developed and developing countries could deliberate on initiation of similar structures and partnerships for one specific or multiple urban sectors, taking into account their specific legal and market conditions. The evolution of pioneering experiences will be closely followed to deduce their obstacles and development opportunities.

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Chapter 28

Tapping Into Transformative Potential: A Proposed Community Scoping Framework For Local Government Strategic Sustainability Planning

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Abstract

Strategic sustainability planning can tap into the transformative potential of a place and in so doing facilitate community-based transitions towards sustainability. Community scoping, one of the first steps in strategic sustainability planning, can help practitioners to understand and harness this transformative potential. The conventional purpose of community scoping has been to identify the place-specific factors (e.g., issues and assets) upon which strategic sustainability goals should be based. It is a vital step in strategic sustainability planning because it provides an opportunity for stakeholders to identify and discuss the things they really care about. This, in turn, helps to build the capacity and momentum needed to realize long-term sustainability goals. But much more could be accomplished through the community scoping step. I suggest that strategic sustainability planning practice stands at a critical juncture. By now, many practitioners and citizens have gained a good understanding of what it takes to successfully enact sustainability goals. Thus, the time is ripe to refine the methods that practitioners have been using in strategic sustainability planning. In this paper, I evaluate the community scoping frameworks that have been applied in local government strategic sustainability planning in Canada. Then, I propose an approach to community scoping that can help practitioners to bridge the divide between plan development and implementation phases, while considering core requirements for community-based transitions towards sustainability. Finally, I discuss the implications of this proposed approach for strategic sustainability planning practice.

1. Introduction

Strategic sustainability planning (SSP) entrains the fundamental hope of establishing a more equitable and ecologically rational way of living. In far too many cases, however, this hope has been dashed by the challenges that have been associated with creating and implementing strategic sustainability plans. Over twenty-five years of experience in SSP around the world have proven that these challenges may include organizational capacity concerns (e.g., lack of strong political leadership, insufficient financial resources, siloed organizational structures, etc.); community capacity matters (e.g., lack of support from community leaders, trust issues, etc.); and other systemic issues rooted in culturally embedded societal norms (see Doppelt, 2003a; Lafferty, 2004; Marbek, 2009). These problems reflect the tendency of sustainability goals to confront the status quo, as well as how difficult it can be to realize them within incumbent socioeconomic systems. They also reveal our understanding – or lack thereof – of how societal transitions have occurred in the past and how to intentionally facilitate them in well-established complex systems.

SSP scholars and practitioners have developed prescriptions for best practices that attend to the above mentioned and other common trials and tribulations in SSP. These prescriptions have tended to emphasize, among other things, the importance of paying attention to context (Connelly et al., 2008), alignment of strategic plans and priorities (Poister & Streib, 2005), long-term strategic management (Poister, 2010), inter-departmental communications (Doppelt, 2003a), collaborative multi-stakeholder decision making (Clarke, 2010), and inter-organizational co- operation (Clarke, 2010). Understandably, the bulk of this research has focused on how to

more successfully implement sustainability goals in well-established community systems.

Much less attention, however, has been devoted to the practical implications of these challenges and best practices for the frameworks that practitioners have been using on the ground. Specifically, more research is required to better understand how these challenges and best practices might be addressed in the plan development stage of SSP. Indeed, the tendency in the practitioner and scholarly research has been to perceive plan development and implementation stages as independent as opposed to integrated (see Connelly et al., 2008; Clarke, 2010). Thus, today, SSP practice may stand at a critical juncture, where the past twenty-five years of learning about challenges and best practices should provide the basis for refining the frameworks that practitioners have been using on the ground.

In this paper, I evaluate the community scoping frameworks that have been applied in local government SSP in Canada. Community scoping is one of the first steps in the plan development phase of SSP. In public-sector SSP, the purpose of community scoping has been to identify the place-specific factors (e.g., issues/challenges and assets/opportunities) upon which sustainability goals should be based. Directions for the community scoping step are included in well-known SSP frameworks including, among others, The Natural Step (2009), Local Agenda 21 (ICLEI & IDRC, 1996), and the EarthCAT Guide (Hallsmith et al., 2005). These SSP frameworks give more or less different instructions on when and how to undertake community scoping. Despite their differences, they all cover the content and process components of community scoping. Content components include the concepts and principles that comprise the frameworks, as well as the worldviews that underpin them. The process components include when the community scoping step is undertaken and the methods used to engage the general public.

In other sectors, other terms have been used for community scoping. In private-sector strategic planning, for example, it has been called "Environmental Scanning" and one well-known framework is SWOT, which investigates an organization's internal and external Strengths, Weaknesses, Opportunities and Threats. Regardless of what it has been called, community scoping is a vital step in strategic planning because it brings stakeholders together in a space where they can share their ideas for the future, and identify and discuss that which they really care about. This, in turn, helps to build the capacity and momentum needed to realize long-term sustainability goals. But, given the lessons learned about the challenges and best practices in SSP, much more could be accomplished through the community scoping step.

In Section 2, below, I describe how community scoping could be used as a tool to tap into the transformative potential of a place. Then, in Section 3, I describe the methods that were used to evaluate the applied community scoping frameworks. In Section 4, I present the results of the analysis and discuss some key findings that emerged. Finally, in Section 5, I describe the

proposed approach to community scoping and discuss the implications of this approach for SSP practice.

2. Tapping Into Transformative Potential Through Community Scoping

Practitioners encounter a diverse range of contextual factors in SSP (e.g., actors, governance networks, values, local social-ecological issues and assets, etc.). Understandably, the tendency has been to perceive these factors as challenges to and/or enablers for implementing sustainability goals (see Doppelt, 2003b; de Vries, 2010; The Natural Step, 2009b). At this point in time, however, it may be more fruitful to reframe them as things that comprise the "transformative potential" of a place. Because community scoping is essentially concerned with these contextual factors, it can be used to better understand and harness this transformative potential.

Here, the term transformative potential is rooted in Gunderson and Holling's (2002) theory of transformative change in complex social-ecological systems. It is also rests on the notion of "bricolage" in institutional theory (see Campbell, 2004). With respect to the former, Gunderson and Holling posit that the identity of complex social-ecological systems changes according to a repeating adaptive cycle of development that consists of four basic stages: rapid growth, conservation, release and reorganization. Potential is one emergent system property that fluctuates throughout these four stages of development. Gunderson and Holling recognize the simplicity of the adaptive cycle concept and that more research is required to better understand its applicability in complex social-ecological systems. But it is useful for the purposes of this paper because it situates the notion of potential within a framework of transformative change. To summarize, a system's potential is highest in the late conservation stage of the adaptive cycle. This is when certain actors and organizations have become dominant, networks of relationships have formed, and the institutions of a particular social-ecological system have become well established. These established actors, relationships and institutions use the accumulated "capital" (i.e., governance networks, natural and financial resources, skills, etc.) in the system for their own growth and maintenance. As time goes on, they control this potential more and more. Eventually, the system becomes so rigid and tightly controlled that its capacity to adapt to change diminishes to the point where one or many disturbances push the system beyond a critical threshold. Once a threshold is crossed, the potential that was locked up in the system is suddenly released and made available for reorganization. The system that emerges may be slightly or fundamentally different from the previous one.

As Gunderson and Holling stress, the capital tied up in an established system constitutes the potential for other kinds of systems and futures. This is similar to the notion of bricolage in the New Institutionalism. The New Institutionalism constitutes a rich body of literature dedicated to understanding and explaining how human-made institutions emerge, persist, change, and influence human behaviour (see Hall & Taylor, 1996). New Institutional scholars have used the concept of bricolage to explain how actors craft novel institutions based on the range of extant, dominant and marginal ideas available to them (Campbell, 2004). Past and present ways of thinking and practice, then, constitute part of the potential for alternative futures. In Gunderson and Holling's (2002) explanation of transformative change, disturbances are emphasized as key to releasing this potential. Change is depicted as innate and inevitable. But New Institutional scholars have placed more emphasis on the roles that actors play to purposefully bring about institutional change. As Streeck and Thelen (2005) have illustrated, many incremental changes made by actors over time may lead to transformative change.

SSP represents a conscious attempt by actors to facilitate transitions in organizations and/or complex community systems. This requires an understanding of the transformative potential of a place. Generally speaking, much more research is needed to better understand the concept of transformative potential and how it might be measured and interpreted, especially in the context of SSP. One logical corollary is the threshold concept, which may become part of practitioners' conscious efforts to initiate transitions. At this point, it seems reasonable to assert that each place will possess a different amount and type of transformative potential, depending on a diverse range of context-specific factors. Moreover, how practitioners and citizens' understand this potential depends, in part, on the frameworks they develop to investigate it.

As previously mentioned, the conventional purpose of community scoping in SSP has been to better understand the contextual factors (e.g., issues, assets, etc.) upon which sustainability strategies should be based. These place-specific factors reflect the actors, governance networks, skills, customs, structures and processes, etc., that comprise established community systems. But they can be reframed as factors that shape the transformative potential of a place. In identifying and exploring these place-specific factors, the community scoping step can tap into the transformative potential of a place and in so doing more successfully facilitate community-based transitions towards sustainability. But this requires a shift in current community scoping practice. The approach that I propose is based on an analysis of community scoping frameworks that were applied in local government SSP in Canada. Section 3, below, describes the methods I used in this analysis.

3. Methods

The purpose of the evaluation was to better understand how practitioners have been undertaking community scoping in local government SSP in Canada. Using 2006 Statistics Canada population data for municipalities, I undertook an inventory of municipal SSP initiatives. I focused on municipalities with populations of 10,000 and up. Municipal web sites were searched for strategic sustainability plans that were approved by relevant authorities between the years 2000 and 2010. Since SSP may take many forms, I developed a set of criteria to guide my selection of plans for further analysis. These selection criteria are presented in Box 1, below.

Box 1. Strategic Sustainability Plan Selection Criteria

1. The plan adopts a community-wide scope.
2. The plan is high-level and seeks to influence lower- and same-level plans, policies, etc.
3. The plan adopts a long-term perspective (5 years or over).
4. The plan explicitly adopts the concept of sustainability.
5. The plan sets out social, economic, and ecological objectives and goals.
6. The plan includes a description of community-specific concerns.
7. The objectives and goals seek to adjust aspects of community systems.
8. The planning process included input from the public.
9. The plan includes a consideration for the implementation stage and/or an implementation plan.
10. The plan was developed and approved by relevant authorities between the years 2000 – 2010.

In total, 67 plans were selected for inclusion in the study. Twenty-seven plans included enough information about the community scoping step to be considered for an in-depth examination (see Appendix A). The analysis focused on the following key content and process components of the applied community scoping frameworks:

- the purpose for which community scoping was undertaken,
- the range of concerns initially covered by the frameworks, and
- the range of concerns elicited from the public through application of the frameworks.

With respect to the purpose of community scoping, the analysis focused on when it was undertaken and whether the identification of community concerns extended around implementation considerations. Here, the aim was to better understand how community scoping frameworks have been used in the plan development phase to connect strategic goals to place- specific enactment needs, constraints and opportunities. With respect to the range of concerns covered, the analysis focused on whether the frameworks devoted attention to generic requirements for community-based transitions towards sustainability. A particular evaluative lens was developed for this purpose. This evaluative lens is described in Section 3.1., below.

3.1 Evaluative lens

The evaluative lens was used to better understand the range of concerns covered by the community scoping frameworks. It was comprised of core concepts from three bodies of literature: sustainability assessment, social-ecological resilience theory, and the New Institutionalism. Together, these fields of research attend to the core requirements for community-based transitions towards sustainability.

Sustainability assessment sits at the leading edge of a spectrum of integrative approaches to decision making (see Dalal-Clayton & Sadler, 2005). Sustainability assessment scholars have devoted much attention to figuring out precisely what sustainability should mean, as well as how sustainability concerns should be

incorporated in decision-making processes (see Partidario & Clark, 2000; Pope et al., 2004). They have also developed many different sets of criteria to guide

decision making (e.g., George, 1999; Hermans & Knippenberg, 2006). For the purposes of this study, Gibson et al.'s (2005) generic decision-making criteria for sustainability were used. They represent the features of the concept that are common to a diverse range of interpretations and rest on an integrated understanding of social-ecological systems, present and future timeframes, and local-to-global scales. They cover a comprehensive suite of generic sustainability concerns, including social-ecological system integrity, livelihood sufficiency and opportunity, intra- and intergenerational equity, resource maintenance and efficiency, civility and democratic governance, and precaution and adaptation (see Appendix B).

Social-ecological resilience theory emerged out of Holling's observations about transformative change in complex ecological systems (see Holling, 1973). Here, resilience is defined as the capacity of a social-ecological system to absorb and adapt to change while still maintaining essentially the same identity (Folke, 2006). It is important to note, however, that resilience can be positive or negative. For example, ecologically destructive systems that are very resilient and resistant to change possess a negative type of resilience. Resilience researchers have developed generic criteria for a resilient and sustainable world (Walker & Salt, 2006). They have also developed concepts that planners can use to figure out how communities are changing in response to various internal and external drivers (Resilience Alliance, 2007). With this knowledge, planners can create strategies that aim to ensure that communities respond to change in ways that contribute to community well being. For the purposes of this study, Walker and Salt's (2006) generic criteria for a resilient world were used. They emphasize the dynamic properties of complex systems including, among others, diversity, modularity, ecological variability, slow variables and feedback loops (see Appendix B). As such, they complement Gibson's sustainability criteria, which are more oriented towards the distributive dimensions of social-ecological systems.

As previously described, the New Institutionalism constitutes a rich body of literature dedicated to understanding how human-made rules emerge, persist, change and influence human behaviour. According to Scott (2001), these rules may be formal (e.g., laws, standards, etc.) or informal (e.g., shared beliefs and customs). Actors create and maintain the rules that, in turn, constrain the range of options available to them when the time comes to change the rules (Hall & Taylor, 1996). As such, these rules may provide both opportunities and/or barriers to change (Campbell, 2004; Brown, 2005). Some ubiquitous concepts in New Institutional scholarship include path dependency, which explains how history matters with respect to the extent to which institutions change; agency, which emphasizes the pivotal role that actors play in institutional change; and tipping points, which, similar to Gunderson and Holling's (2002) interpretation of thresholds, signifies the point at which incremental or more transformative change may occur. Planners can use these and many other insights generated by New Institutional scholars in order to better understand how to facilitate transitions in well-established community systems. In SSP, for example, these insights would direct planners to investigate the formal laws and informal patterns of thinking and behaving that may help and/or hinder the successful implementation of sustainability goals. For the purposes of this study, Scott's categorization of formal and informal institutions was used in order to examine the range of institutional concerns covered in the community scoping step (see Appendix B).

This evaluative lens and the overarching theme of transformative potential helped to reveal

important insights about trends in community scoping practice in local government SSP in Canada, as well as opportunities to refine community scoping frameworks. In Section 4, below, I discuss the main insights that emerged.

4. Results and Discussion

4.1 The purpose for which community scoping was undertaken

The findings revealed that practitioners have generally been undertaking community scoping once, early in the plan development stage. In the vast majority of initiatives, the community scoping step included the public through a variety of more or less deliberative methods including, to name a few, workshops, surveys and questionnaires, and in-person interviews. Generally, the task of identifying community concerns was combined with visioning, and the information elicited from the public provided the basis for the strategic goals and/or other actionable items (e.g., actions, targets and strategies), as well as the overarching vision and objectives.

Of note here is that the community scoping step has been primarily focused on the plan development phase of SSP. In the vast majority of cases, the community scoping step did not extend around a concern for the context-specific needs, constraints and opportunities that might constrain or enable implementation. In other words, the goals and other actionable items that emerged out of the community scoping step were not investigated through another round of community scoping aimed at identifying the place-specific enactment requirements associated with them. This reflects and contributes to the prevailing gap that exists between plan development and implementation phases. Indeed, as Connelly et al. (2008) assert, one major problem in SSP has been that plan development and implementation stages have not been interpreted in a holistic way.

In not addressing the implementation side of strategic planning in a detailed way through community scoping, a valuable opportunity has been missed to tie strategic goals to place- specific enactment requirements and tap into the transformative potential of a place early in the plan development process.

4.2 Range of concerns initially covered by the frameworks

As previously mentioned, I used an evaluative lens comprised of sustainability, social-ecological resilience and institutional change criteria in order to better understand the range of concerns initially covered by the community scoping frameworks. The findings revealed that, generally speaking, the community scoping frameworks did not rest on a set of principles or criteria in order to ensure that a particular range of concerns would be covered in application. Rather, they were comprised of open-ended questions and/or predetermined response options (e.g., “agree” or “disagree” on predetermined policy alternatives).

Regardless, the findings revealed that a good range of sustainability and institutional change concerns was covered. In both the open-ended and predetermined response approaches, the frameworks were generally geared towards identifying community values, desires for the future, ideas for change, change needs, issues/ challenges, and assets/opportunities. Thus, an implicit

theme of transitions towards sustainability underpinned many of the community scoping frameworks. In some cases, an explicit theme was found, including human needs, external threats, and quality of life, to name a few. It is important to note, however, that the community scoping frameworks that were comprised of open-ended questions tended to cover a wider range of sustainability and institutional change/transitions concerns than frameworks that used predetermined response options. This is because the open-ended questions generally allowed for a wider range of potential responses.

The least addressed concerns were social-ecological resilience ones. More research is required to understand why. Clearly, the concept of social-ecological resilience has not yet penetrated municipal strategic sustainability planning practice in Canada in a pervasive way. In relation to this finding, a question emerges about the efficacy of approaches to community scoping that are not underpinned by a set of guiding principles or criteria. The

findings revealed that a good range of sustainability and transitions concerns was initially covered; however, if a set of principles had been used, it is conceivable that a more comprehensive range of sustainability, social-ecological resilience and transitions matters would have been covered. Thus, a hybrid approach comprised of open-ended or predetermined response options that cover a particular set of concerns may be most effective.

4.3 Range of concerns elicited from the public through application of the frameworks

The findings revealed that a similar range of sustainability, social-ecological resilience and institutional change/transitions concerns emerged, regardless of whether an open-ended or more restrictive approach was used. Generally speaking, communities were most concerned about livelihood sufficiency and opportunity, resource maintenance and efficiency, and civility and democratic governance issues, as defined by Gibson et al. (2005). These issues were expressed differently from place to place. Intra- and intergenerational equity, precaution and adaptation concerns tended to be ignored. Similarly, generally speaking, social-ecological resilience and transitions concerns did not often emerge. This finding about transitions considerations leads back to the point made earlier about how the community scoping step has tended to focus primarily on plan development concerns as opposed to extending around both development and implementation matters.

The findings also revealed a connection between the community scoping methods used and the quality of the concerns elicited form the public. When workshops or other deliberative methods were used to undertake community scoping, and when the community scoping frameworks were comprised of open-ended questions, the responses that emerged tended to reflect the context- specific values, issues, assets, etc., of a place. Conversely, when mail-out surveys or questionnaires were used, and when the frameworks were comprised of predetermined response options, the responses tended to reflect the generic quality of the predetermined response options.

Deliberative settings and open-ended questions, then, seem to be more effective in terms of better understanding community-specific sustainability, resilience and transitions concerns and, by extension, the transformative potential of a place.

The above findings begin to underscore some key areas where community scoping practice could be refined. These will be described in Section 5, below.

5. Proposed Approach to Community Scoping and Implications for Practice

The approach to community scoping that I propose refines practice in two key ways, with various practical implications for conventional SSP. First, I propose that community scoping frameworks should aim to better integrate the development and enactment stages of SSP. This can be done if practitioners undertake two rounds of community scoping during the plan development stage, one aimed at uncovering the context-specific basis upon which strategic goals should be based, and one aimed at identifying the context-specific enactment needs, constraints and opportunities associated with these goals.

Here, the main implications for practice are process related. Two rounds of community scoping would require two rounds of public engagement, each with a different set of stakeholders. The second round should involve more targeted stakeholder participation in order to connect the goals that were created with the members of the community needed to implement them. This would give them an opportunity to revise the goals based on what they believe would be feasible over the short and long term. Two rounds of public engagement may require more time and financial resources than are usually devoted to the plan development stage. This may be remedied with some creative thinking about the amount of time dedicated to each round as well as when they would occur in the plan development stage. Other process implications include ensuring that the terms of reference for developing strategic sustainability plans cover two rounds of public engagement for community

scoping purposes.

The second refinement relates to the content and process components of community scoping. Namely, I propose a hybrid approach to developing community scoping frameworks. More research is required to determine precisely what this should mean; however, based on the above described research findings, it seems most effective to base community scoping frameworks on a comprehensive suite of generic principles for community-based transitions towards sustainability. The evaluative lens that I used in this study represents one possible suite that could be used for this purpose. However, they would need to be translated for a non-academic audience. Here is where it may be useful to combine a set of open-ended questions with a suite of guiding principles in a deliberative workshop setting. The open-ended questions would be accessible to the public and flexible with respect to the range of responses that could emerge, while the principles would help to ensure that the questions covered the core generic requirements for community-based transitions towards sustainability. Two different sets of questions and principles would be needed, one for the first round of community scoping, which would be oriented towards identifying community values, desires, issues and assets, etc.; and one for the second round, which would be geared towards identifying place-specific enactment needs, constraints and opportunities.

This proposed approach to community scoping requires more research and refinement through application. Indeed, there may be many more implications for practice than mentioned here. At this early stage, however, it seems that the proposed approach would help to address the gap that persists between plan development and implementation phases of SSP, as well as cover a more comprehensive suite of generic requirements for community-based transitions towards sustainability. Together, these two refinements would enhance practitioners' capacity to tap into a community's transformative potential and, in turn, more successfully facilitate community-based transitions towards sustainability.

6. Summary

Community scoping is one of the first steps in SSP. The conventional purpose of community scoping has been to identify the place-specific factors upon which strategic sustainability goals should be based. It is a vital step in SSP because it provides an opportunity for stakeholders to identify and discuss the things they really care about. This, in turn, helps to build the capacity and momentum needed to realize long-term sustainability goals. But much more could be accomplished through the community scoping step.

In this paper, I examined the community scoping frameworks that have been applied in local government SSP in Canada. The analysis focused on some key content and process components of community scoping frameworks. An evaluative lens was developed based on sustainability, social-ecological resilience and institutional change/transitions concerns. These concerns cover the core requirements for community-based transitions towards sustainability. The findings revealed that community scoping frameworks have concentrated primarily on plan development considerations as opposed to both development and implementation matters. This has contributed to the gap that persists between plan development and enactment phases. Generally, the community scoping frameworks were comprised of open-ended questions and/or predetermined response options. The frameworks comprised of open-ended questions initially covered a wider range of sustainability, social-ecological resilience and transitions concerns. In application, both approaches elicited a similar range of sustainability, resilience, and transitions concerns from the public. The open-ended approaches, however, tended to draw out context-specific responses, while the responses elicited from the predetermined approaches tended to reflect the generic quality of the predetermined options.

Based on these findings, I proposed an approach to community scoping that would help to bridge the gap between plan development and implementation phases, while considering core requirements for community-based transitions towards sustainability. Two rounds of community scoping should be undertaken in the plan development phase. The first round should be aimed at uncovering the context-specific basis upon which strategic goals should be based. The second round should be aimed at identifying the context-specific enactment needs, constraints and opportunities associated with these goals. This would require two rounds of public engagement, each with a different set of stakeholders. The second round should involve more targeted stakeholder participation in order to connect the goals that were created with the members of the community needed to implement them. Community scoping frameworks should be comprised of open-ended questions structured around a comprehensive suite of generic principles for community-based transitions towards sustainability. Two different sets of questions should be used, one for the first round of community scoping and one for the second round. Together, these refinements would enhance practitioners' capacity to tap into a community's transformative potential and, in turn, more successfully facilitate community-based transitions towards sustainability.

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Appendix A

The table, below, lists the municipal strategic sustainability plans that were selected for the in- depth analysis of applied community scoping frameworks.

Municipal Strategic Sustainability Plan Selected for In-Depth Analysis

Province/Territory	SSP Initiative
Alberta	Camrose Municipal Sustainability Plan
	Cochrane Sustainability Plan
	Lethbridge City Municipal Development Plan/Integrated Community Sustainability Plan
	Lethbridge County Integrated Community Sustainability Plan
	Spruce Grove Your Bright Future Municipal Development Plan
British Columbia	Fort St. John Today & Tomorrow: Our Strategic Plan
	Prince George Integrated Community Sustainability Plan
	Prince Rupert Quality of Life Community Plan
	Sooke DM Official Community Plan
	Sooke DM Sustainable Development Strategy
	Williams Lake Imagine Our Future Integrated Community Sustainability Plan
Newfoundland and Labrador	Gander Integrated Community Sustainability Plan
	Mount Pearl Integrated Community Sustainability Plan
Northwest Territories	Yellowknife Community Based Strategic Plan
	Yellowknife Smart Growth Development Plan
Nova Scotia	Cape Breton Regional Municipality Integrated Community Sustainability Plan
	Chester Municipality Integrated Community Sustainability Plan
	Municipality of the District of Lunenburg Integrated Community Sustainability Plan
	Truro Community Sustainability Plan
	West Hants Municipality Integrated Community Sustainability Plan
Ontario	Bracebridge Community-Based Strategic Plan
	Collingwood Sustainable Community Plan
	Huntsville Unity Plan
	Kingston Sustainable Kingston Plan
	Mississauga Strategic Plan: Move, Belong, Connect, Prosper, Green
Prince Edward Island	Charlottetown Integrated Community Sustainability Plan
Yukon Territory	Whitehorse Strategic Sustainability Plan

Appendix B

Gibson et al.'s (2005) generic decision criteria for sustainability, Walker and Salt's (2006) generic criteria for a resilient world, and Scott's (2001) categorization of institutions comprised the evaluative framework used in this study. They are presented, in turn, below.

Gibson et al.'s (2005) Generic Sustainability Decision Criteria

Social-ecological system integrity – ensure that all decisions, activities, etc., seek to establish and maintain the long-term integrity of socio-biophysical systems and protect the irreplaceable life support functions upon which human as well as ecological well-being depends.

Livelihood sufficiency and opportunity – decisions, actions, etc., should ensure that everyone and every community has enough for a decent life and that everyone has opportunities to seek improvements in ways that do not compromise future generations' possibilities for sufficiency and opportunity.

Intragenerational equity – decision, actions, etc., should ensure that sufficiency and effective choices for all are pursued in ways that reduce dangerous gaps in sufficiency and opportunity (and heath, security, social recognition, political influence, etc.) between the rich and the poor.

Intergenerational equity – ensure that all decisions favour present options and actions that are most likely to preserve or enhance the opportunities and capabilities of future generations to live sustainably.

Resource maintenance and efficiency – ensure that all decisions seek to provide a larger base for ensuring sustainable livelihoods for all while reducing threats to the long-term integrity of socio-ecological systems by reducing extractive damage, avoiding waste and cutting overall material and energy use per unit of benefit.

Social-ecological civility and democratic governance – build the capacity, motivation and habitual inclination of individuals, communities and other collective decision making bodies to apply sustainability requirements through more open an better informed deliberations, greater attention to fostering reciprocal awareness and collective responsibility, and more integrated use of administrative, market, customary and personal decision making practices.

Precaution and adaptation – respect uncertainty, avoid even poorly understood risks of serious or irreversible damage to the foundations for sustainability, plan to learn, design for surprise and manage for adaptation.

Immediate and long-term integration – apply all principles of sustainability at once, seeking mutually supportive benefits and multiple gains.

Walker & Salt's (2006) Criteria for a Resilient World

Diversity – A resilience world would promote and sustain diversity in all forms (biological, landscape, social, and economic.

Ecological variability – A resilient world would embrace and work with ecological variability (rather than attempting to control and reduce it).

Modularity – A resilient world would consist of modular components.

Acknowledging slow variables – A resilient world would have a policy focus on "slow", controlling variables associated with thresholds.

Tight feedbacks – A resilient world would possess tight feedbacks (not too tight).

Social capital – A resilient world would promote trust, well-developed social networks, and leadership (adaptability).

Innovation – A resilient world would place an emphasis on learning, experimentation, locally developed rules, and embracing change.

Overlap in governance – A resilient world would have institutions that include "redundancy" in their governance structures and a mix of common and private property with overlapping access rights.

Ecosystem services – A resilient world would include all the unpriced ecosystem services in development proposals and assessments.

Scott's (2001) Categorization of Institutions

	Regulative	Normative	Cultural-Cognitive
Basis of compliance	Expedience	Social obligation	Taken-for-granted, shared understandings
Basis of order	Regulative rules	Binding expectations	Constitutive schema
Mechanisms	Coercive	Normative	Mimetic
Logic	Instrumentality	Appropriateness	Orthodoxy
Indicators	Rules, laws, sanctions	Certification, accreditation	Common beliefs, shared logics of action
Basis of legitimacy	Legally sanctioned	Morally governed	Comprehensible, recognizable, culturally supported

Section 10

Good Governance of Extractive and Land Resources

GLOBAL ASSOCIATION
Master's in Development Practice Programs

Sustainable Development Practices: Advancing Evidence-Based Solutions for the Post-2015 Agenda.

Proceedings of the 2013 International Conference on Sustainable Development Practice

Chapter 29

Benefit Sharing and Natural Resources Use: the case of the Niassa Reserve, Mozambique

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Abstract

Benefit sharing is a mechanism through which local populations and communities directly benefit from the transfer of economic resources derived from the sustainable use of natural resources. The concept has been consolidated by the Convention on Biological Diversity, yet despite its relevance, benefit sharing has been sparsely and unevenly implemented around the world. In Mozambique, the national law (Decree Nº. 12, June 6th, 2002) requires that 20% of total revenues generated from state-collected fees for the direct use of natural resources be transferred to local communities. The money is transferred and managed by the communities themselves, and they must define their application to social and environmental benefits that reach the largest possible number of beneficiaries. Most communities in Mozambique living near or within protected areas are beneficiaries of this mechanism, which has been operating for over a decade. This study examines the cash transfer benefit sharing mechanism in the Niassa Reserve, Mozambique, and the perception of beneficiary communities.

Introduction

The Convention on Biological Diversity (CBD) is an international agreement adopted on 22 May 1992 and opened for signature on 5 June 1992 at the United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro. More than 190 countries has ratified the Convention and are working together to implement its three main goals: 1) conservation of biodiversity; 2) sustainable use of its components and; 3) fair and equitable sharing of the benefits arising out of the utilization of genetic resources. While the two first goals seems to have reached more significant achievements in the last two decades, the implementation of the third one remains a challenge for most of the signatories parties of the Convention.

In a broader sense, fair and equitable benefit sharing can be defined as a mechanism through which local populations and communities are directly benefitted with the direct or indirect transfer of economic resources derived from the sustainable use of natural resources. This mechanism, as mentioned, is associated with the CBD's goal less implemented by countries mostly due to legal and moral implications frequently related to State sovereignty, traditional knowledge associated with genetic resources, economic development, scientific research, the industry dependency on genetic resources, amongst other topics. The mechanism predicts that any company, institution, or country that makes commercial use of biological resources, accessing or not the traditional knowledge associated to local and traditional communities, must return part of the economic gains acquired to the communities. The benefit sharing aims to contribute to improving the quality of life and development of local communities, as well as encourage them to maintain their cultures and practices of nature conservancy.

Only in 2010, during the 10th Conference of the Parties, in Japan, CBD adopted a supplementary

agreement providing a transparent legal framework for the effective implementation of benefit sharing by the countries: the Nagoya Protocol. However, specific rules and guidelines for benefit sharing still should be defined by national legislations.

Currently, about 40 countries have some form of regulation in this regard, most of them establishing rules for access and benefit sharing inside and outside protected areas.

Access and benefit sharing inside Protected Areas (PAs) are also a controversial subject. While most restricted categories of protected areas, such as those classified as category I and II according IUCN's system, not allow direct use (or access) of biodiversity, other were designed to promote sustainable use (eg. PAs under the IUCNs categories V and VI) and the economic benefits generated should also be fair and equitably shared with the local communities, despite the fact of the protected areas territory is under public or private domain.

Protected areas offer tremendous direct and indirect economic, cultural, ecological, spiritual, and scientific benefits to society. The direct and indirect use of natural resources offer a great opportunity for local communities experiencing economic development derived from job opportunities created, either by the implementation of mechanisms for benefit sharing. Also, offer a great opportunity to catalyze the awareness to emphasize the economic importance of conservation (MULLER, 2007). Protected areas are special cutouts of maintenance of essential natural resources and ecosystem services. However, they are often seen as untouchable refuges where economic development is not compatible. This utilitarian view does not allow the majority of society realize the benefits of protected areas, nor the positive progress of structural projects, and several activities performed in the direct surroundings of protected areas such as industrial power plants, agriculture, and tourism (MEDEIROS & YOUNG, 2011). Despite the issue of traditional communities living in the vicinity or inside protected areas being extremely delicate, it is the key focus for the transformation of society's perception about these spaces. Furthermore, it offers the opportunity to create a dual relationship, both cultural and socio-economic.

Several mechanisms for benefit sharing related to protected areas has been implemented in the last decades, especially in Africa, in regions associated with poverty and wildlife. In some cases, conditional cash transfer (CCT) are the main instrument adopted. CCT is a mechanism where its main objective is to provide money to the beneficiaries contingent on certain behavior, usually conservation and sustainable use of natural resources. CCTs aims also to contribute to poverty alleviation and awareness of local population on the importance to conserve the protected area. However, to work properly, communities has to be well prepared to manage and understand the mechanism, otherwise new conflicts will emerge. CCTs mechanisms requires a big load of empowering, participation and autonomy of communities. Furthermore, it also involve interpretations, interests, and expectations of all those involved.

Many local communities living inside or near protected areas in Zimbabwe, Zambia and South Africa, for example, have part of their income derived from cash transfer from tourism and/or sport hunting activities in parks and game reserves (JOHNSON, 1997; JONES & MURPHREE, 2001; CHILD & DALAL-CLAYTON, 2004). Additionally, many countries now have legislation in place to ensure that local communities be benefited directly from revenues collected by protected area authorities. For example, tourist entry fees or hotel levies are some of the common way to collect revenue from the use of the protected area. In Uganda, revenue sharing is supported by a Wildlife Statute, and 12% of gross profits generated by parks goes back to local communities (WORAH, 2002).

In Mozambique, the national legislation (Decree No. 12, dated June 6, 2002) foresees the transfer of 20% of total revenues generated from exploitation of flora and fauna by the State to the local communities. The money is transferred and managed directly by the communities, that must define the investment in socio-environmental benefits that reach the largest possible number of community members. Most populations in Mozambique living near or within protected areas are beneficiaries of this mechanism, which recently completed ten years

since its creation.

This study examines the cash transfer benefit sharing mechanism in the Niassa Reserve, Mozambique, and the perception of beneficiary communities.

Research Methodology

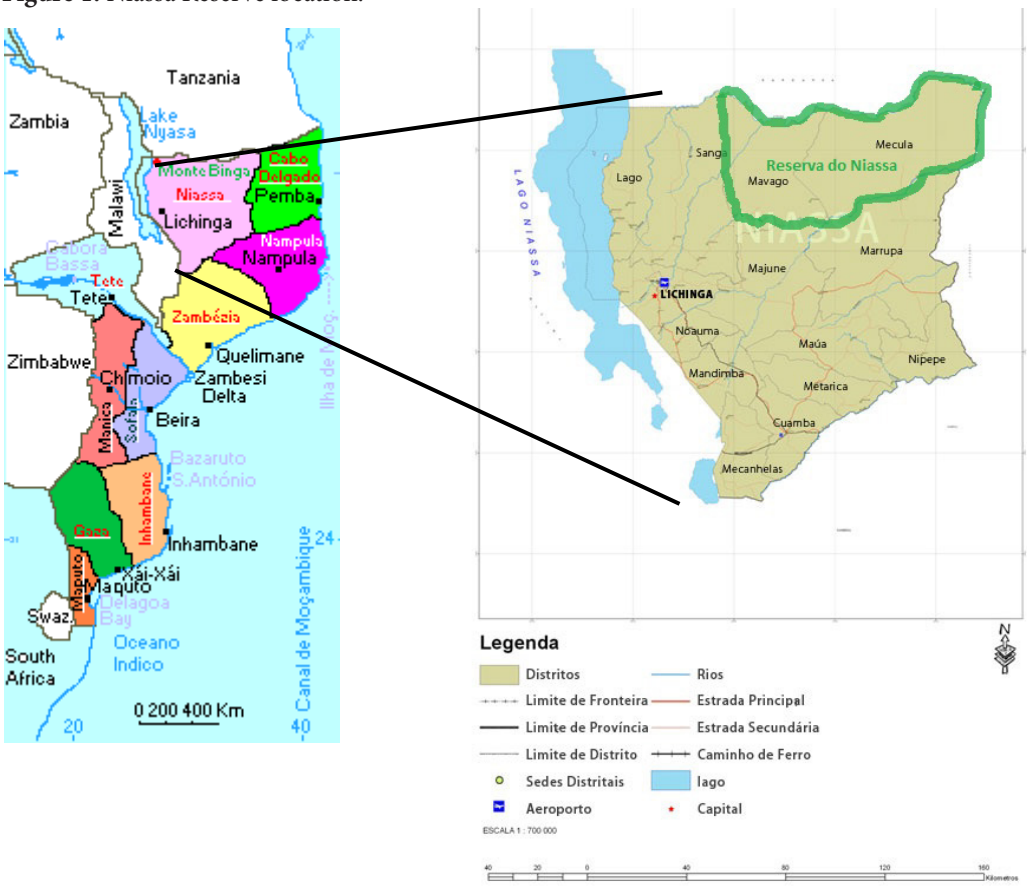
The Niassa Reserve, with an area of 42400 km², including its buffer zone, is located in Niassa province in northern Mozambique (figure 1). It was founded in 1954 but legally created by Decree n. º 2884 July 23, 1960.

The Niassa Reserve is considered one of the major remaining forest of "miombo", protecting in its limits one exuberant faunal and floristic richness recognized by the scientific community. It is the second largest protected area in the African continent and serves as a refuge for one of the largest elephant populations in the world, a fact that puts them in constant state of alert because of the significant increase in trafficking of ivory in the region.

The Niassa Reserve allows the activity of hunting sports, main source of income of the Reserve, and also ecotourism activities.

Currently, there are approximately 35,000 people living within its boundaries, manly in two provincial districts, Mecula and Mavago. Niassa is the province with one of the lowest Human Development Index of Mozambique.

Figure 1: Niassa Reserve location.



To achieve the proposed objectives at work, data collection, and analysis were conducted regarding the legal instrument that refers to the transfer mechanism, and other documents and reports produced by responsible committees for the distribution of resources for the *regulados* and their communities. The *regulados* are administrative units within a district, with leaders called *régulos*, who officially respond to all communities in their area. This analysis aimed to identify all steps involved in the transfer of resources to communities, as well as the resource destination by the beneficiary communities.

A set of key actors involved in the process (representatives of beneficiary communities, representatives of resource managers committees, representatives of the Niassa Reserve, the provincial government and national government) was identified and fourteen semi-structured interviews were conducted. The relationship with the profile of respondents is presented in Table 1. Each interview sought to evaluate two central questions: (i) the level of knowledge about the contents of the legal instrument and its application, and (ii) its functionality based on the benefits achieved by community.

Table 1. No. of interviews per participants of the process

NUMBER OF INTERVIEWS PER PARTICIPANTS	
Participants of the process	**Number of interviews**
Communities	6
Committee Representatives	3
Representatives of Government and Reserve Management	4

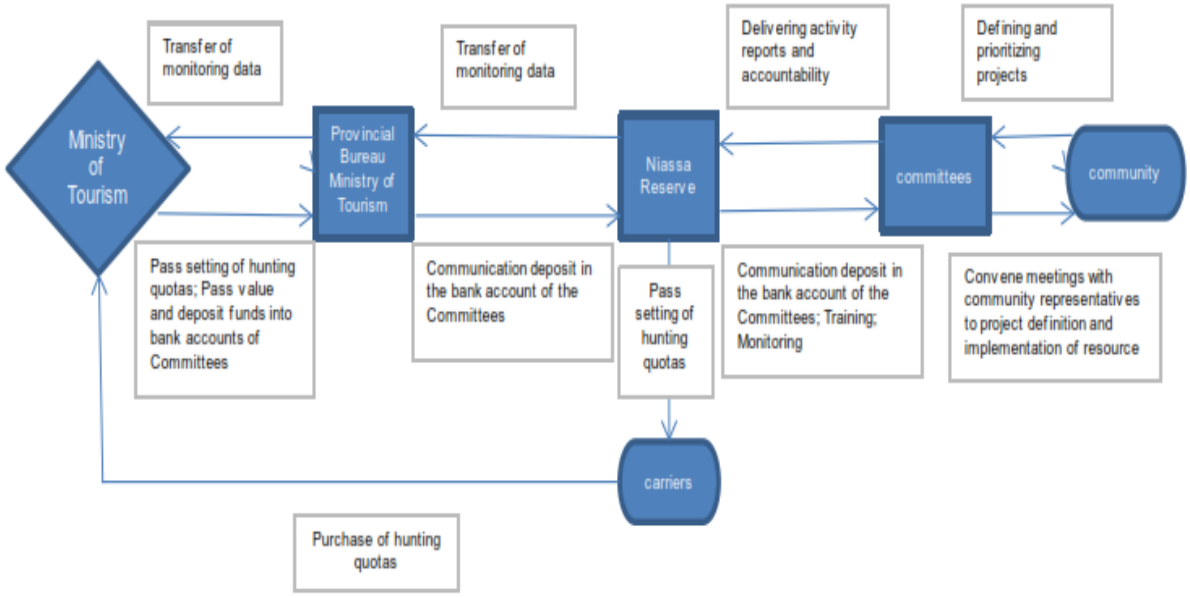
An in loco verification on the effective money transfer to the communities and the benefits generate with the use of the resources was made from the visits to the two beneficiaries communities located within the Reserve (Mecula and Mussoma). In each community, based on the information obtained by the interviews with the community leaders, the benefits generated through funds derived from the transfers were identified.

Results

The creation of a ministerial statute which deals with the 20% of economic benefits transferred to communities, due to the access and use of forest and wildlife resources, elapses, according to the provincial director of tourism, from the recognition that those people are the responsible for resource conservation. In his words, *"it was seen that these resources are more protected by the communities, and what would be the benefits for them? It would be only cutting wood, hunting to eat meat, while there are operators that do elephant hunting and exploit wood? It became a diploma that states that 20% of the fees derived from the exercise of wood cutting or hunting should return to the community"*. According to this public manager, the fact that the communities are deprived from some activities, and from the free exploitation of resources, when there is the presence of formal explorers, also directed the creation of the instrument.

To manage this mechanism a hierarchical structure was also set up that allows the occurrence of flaws (Figure 2).

Figure 2. Flowchart of responsibilities and activities



The basis of this structure is formed by the "mother committees", which are collegiate structures formed by community workers from different communities, with at least 10 representatives. These committees receive funds transferred by the State that are managed on a specific bank account. It is up to each "mother committee" to distribute these resources for the subcommittees. Moreover, it is the role of the "mother committee" to argue in favor of investments that benefit the community as a whole, monitoring the application, periodically submitting reports on the use of the resource to the Reserve, and reporting situations that compromise the good progress of the process. These committees act by representing various communities or villages. Subcommittees formed by tribal chiefs, and neighborhoods secretaries, among other socially recognized figures, represent each village and are responsible for the decision, theoretically representing the collective desires regarding the implementation and execution of the budget.

It is up to government entities to integrate this structure (the district government, the provincial government and the Niassa Reserve), including monitoring the process, giving technical support, training, and directing the application for projects that benefit the whole. It is the responsibility of the Reserve to notify when the money arrives or when it is not in the committee's bank account. It is the responsibility of the Provincial Direction of Tourism, as soon as it is informed by the Ministry, to inform the district government when the money is transferred to the "mother committees". The Ministry of Tourism is responsible for setting hunting quotas every year, reviewing and charging the fees, and then deducting 20% of profits to pass on to each Mother Committee (an assembly of small community committee in the same region).

The results clearly show that there is a very large discrepancy between the perception of different actors regarding the categories analyzed.

Community

All of the people from the communities who were interviewed demonstrated knowledge of the existence of the benefits transfer program. However, the understanding of this mechanism does not reach satisfactory levels. None of the respondents were able to accurately describe how and why resources are transferred to communities, yet all knew that this resource has some sort of connection with the Niassa Reserve. Four respondents believed that the reserve was directly responsible for cash transfer and not the Tourism Ministry (responsible for the management of the protected areas in Mozambique). Others believed that the money came from other countries in the form of development aid or as a compensation paid by the Reserve due to destruction of *"machambas"* (communitary plantations) by wildlife. This demonstrates a high level of misinformation regarding the transfer mechanism. When asked about the importance of the reserve for the existence and maintenance of the transfer mechanism, none of the interviewees was able to establish a direct connection between the presence of the protected area and the development of sport hunting and the execution of the transfer. This result demonstrates the low understanding in the community about the instrument, which could be related to the lack of communication and educational actions on the part of the government about the program. The achievement of transfer without adequate information regarding its origin and purpose reduces the effectiveness of the instrument. Despite the sharing of the economic benefits, the beneficiaries have no comprehension that it is due to local biodiversity and that its continuation depends on conservation.

Continuing on this trend, none of the respondents knew the amounts received by the benefit transfer. Regarding the use of money, nobody mentioned more than two distinct applications and everyone interviewed state that it is usual for the resource to remain in the hands of few people, usually representatives of subcommittees, not benefiting the entire community. The following speech shows the situation clearly: *"those leaders (régulos and representatives of management committees) when returning (from the meeting) have already created a belly, come here and keep quiet (...) did not solve the community."* Regarding the decision for the allocation of money, all stated that it is the representative of the subcommittees who makes decisions, which may occur without prior consultation with the community, and although two respondents participated in the meeting of the decision on investment it happened only once.

All respondents said they get most of the information about the mechanism by others in the community, and one of them attended a meeting organized by the Reserve, another two attended the community meetings to decide on the application of money and three never heard about the event meeting. Everyone agrees that information sharing is flawed, which ends up harming the community's management of resources. An important point to be emphasized is that although all claimed that the delay in the transfer causes discomfort and disbelief from the community, undermining the whole process, everyone recognizes that mismanagement is part of community responsibility, not attributing the failures to an external entity as usually happens often in societies nationalized.

Respondents claim that the resource is important to the community and that even if people are unsatisfied with the process, complaining about the way it is managed and causing conflicts, it is better for it to continue to exist, since it brings opportunities for improvement. In the words of one of the interviewees: *"The money is little, but it has many ways to use and benefit of the whole community." In the words of another one respondent, what happened when the community reported to the government and to the Reserve: "They come here in hear concerns, write, write, keep on writing, and say they will bring to those eligible and will bring solutions, but until yesterday we received no response."* Given the above it is clear there is a general satisfaction related to the mechanism, but not about its management.

Committees Representatives

Comparing the level of mechanism understanding of committees representatives with the community representatives, it was clear that the first ones are better informed. Every interviewed Committee member knows that the transferred cash resource is linked to an economic activity developed in the Reserve, however believing that communities are benefited by being within the conservation area, which is not true because this transfer mechanism covers the entire national territory and is related to the exploitation of biodiversity inside and outside protected areas. In this sense, only two of the respondents perceive this relationship, which we call here economic-ecological, and can act as a generator theme in actions to raise awareness and education in the region where the Reserve is located. Three of the representatives have a full understanding of the mechanism, knowing that the resource is transferred by the Ministry of Tourism, and in this case, consists of fees paid to the government by exploration blocks of hunting in Niassa Reserve due to slaughtering of animals within the Reserve. The fourth respondent knew that the resource exists for hunting exploration areas in the reserve, but did not know the details about the basis for calculation of the 20%, nor that this is linked to the Ministry of Tourism.

Once again the flow of information proves to be faulty. All representatives affirm to participate in frequent meetings with the Reserve agents, however they say there is a lack of transparency and clarity about the process. Complaints related to the lack of information about why delays occur in the transfer of the resource, the criteria for division of the values between the communities and on the transparency of values where the 20% comes from are unanimous. Representatives of the two committees (Mungano and Mussoma) claim to have formally requested answers to these questions, both to the Reserve as to the Ministry of Tourism, but received no response. One respondent stated that this lack of information and transparency in the process ends up creating conflicts between the representatives of committees and the community, since these last often do not believe that the first do not hold such information, coming to think that the delayed resource was spent by committees. Moreover, the delay in the transfer has other impacts, as well demonstrated by the following statement: *"What happens is not the law and the community feels hindered. If there is no 20%, the quota does not appears, how one will denounce those who hit an elephant?"* This situation seems to be real. All respondents in this study believe that there is pressure on illegal hunting when resources are not passed.

Regarding the flow of information between the committees and the communities it became clear that meetings are only made when the feature arrives. At that moment the mother committees convoke a meeting with the village leaders and the heads of subcommittees to decide the destination of the money. However it happens that of some tribal chiefs are not informed about these meetings, as the chief interviewed said. In this case, having been warned or not, when a tribal chief or subcommittee meeting does not go to the meeting, the resource is not passed to their community, since normally the money is divided equally among those present. The issue of participation in the meetings should also be regarded taking into account geographical and material aspects. Sometimes a mother committee covers an area that can contain more than a dozen villages of up to 20 kilometers away and with poor roads between them. This requires travel time of up to one day. Moreover, rarely people from the communities or mother committees have some sort of means of transport and resources are limited even to afford basic necessities such as food and lodging, as to attend a meeting people from distant communities spend at least two days. Added to all the nomadic nature of communities. Considering the scope of some mother committees, which include many communities and suffer, for operational and financial issues in relation to communication and participation, seems to make sense to recall the studies presented by Ostrom (2009). These studies demonstrate that social agents when they have greater possibility of communication between them, given the opportunity to discuss the structure of the situation, tend to improve the results of the process together. In this case the tendency of an individual to act as a "hitchhiker" or well, get something at the expense of others, is diminished.

About the benefits that the cash transfer brings to communities all assert that it is about very small amounts that do not allow developing very substantial actions. It is common that these 20% be directed to co-participation in state projects, such as maintenance of wells for water collection made by the government. Two respondents said that they think the resource benefits the entire community and that their management is satisfactory since the committee never receives complaints of the population. However it was in this same regulado where the community more complained about the work done by the committee, including having reported such complaints to the Reserve. This fact was confirmed when we analyze the documents from the Reserve, which included such appeal. The third representative of this committee, which is an ex-member, said that the money ends up in the hands of a few people, not benefiting everyone. This perception is also shared by the fourth respondent who said: *"In the communities there are people who put themselves as owners (...) not all benefit from the 20%, only one group."* Also in this sense, besides having groups, usually the subcommittees chiefs, who benefit directly from the money, some applications just end up attending to the demands of other groups with greater power of representation, this is the case of the construction of mosques.

Government and reserve management representatives

The representatives of the Reserve, which is co-managed by the government and a nongovernmental entity, stated they are only informed about the value to be transferred to communities. However, for these actors, the base of calculation of the 20% is available, once aware of the fee charged by the slaughter of each animal, know how many shares are granted annually and make the oversight of slaughtered. However, it is clear that these numbers are not passed in a systematic manner by the Ministry to the Reserve, and therefore even less to management committees and communities. Even provincial direction of tourism has access to data on how many animals are slaughtered at the end of a year because the ministry does not pass this information, what they know is the total annual quota granted.

Even towards the transfer of information only representatives of the reserve and direction of provincial tourism knew that the delay is due to bureaucratic procedure that involves the transfer. The director of the district did not have that knowledge, which reveals, once again, that even among public officials there is a communication failure. As explained by the director of tourism, by 2008 the licensing of hunting was done at the provincial level, which facilitated the deduction of these 20% of the source and transfer to the accounts of communities. From 2009 this procedure started to be done directly by the Ministry, with the resources from the rates going to a single government account and then transferred to communities through mother committees. According to three respondents this was the main reason for the transfer not being done on a regular basis over the past four years. In this sense one respondent suggests, *"while the process continues to be managed centrally we will always have these delays, while there is this phenomenon of not being deduct at the source as we had been doing, will always be late and never will respect the law, that no longer respect because there is no delivery quarterly."* Also, regarding to delay in the cash transfer, the representatives of the reservation claim that this situation creates conflicts with the community, affecting many other actions of the reserve. The Niassa Reserve managers are often accused by committees of stealing the money. In the words of one of them: *"The community thinks that this money keeps with the staff of the reserve. My colleague, one of his biggest frustrations was that, having to talk about something that never caught on. All these delays affect our reputation and undermine our relationship with the community and undermine particularly with committees that are our spearheads because everything we want to do with the communities they are who can help us."* All respondents recognize having miscommunications in the process and claim that this characteristic should change. It is observed that the generalization of national conditions to Mecula communities is a factor that acts by decreasing the effectiveness of application of the instrument. The need for the committees have a bank account makes sense for many reasons, however in the territory analyzed ultimately generates new possibilities of mismanagement and creating conflicts. The complexity of management of this instrument requires the creation of sophisticated governance systems and that regards of assimilating

the heterogeneity of the localities. This issue, as well as the change in the payment process, reflects a growing bureaucratization of state activities, which negatively influence the mechanism. Studies show that bureaucratic rationality, predominant among public spheres, creates barriers that make rigid organizational structures and impair the proper care in social demands (SARAIVA & CAPELÃO, 2000).

All actors know that the benefits generated by the transfer does not reach all communities and suggest some reasons: a) the fact that the value is low, b) the occurrence of deviations from the mother committees to subcommittees c) the presence in communities, of interest groups with greater power to act on the direction of the resource d) technical, administrative and operational inability of the committees and e) dispersion of communities for a very wide geographical area or their nomadic nature. Even knowing about this problems,, none of the organs performs any definitive and legally action established to deal with these issues. What is usual done is to inform, question and try to reverse the situation through the complaint. One issue to be highlighted and that can encourage the diversion of resources, according to representatives of the Reserve, is the deposit on a bank account. Before this system, the money was delivered, by the Reserve, in cash straight to the committees representatives in meetings with the community, so everyone there knew the amount of money received. With the inclusion of the banking system in the process, some encumbrances of the resource become unavoidable, as the going of representatives of the committee mother to Lichinga, which is distant 480 km from Mecula for withdrawal of money. Would be in this route that there would be possibilities of misuse of the resource. In the words of one respondent: *"If a committee chairman and a secretary travel to Lichinga and by any complication spend the 3 nights, raise the value, spend about $12.000 [meticais], come back, come and submit a report, who in community will have sufficient authority to deny the accounts they can present? Deviation of funds can happen because the system allows, then the previous system ensured that all these constraints did not happen because the money arrived and was presented publicly."*

Only the representatives of the Reserve realize that the way the division of the 20% is made between communities is not fair and ends up generating more conflicts. As well exemplified by a member of the mother committees, a *regulado* with seven (7) communities received an amount of $228.000 meticais, while one received $90.000 to 14 communities. The division is made according to the proximity of the communities of game blocks, and ends up being really unfair considering that the amount transferred is already little it can have a smaller range even if it is not divided equally, not allowing the realization of visible projects. On this matter the reserve director says that is being rethought this way of splitting up because when it comes to exploitation of wildlife, it makes no sense to consider the proximity between community and blocks, since it is a resource widely mobile. Moreover if a block has operational capacity greater than another it will slaughter more animals, reversing more money to the communities of its surroundings. And that does not mean others will not be holding that resource exploited and will not suffer the same restrictions on the presence of the reserve.

Conclusions and Recommendations

The success of any benefit sharing mechanisms and conditional cash transfer programs depends on the implementation and managerial capacity of all involved instances. In the specific case of Niassa Reserve, the results has shown that despite the fact that the money reaches the communities, this occurs in a very intermittent way what leads to disbelief and mistrust on the part of communities.

The flux of information about the mechanism from the managerial instances (government and Reserve administration) to the beneficiaries is another key problem to be solved. Once many of the beneficiaries didn't show enough and clear knowledge between the origin of the resources and for what purposes they are being distributed, some of the original goals probably will never be achieved.

Finally, the issue of diversion of resources is also something that needs to be solved, once it undermines the internal confidence of communities, generating new conflicts that did not exist before. The systematic monitoring by the government or independent organization, nonexistent today, could help to improve the mechanism.

Based on the results presented in this work, the following recommendations are made:

- need for decentralization of the process, of legal re-definition on assignments of each public and private entity, consolidating the different levels of governance over the process. According to Provincial Tourism Director: "*We need to improve a lot and recognize that the process of decentralization of powers in governance of the state should go more to the province and the province more to the district.*"
- improve the human resources capacity in government agencies to deal with the issues involving the 20% mechanism, mainly through training, development communication and monitoring skills. Here we share the vision presented by Ostrom (2009) that let communities manage individual values in decision making about their common resources can be difficult, undermining the whole process. In this regard, we emphasize the importance of facilitating institutions to respect the issues of reciprocity, trust and reliability;
- need to establish standards for the application of the ressources, for example, only doing the cash transfer when the subcommittees have agreed a draft application with the community;
- need to take into account local specificities to think the cash transfer;

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Chapter 30

Stretegic Options on Ecotourism For Sustainable Community Development

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Abstract

With the ecotourism initiatives of the municipal government and tourism prospects in the island municipality of Tingloy, Batangas, Philippines, and the results of previous studies done, potential of ecotourism is great. Definitely, this will lead to the improvement of the community in terms of socio-cultural, political, environmental and more particularly, economic. Strategic options derived from the cross analysis of the four elements- strengths, weaknesses, opportunities and threats- are recommended: In terms of political : intensive promotion of the place as to its accessibility and safety, linkages and tie ups with both the government and non-government agencies as to the training and technology transfer in the use and production, promotion and marketing of tourism products and services, creation and strict implementation of ordinances and regulations as to proper use of resources and services, healthy competition and dynamic environment for business and trade in the island, environmental care and protection, intensive waste management program, beautification and clean and green program, strengthened linkages and sourcing of funds and intensive revenue collections for continuous improvement of planned infrastructure and facilities in the island. In terms of economic: involvement of the stakeholders in the training in the manufacture, promotion and marketing of products and services needed, sourcing of funds to sustain tourism products development and acquisition of technology to create diverse products for each barangay to avoid competition and manipulation of business. In the environmental aspect: strengthening of the implementation as to the proper use, protection and preservation of environment, natural wealth and resources. With respect to socio-cultural: reorientation and training on community values, public relations and tourism management among service providers, preservation and protection of cultural heritage by putting up a museum and inclusion in the tourism activities those related concerns, continuous monitoring and maintenance of peace and order in the community and more effective and efficient regulation and monitoring as well as evaluation of the tourism activities in the island. It is essential that the local government and all stakeholders cooperate and support one another to plan and manage tourism development activities and programs despite differences on their perception as to the potential impact of ecotourism in the island. Community based ecotourism needs careful planning for an efficient and effective implementation to the benefit of all stakeholders taking into consideration the strategic options based from the SWOT analysis and the perceived potential impact of ecotourism among stakeholders. The inputs to the ecotourism program development should be made part of the municipality's responsible tourism program which shall be properly implemented, monitored and evaluated periodically. Evaluation of the program outcomes and impact to the stakeholders shall be considered to ensure community's growth and sustainability.

Introduction

Sustainable tourism development is faced by the challenge of an "industry built upon the most fragile of natural and cultural environments, where the most unintended and innocent of human gestures can easily wreak havoc on the site's resources". Both the tourist markets and the Philippine tourism industry itself have become more aware of the negative environmental and social costs associated with tourism development, thus, the country has thus begun to recognize the need to adopt new development approaches such as "ecotourism" in order to come up with tourist products that are environmentally sensitive and economically viable.

To ensure ecotourism development, the local government of Tingloy (Maricaban Island), one of the

32 municipalities of Batangas (one of the fastest urbanizing provinces in the country, has involved itself in some ecotourism initiatives and programs to promote tourism in the island. Among the ecotourism initiatives introduced by the joint efforts of Tingloy municipality and concerned sectors is involvement in the program of SCOTIA(Sustainable Coastal Tourism in Asia) programs to equip them with environmental management training and arrest damaging human impact on the island's marine resources, strengthening solid waste management program and ecological sanitation, establishing a multi-sectoral government and private organization for tourism development, which will be the key player for a long-term tourism development (SCOTIA,2011). The local government has also joined efforts with WWF(World Wildlife Fund)-Philippines and the Batangas Provincial government and 11 coastal towns in launching an Integrated Coastal Management (ICM) Project in Balayan Bay and adjacent bays. With the project, strengthened community-based groups were put up and a law enforcement system within the bay was established. Several agencies also coordinated with one another as to the establishment of the Bantay Dagat sea patrol, thru the Coastal Conservation and Education Foundation (CCEF) (previously the Sulu Fund) in coordination with the municipal government and the local people's organizations, the Samahan Tungo sa Kaunlaran ng Santo Tomas (STKST) and Batalang Bato Marine Council (BBMC) to help manage the sanctuary in Batalang Bato, a marine protected area in Tingloy(WWF-Phil, 2011).

With such aforementioned ecotourism initiatives of the municipal government and tourism prospects in the island municipality, the researchers are prompted to find out further if the island municipality has really the potential to be an ecotourism destination by investigating into its profile and by conducting a SWOT (strengths and weaknesses as well as opportunities and threats) analysis in terms of economic, socio- cultural, environmental and political among stakeholders. Inputs to community based ecotourism development framework will form part of the local government's general tourism development program.

Conceptual Framework

Republic Act 9593: The Tourism Act of 2009 mandates that every concerned entity to "promote a tourism industry that is ecologically sustainable, responsible, participative, culturally sensitive, economically viable, and ethically and socially equitable for local communities". With all its existing provisions of the tourism act and all regulatory bodies, ecotourism is introduced.

Further, ecotourism as defined as "responsible travel to natural areas that conserves the environment and improves the well-being of local people" (TIES, 1990) or a type of tourism where the environment, local community and visitors all benefit (Atienza, 2009), stressed that: to achieve equitable, social, economic and environmental benefits from ecotourism and other forms of tourism in natural areas, and to minimize or avoid potential negative impacts, participative planning mechanisms are needed that allow local and indigenous communities, in a transparent way, to define and regulate the use of their areas at the local level, including the right to opt out of tourism development" (Quebec Declaration on Ecotourism, May 2002).

The foregoing concepts posit the idea that assessing the potential impact of tourism activities to the stakeholders of the area will determine the acceptability and sustainability of the tourism programs. Further, SWOT (Strengths, Weaknesses, Opportunities and Threats) analysis is important as basis of ecotourism development plan. The role of the local government, the community, business men, and NGO's as the stakeholders are also vital in the tourism program development with respect to the municipality's existing culture, resources and plans for development.

Method

The researcher employed the mixed qualitative and quantitative approaches in research with the use of research triangulation where in-depth analysis and interpretation of empirical data and information gathered from documents, interviews, focused group discussions and observation feedback. Records and documents pertinent to the study were subjected to documentary analysis.

The distribution of samples of stakeholders per barangay was determined using stratified proportional allocation.

Researchers used self- made instrument to determine the potential of ecotourism in terms of strengths and weaknesses as well as opportunities and threats. Instrument was validated by experts and was subjected to test on reliability (Cronbach Alpha) to further verify the items formulated. The instruments pertaining to SWOT analysis were run using factorial analysis. Data gathered as to SWOT were treated using descriptive statistics such as Weighted Mean.

Results and Discussion

1. Potential of the Island Municipality as Ecotourism Destination

1.1. Location accessibility / Natural Features. Tingloy, popularly known as the Maricaban Island, has a territorial expansion of about 14 square miles (36 km^2) of rugged hills and sloping mountains, lowland plains and valleys. The coastal perimeter of the Island with green trees and clinging vines and sudden drops of stony mountains slopes is a real threat to the eyes. Spread all over the Island are barangays. Tingloy is a fifth-class municipality in the province of Batangas, Philippines. According to the 2007 NSO census(the latest available), it has a population of 18,548 people in 4,639 households. The town wholly comprises Maricaban Island, just south of the Calumpang Peninsula. Tingloy has small island beaches and over 30 dive points which become popular to tourists and provide livelihood to the residents. It is Positioned in between Batangas mainland and the province of Mindoro. Situated south of the Calumpang Peninsula, Tingloy is only about 30 minutes away from the popular dive area of Anilao in Mabini, Batangas. It is bound on the north by Balayan Bay, on the east by Batangas Bay, and on the south by Isla Verde passage . It is accessible thru motor boats from Anilao or Talaga, Mabini, Batangas within 1-1/2 to 2 hours. To get to the Island of Tingloy, it would take about four (4) hours or more to reach the island from Manila, the capital city of the Philippines.

1.2.Tourist arrivals. As per record, there were around 2,615 picnikers/ tourists and 5340 divers who visited the island from January 2011 to December 2012.

1.3. Local products. Aside from beach resorts, mountain trekking spots and almost 30 dive points, the community residents create native products such as 1)Buri products; 2) Coconut products;3) Fish and shell products; 4)Native food products and delicacies; 5) meat products; 6) Fruits and Vegetables; 7) Medicinal and herbal plants; 8) Bamboo houses and furniture.

1.4. Entertainment / Recreation . Local festivals which are being held are the “Sombrero Festival”, the “fluvial” parade being done as part of the Fiesta celebration in August and the “Tubanig” – from tuba (wine) and banig (buri mat))festival.

1.5. Cultural heritage and Community Values form part of the history and the people especially its

struggle during the Japanese occupation, and collection of different forms of literary genres reflect the people's values and way of life.

1.6. Infrastructure and facilities. Despite the scarcity of funds for infrastructure and facilities, the local government continuously pursue the ongoing programs and projects of the municipality such as the construction of Tingloy circumferential road, repair / improvement and construction of Fifteen (15) barangay roads and footbridges of barangays, rehabilitation of Municipal Pier, construction of Drainage canal and pathways, Waste Management and clean and Green Program. Other facilities and amenities include 1) Health Facilities as community hospital and barangay health centers; 2) Communication Facilities ; 3) Rural Bank / Financing Facilities; 4) Electric and Water Facilities although limited provide convenience to the stakeholders; 5) small Ports and Harbors; 6) Transportation Facilities such as bancas and motorboats and even motor vehicles 7) Tourism office specifically assigned to supervise, monitor, control tourism activities and collect appropriate fees.

1.7. Institutional capacity and support. Due to lack of budget to be solely devoted to tourism related infrastructure and development, the Tourism program of the Municipality is not yet in place. As to tourism linkages, the local government coordinates with other government institutions and NGO's make tourists flock to the area. Coordination and cooperation with national and international agencies pave way for the development of tourism in the place.

1.8 Tourism Related policies and implementing guidelines. There are implementing guidelines and policies specifically designed for tourism purposes such as those related to peace and order, health, environmental, livelihood, etc.

2. Potential of Tingloy as an Ecotourism Destination in Terms of SWOT(Strengths, Weakness, Opportunities and Threats)

Results revealed that among the strengths agreed by by respondents for the island municipality to become an ecotourism destination, *quality native products* ranked first as the item got the highest weighted mean, followed *by clean environment favorable climate, peace and order and with beautiful and clean beaches*. On the other hand, those items ranked least by the respondents are : *unique culture available indigenous resources for tourism products and most economical destination to go in Luzon area*.

This means that the respondents are proud of the island as an ecotourism destination because of the still unexplored features of the island aside from the native delicacies / products made by the rural folks. These are considered strengths because the island is one of those few prospective tourism destinations that can boast of the virgin lands and forests , flora and fauna, and with variety of marine life species.

As to the weaknesses, those which got the highest weighted mean it the item *power shortages / irregular supply*. Next in rank is the item *lack of good access roads around the island proliferation of water transport uni*). Power shortage problem is now being faced by the residents, so they considered this as a weakness particularly during peak season of April and May, when tourists flock to the island. Lack of good accessible roads pose another challenge but the local government is now prioritizing the construction of the circumferential road all over the island. Proliferation of water transport units may create competition among each boat or motorboat owners so the local government creates a scheme to a more equitable distribution of services.

Results showed that respondents believed that there are opportunities that will challenge them in the island as an ecotourism destination. They place the following items in the highest ranks: *increased job opportunities to residents, good publicity of Tingloy as a good tourism destination); and creation of diverse native products and services*. The challenge on the. business entrepreneurs and the local government to create job opportunities to

the community members is big; likewise, the performance of the services and the creation of products that will attract the tourists are very important for patronage. Ranked least are items *implementation of holiday economics/ long weekends; increased in revenue collections* and possible *construction of bridge from Mabini and Mindoro*, etc. Aside from the increased revenue collection which will directly benefit the government, respondents doubt the implementation of long weekends just for the sake of tourism and the possible construction of bridges connected to Batangas mainland and Mindoro.

In terms of threats, respondents identified the items which got the highest weighted means as "*Gradual loss of wildlife, land and water natural wealth; Sea transport irregularities and Poor safety-sea and land transport; unhealthy competition among business owners and service providers*. These threats are common reactions of the people when interviewed by researcher. By the influx of visitors coming to the island, there is really a big possibility of gradual loss of wildlife, land and water natural wealth. The schedule of sea transport will not be the same as before although the local government is expected. To regulate its smooth flow. However, in cases of urgency or need for transportation to bring tourists to the preferred places of destination. This usually happens nowadays when visitors rent a motorboat to bring them to other parts of the island. This results to delayed transport of island passengers. *Erosion of positive / desirable values and attitude among community residents; Ownership of land in the lowlands and the town proper will be transferred to migrants/foreigners; Increased Number of crimes*; Unhealthy completion among businessmen may also occur due to the business opportunities they may have, however, the government's role is vital in settling over disagreements or conflicts. Threats also include erosion of values due to the influence of outsiders and ownership of properties maybe transferred to foreign investors.

Strategic Options on Ecotourism for Community's Sustainable Development

Table 2.5. Summary on the SWOT as to Ecotourism Potential of Tingloy

Ecotourism Potential in terms of:	Weighted Mean	Verbal Interpretation	Rank
Strengths	3.23	Agree	1
Weakness	2.76	Agree	3
Opportunities	3.07	Agree	2
Threats	2.53	Agree	4
Composite Mean	**2.90**	**Agree**	

Results show that the strengths were mostly seen by the respondents as potential of Tingloy as an ecotourism destination. Opportunities were also perceived by respondents for having the island as ecotourism destination. . Ranked least are the weaknesses and threats which maybe addressed to make them strengths and opportunities to really make Tingloy as a potential tourism destination.

By doing strategic options, an analysis was made in such a way the weaknesses have to be addressed to take advantage of the opportunites at the same time address the threats; likewise, an analysis of how to take advantage of the opportunities and address the threats with the strengths cited.

In summary, the strategic options derived from the cross analysis of the four elements- strengths, weaknesses, opportunities and threats are the following strategies are recommended:

In terms of political : intensive promotion of the place as to its accessibility and safety linkages and tie ups with both the government and non-government agencies as to the training and technology transfer in the use and production and marketing of tourism products and services, creation / strict implementation of ordinances and regulations as to proper use of resources and services, regulation of business in the island, environmental care and protection, intensive waste management program, beautification and clean and green program, strengthened linkages and sourcing of funds and intensive revenue collections for continuous improvement of planned infrastructure and facilities in the island.

In terms of economic: involvement of the stakeholders in the training in the manufacture, promotion and marketing of products and services needed, sourcing of funds to sustain tourism products development and acquisition of technology to create diverse products for each barangay to avoid competition and manipulation of business.

In the environmental aspect: strengthening of the implementation as to the proper use of environment and resources as well as the waste management programs and training and orientation on the care and preservation of environment and natural wealth.

With respect to socio-cultural: reorientation and training on community values, public relations and tourism management among service providers, preservation and protection of cultural heritage by putting up a museum and inclusion in the activities those related concerns, continuous monitoring and maintenance of peace and order in the community and evaluation of the tourism activities in the island.

3. Proposed Inputs to Tourism Program Development

General Objectives : This program aims to utilize tourism to reduce poverty and contribute to the conservation of cultural and natural resources in the island municipality, without sacrificing the negative impacts as to economic, socio-cultural, environmental, political, thus contributing to the attainment of the goal of the national tourism industry. Strategies and programs are proposed focused on the following key result areas:

1. Capacity Building for Ecotourism
2. Planning ecotourism activities with communities and other stakeholders
3. Developing viable community-based ecotourism projects
4. Strengthening benefits to the community and the environment

Conclusions and Recommendations

1. In terms of profile of the municipality, the local government, must do its best to meet the preconditions / requirements in preparation for ecotourism. Stricter enforcement of tourism related activities and its Institutional capacity and support by coordination and cooperation with the provincial, national and international agencies and stakeholders will pave way for the development of tourism in the place.

2. Consider the profile of the municipality as well as the studies done on potential impact of ecotourism and the SWOT analysis in planning a community based ecotourism program. Involve all stakeholders in the planning. A comprehensive economic plan relative to tourism development maybe formulated to uplift the quality of life of the community. Respondents perceive the trengths and opportunities for Tingloy to become a potential ecotourism destination,likewise, the weaknesses and threats but if properly addressed maybe converted into strengths and opportunities that will further develop the island as a potential tourism destination.

3. The strategic options derived from the cross analysis of the four elements- strengths, weaknesses, opportunities and threats- are recommended for implementation

4. Hand in hand the local government and all stakeholders should work together to plan for tourism development. despite their differences on their perception on the potential impact of ecotourism in the island . Community based ecotourism shall be planned for an efficient and effective implementation to the benefit of all stakeholders taking into consideration the results of this study particularly the strategic options based form SWOT analysis and the perceived potential impact of ecotourism among stakeholders.

5. National level support is needed in terms of linking conservation and tourism activities and responsibilities, appropriate legislation and assistance towards small enterprises and community initiatives, and national and international promotion as well as mutually beneficial coordination.

6. Inputs to the ecotourism program development based on the results of the study maybe consideredas part of the municipality's whole tourism program which shall be properly implemented and evaluated thereafter.

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Section 11

Global Governance and Norms for Sustainable Development

GLOBAL ASSOCIATION
Master's in Development Practice Programs

Sustainable Development Practices: Advancing Evidence-Based Solutions for the Post-2015 Agenda.

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Chapter 31

New norm for development: civil society partnerships to reach the most vulnerable along the last mile

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Abstract

The past decades have seen great curiosity and concern about the impact of humanitarian aid on reducing extreme poverty and improving the human condition around the world. Most analysis leads to dim results at the macro-level. Certain gains within the MDG framework are hopeful, but the narrative these days is largely one of greater pessimism about the ability of standard models for development to achieve desired impact. In response, many people are betting on innovation and technology to overcome the gaps in services and outcomes. The evidenced-based solution we offer in this paper is a modality of civil society partnerships with businesses, state actors, and research bodies oriented towards promoting human dignity and the common good, as practiced by AVSI Foundation for over 40 years. As applied in different sectors, this modality allows for external and domestic support to overcome the "the last mile" problem for the hardest-to-reach beneficiaries through a web of human relationships. Evidence from various sectors points demonstrates the effectiveness of this approach to achieve enduring change. Civil society is the great asset that risks being squandered if the public sector, the market, or even well-intentioned international development firms and NGOs do not fully appreciate and engage with the range of groups that have emerged with courage and commitment to address their own most urgent needs. Education: Private, non-profit schools which emerge from the desire of parents to provide their children with the quality of education so desired are an essential component of many countries' responsibility to provide education for all. Example: Little Prince Primary School and Cardinal Otunga Secondary School in Nairobi, Kenya effectively reach under-served populations and make high quality education accessible through flexible adaptation to local context and innovation. Healthcare: private, non-profit healthcare providers are an essential component of civil society which addresses basic needs in a direct way. Given that health care is much more than a medical issue, local providers trusted by the community are irreplaceable assets for a country's healthcare system. Example: St. Joseph Hospital in Kitgum, Uganda, has developed into a center of excellence for health care and community engagement through partnerships with AVSI, local government and other internationally funded initiatives. Employment and Youth: Possibly the area in which trust and legitimacy are most essential is that related to youth. Civil society organizations which are able to cultivate legitimacy among young people can offer an extremely valuable entry-point, enabling policies and services to reach the marginalized youth who too often are invisible and distant from paths to education, employment and alternatives to violence. Example: The "Tree of Life" project through AVSI's partnership with FIAT in Brazil has developed into a long-standing program to enhance the education of urban youth and to smooth the transition to work. In conclusion, partnerships which foster the formation of a strong web of human relationships ensure that invested resources enhance the assets which already exist, in turn catalyzing processes of transformational change.

Introduction

The past decades have seen great curiosity towards and concern about the impact of humanitarian aid on extreme poverty. Certain gains within the MDG framework are hopeful, but the narrative these days is largely one of greater pessimism about the ability of standard models for development to achieve desired impact, particularly within the most difficult contexts. The strongest critics argue for a complete abandonment of most foreign assistance for development. Others, instead, are hopeful that we can still learn from success and failure and tweak the way development aid is delivered and used. Many people are betting on innovation and technology as the preferred tools and the business sector as the preferred delivery channel to overcome the gaps in services and outcomes. At the same time, in certain sectors the pendulum is swinging back towards state-led

development, driven by the tenet that the state should be the provider of basic services to its population.

This paper is not intended to review or contribute to the numerous theories of development or attempts to measure the impact of the many forms of aid and cooperation.[1] Nor is it intended to analyze in depth the existing international aid architecture and its trends. The paper is the result of reflection by development practitioners with concrete experience with various donors and funding mechanisms and years of relationships with people commonly referred to as the poorest of the poor, or the most vulnerable.

Despite years of investment, experiments, variation in the delivery channels and mechanisms, and increasing attention to accumulating evidence of "what works", extreme poverty and marginalization continue to exist throughout the world. From the perspective of a development NGO engaged in long-term, community-based projects focused on basic service areas such as education, health care, , agriculture, and economic livelihoods, AVSI[2] would argue that there continues to exist a problem of "the last mile". In other words, goods and services provided by governments and donor-led programs do not reach the most vulnerable and marginalized individuals in a sustainable way and with sufficient quality. Precisely in the countries progressing most quickly in terms of economic development, the gap between the most affluent and the poor continues to grow in terms of financial resources, but also in terms of access to opportunities for quality education and employment. Even a casual observer of the global state of affairs would question how it is possible that today, in 2013, that 50% of the rural poor in Haiti lack regular access to clean water and 90% do not have access to an improved sanitation facility? How is it that roughly 50% of all women in Uganda do not manage to access a health center to deliver their babies, with the brunt of that percentage concentrated in the rural and conflict affected north?[3] How can unemployment of young adults in Brazilian slums be 20-30% when the cities are exploding with multinational companies?[4]

Especially among the sectors of technology and trade, solving the "the last mile" problem is often reduced to a matter of putting infrastructure into place, whether it be internet connectivity or an incentive mechanism to increase the participation of those still outside of the system. Certainly useful, the presence of systems is not sufficient to guarantee sustained demand over time. Infrastructure must be accompanied by durable relationships of trust among local governments and service providers with the populations that they aim to reach. From AVSI's engagement with highly vulnerable people and communities in over 35 countries of the world for the past 40 years, we have identified three main barriers which contribute to this last mile problem. This list is not exhaustive, but offers a useful framework for understanding the causes of the problem and evaluating existing modalities.

The barriers for programs and services to reach the last mile include:

1. Geographical constraints: distances, difficult terrain, poor infrastructure, and therefore the cost of accessing hard-to-reach communities is high.

2. Cultural differences and preferences: lack of demand for services which relates to barriers such as language, self-esteem or capacity of the marginalized to seek services; lack of fit between service and

[1] The book, "At the Root of Development: the Importance of the Human Factor", by G. Berloffa, G. Folloni, I. Schnyder v.W., 2012, provides a very thorough treatment of the subject.
[2] www.avsi.org, or in English at www.avsi-usa.org
[3] UNICEF Uganda statistics, 2012.
[4] The exact rates of adult and youth unemployment in urban Brazil are debated. Official labor statistics may underestimate underemployment and may not capture informal markets. It is widely held that levels of stable, formal employment in favelas is lower than in other parts of the main cities.

cultural or religious preferences of the community or lifestyle of beneficiaries.

3. Trust gap: more than a problem of information or knowledge, services are not sought because targeted beneficiaries do not trust the service provider.

In the urban or semi-urban environment, the last mile problem is linked to the burgeoning of informal settlements. The informal sector is a growing concern for governments on a regional and national scale. The people living in urban slums and rural communities on the outskirts of a city or town often remain out of reach for governments or national companies, unless a mediator is present who can help tailor initiatives to fit the unique culture and potential of each community.[5] In these settings, the trust gap may be the most important barrier, with cultural differences and preferences also playing a role.

The rural environment presents the clear challenge of geography due to the wider dispersion of the population and large variations in infrastructural support for transportation and service delivery. The cultural barrier may also be stronger in more traditional settings in rural areas.

Shortfalls of Existing Modalities of International Cooperation to Solve the Last Mile Problem

The current international aid architecture and most common modalities of providing aid for sustainable delivery of quality services fall short of overcoming these barriers in many ways.

- Budget support provided to governments confines resources to the public sector arm of service delivery, which rarely has the capacity to overcome any of the three root causes of the last mile problem. *Particularly acute in many cases is the trust gap*.
- Bilateral, multilateral and private donors who support NGO operations in developing countries rely heavily on project cycles of 3-5 years, with clearly stated outcomes and objectives. The international development community has embraced the need for clear markers of progress and results, primarily for accountability to donors. Incentives towards high numbers of beneficiaries and fast accomplishment of results are pervasive. Competitive bidding for new projects is often done in an environment of pressure to accommodate donors' interests and specifications, not allowing for thoughtful, organic processes of project design and planning with beneficiaries and local stakeholders. *Often, the demand for high numbers of beneficiaries impedes projects from fully addressing the geographical constraint or need for quality, and the choice of implementing agency by the donor directly affects a project's ability to overcome the cultural and trust problems.*
- The international financial institutions primarily provide loans and other financial tools to governments, with some room for other actors in short-term pilots of new approaches aimed at reducing vulnerability and reaching the marginalized.. The high-profile nature of these programs can undermine their stated aim to be community-driven. It is a very real risk that power dynamics and uneven levels of influence skew the setting of priorities and participation of local communities[6]. *The inevitable nature of these institutions as external entities is an obstacle to inclusive ownership by communities, which must involve not only local experts, but community members at every level.*

[5] Ibid, "At the Root of Development." This book includes two case studies from Brazil which clarify the importance of mediators which create trust, facilitate the visioning of a path of change, and support change over time.

[6] A review of Bank-funded community-driven development projects offers significant criticism for the methods used and scant results. See "Community-Based and –Driven Development: A Critical Review," G. Manzuri, V. Rao, The World Bank Research Observer, Vol. 19, No. 1, 2004. http://siteresources.worldbank.org/INTIE/Resources/mansurirao.pdf

- Business and market expansion as a strategy for local development has its challenges. Corporate social responsibility may still have a role to play in addressing some particular issues, yet the inherent demands of a for-profit company (return on investment, generation of profit, short-term responsiveness to investors) often push them towards areas and sectors with greater potential due to larger numbers of prospective customers, a more favorable government or regulatory environment, supportive infrastructure, and human resource capacity. *These factors limit the capacity of companies to overcome the geographic barrier. In the sheer scale of operations, the flexibility to adapt an engagement strategy for each community is lost.*

The Sustainability Concern

Even in cases where governments or international actors have successfully increased demand for services—for example for HIV counseling, testing and treatment—the question of sustainability remains. If the program includes incentives, can it be assumed that the desired behavior will continue without the incentive? Providing services temporarily at reduced or no cost may skew the picture of demand for a service in a particular context.

AVSI has found that sustainability depends on a change that happens at the level of the individual mindsets and practices of thousands of persons. Without effecting a change at this human level, policies or programs that seem to be best practices on paper can still result in increased corruption, conflict or dependency, or in outcomes that are reversed as soon as the external influence is removed. Over the long-term, a significant shift in behavior must originate in an enhancement of the capabilities and aspirations of the agents involved.[7] In addition to aspiring for a better lifestyle, they must also trust their own ability to attain it, as well as trusting those they work with toward achieving it.[8]

The Quality Concern

A cross cutting issue related to service delivery at the last mile is that of maintaining quality of services. For both public and private institutions alike (including NGO and donor initiatives), the cost of doing business across an expansive geographic area is a significant burden and the incentives for scale and cost efficiency often work against the intention of bringing high quality services to the hardest to reach populations. Other disincentives are at play, such as the physical and emotional burden for educated professionals to work in remote areas, and at times, the difficulty of providing attractive salaries and benefits to retain qualified staff.

Poor quality erodes trust and works against any gains in demand creation. Opportunity costs for the poor to seek services for themselves and their children are too high to be wasted on sub-par services.

Civil Society: the Glue that Binds

The evidenced-based solution we offer in this paper is a **modality of civil society partnerships with businesses, state actors, donors and research bodies oriented towards promoting human dignity and**

[7] See for example Amartya Sen, *Development as Freedom*, New York, Knopf: 2009.
[8] See for example the theories of social capital set forth by Woolcock M., "Social Capital and Economic Development: Towards a Theoretical Synthesis and Policy Framework", *Theory and Society*, vol. 27, no. 2: 1998.

the common good, as practiced by AVSI Foundation for over 40 years. As applied in different sectors, this modality allows for external and domestic support to overcome the "the last mile" problem for the hardest-to-reach beneficiaries through a web of human relationships. Evidence from various sectors demonstrates the effectiveness of this approach to achieve enduring change. This modality is presented as a possible new norm for sustainable development, setting forth some key components and criteria to guide the stewardship of resources for combating poverty and exclusion.

Civil society is the great asset that risks being squandered if the public sector, the market, or even well-intentioned international development firms and NGOs do not fully appreciate and engage with the range of groups that have emerged with courage and commitment to address their own most urgent needs. The uniqueness of civil society organizations (CSOs) is their close connection to the constituency, which defines the "why" and the "how" behind their strategies and daily operations. They have the capability to act as intermediaries between individuals or grassroots associations and formal entities, giving voice to people who might otherwise remain marginalized. Rather than bluntly instrumentalizing CSOs, the question for international institutions and governments should be how to guarantee the survival and strengthening of such local organizations. In other words, how to partner together to empower local communities and arrive at a win-win situation of delivering highly effective, quality services to the most vulnerable.

In front of the last mile problem, locally rooted CSOs are the best equipped to address the cultural barrier and the trust gap vis-à-vis the communities and individuals. The challenge remains one of geography and scale; thousands of CSOs are scattered in tiny villages across a rural area or clustered in informal neighborhoods of a capital city plagued by violence and insecurity. This reality necessitates the convening power of an intermediary umbrella organization or network, especially considering that cultural and trust barriers can exist both on the side between community and CSO, and also in the nexus between CSO and government or donors, whether multilateral institutions or NGOs.

AVSI's Experience Based Approach

AVSI Foundation's experience offers a model for the decisive role of an international non-governmental organization (INGO) in effectively partnering with CSOs at varying levels. Its current organizational structure reflects the lessons learned over four decades of dialogue, joint programming and reflection with CSOs in dozens of countries. The two main poles of AVSI's role are (1) its strong ties of trust with local communities, and (2) its capacity to leverage international resources and to advocate for smaller organizations to have access to larger government or private networks.

In each country where AVSI works, a stable presence consisting of an office and a few experienced staff members is sustained by the Distance Support Program and other funds from private individual donations arriving from throughout Europe. The Distance Support Program is a variation of a child sponsorship scheme in which donors are paired with a child who receives their annual support. AVSI manages this program together with local CSOs who are empowered to engage with the child and his/her family directly and respond to their most urgent needs. This funding travels directly from the private donors to individual community members through channels within the AVSI network, which minimize leakages due to corruption or burdensome grants that do not correspond to the actual needs of a context. Typically, resources are solicited by AVSI Foundation headquarters, channeled through the AVSI country office to a regional AVSI office, which in turn works directly with CSOs on the ground. The Distance Support Program gives AVSI a long-term perspective of engagement with the community and families. Relationships and trust need time. AVSI is careful to cultivate this organic process, paying attention to the resources within each community, such as educational institutions and healthcare providers, and empowering them to provide the highest quality service and care possible.

The stable private funds AVSI receives are complemented by project or contract-based funds which arrive

from bi- or multilateral donor institutions or governments such as the European Union, World Bank, the Italian Ministry of Foreign Affairs, USAID, various UN agencies and others. From its technical knowledge base and network, AVSI can act as a lead applicant and bring together CSOs as its implementing partners. These more visible projects provide additional resources to build the capacity of emerging local organizations, and are leveraged effectively in advocating local governments to recognize and favor the activities of CSOs that are authentic representations of the people they serve. Additionally, these projects can help to improve linkages between local associations who share goals or provide similar services.

In order for an INGO to fulfill this role as intermediary and advocate for locally driven initiatives, it must maintain a certain level of independence in making decisions in the field. First and foremost, INGOs must have the freedom to select to work with CSOs who share a common vision. For AVSI, this means associations who are open to the 5 points of the AVSI method.[9] The process of selecting CSO partners is not formulaic but instead relies upon the judgment of staff members to assess the authenticity of the CSO leadership in terms of their interests, connection with the community they are serving and culture of service. These factors are more important than administrative systems for accounting and planning, which are techniques and tools that can be put into place over time. Relationships are essential to build trust. Implementing small initiatives together, through the Distance Support Program, allows for these relationships to deepen and for skills to be built.

Program delivery must be flexible enough that, in any project, staff members are able to use their knowledge of the context and the needs and interests of stakeholders to determine the design and any adaptations that need to be made in order to meet the goals defined together with the community. This dependency on staff members at every level (and not a top-down structure of decisions made from a distant headquarters) means investments must be made in human resources. This includes trainings for program managers and officers as well as social workers and volunteers that are designed to instill both technical and soft skills and opportunities for personal growth.

This approach implies a physical closeness to the CSOs and communities being served. AVSI relies on regional and field offices to facilitate frequent site visits and exchanges. A light structure of international staff complemented by trained and loyal local staff in a well-managed structure of central-regional-field offices has proven to be a winning design.

[9] **1. Centrality of the Person** The person is the center of any development program, and the purpose of every project. This means, first of all, sharing the needs of the other, who as a unique human being desires happiness, truth, beauty, justice and freedom. The person cannot be reduced to a social category or a limitation such as poverty, disease or disability. The very nature of the person implies relationships—first and foremost with the family and the community; consequently, AVSI assumes this context as the starting point.
2. Starting from the Positive Every person and every community represents a potential resource, regardless of their vulnerability.
3. Doing With A project imposed from above is either violent, because not shared, or unsustainable, because assistance-oriented.. This method is the only true method of stimulating ownership and aligning incentives, since project implementers do not have a pre-conceived plan of action.
4. Development of Civil Society and Subsidiarity A society is born out of the free commitment of persons and families joining together. Development projects must prioritize support for associations closest to the individual and community, thus recognizing and valuing the establishment of intermediate bodies as central to a responsible and engaged social fabric. The right of every person to free association with others and to economic enterprise becomes a powerful drive towards better civic and democratic life.
5. Partnership Partnership originates from the application of the principle of subsidiarity. Thus, starting from an existing subject, partnership implies the identification and involvement of a growing number of actors active in the field, including public and private, local and international actors.

Case studies

The solution of partnerships with CSOs is not confined to particular sectors or geographical contexts. In AVSI Foundation's experience, supporting initiatives born out of the local context has repeatedly proven to be the best way to achieve quality, efficiency and effectiveness in meeting social needs including education, healthcare, and youth development. Putting responsibility into the hands of CSOs also helps to avoid the pitfalls of vertical processes which treat each service separately. Community-based providers are much more likely to have a holistic vision of the interconnected needs of their clients.

1. **Education:** Private, non-profit schools which emerge from the desire of parents to provide their children with the quality of education so desired are an essential component of most countries' responsibility to provide education for all.

Two schools in Nairobi, Kenya, show how a private initiative can effectively reach under-served populations and provide high quality education. As CSOs, these private schools enjoy extraordinary trust of the parents and community leaders as well as a higher degree of flexibility to respond to the needs of the population being served.

Little Prince Primary School, situated in Kibera slum, had its beginnings in 2000 as an after-school academic and social enrichment center housed in a semi-permanent building to serve a small number of children and funded by AVSI's Distance Support Program. Over time, parents recognized the value of the education and accompaniment offered to their children, and with their initiative and funding secured from European donors, a full school was built. Over time, AVSI linked the school to educational advisors and continues to build the capacity of local staff, which has always been made up of Kenyans largely from the same or nearby community. Today, Little Prince has a dropout rate of only 7%, compared to the 15-25% national average in elementary schools. Since its foundation in 2001, the school has had a 94% transition rate to secondary school while the national average is around 50%.[10]

Cardinal Otunga Secondary School in Kahawa Sukari, 10km outside of Nairobi, was founded in 2004 by a group of parents and teachers who wanted a high-quality alternative to the boarding school model common in Kenya and who could not access the limited number of spaces in the elite public schools because of poor preparation for and performance on the needed exams. Based on principles of student responsibility and parent involvement, the school offers many opportunities in Open Houses and Parent Meetings to help entire families understand the value of education. Graduates of Little Prince School who have the propensity, but lack financial resources, to attend high school can receive tuition assistance through AVSI's Distance Support Program. A small, family-style residential option is available to a dozen students each year for whom daily transportation to the campus is a barrier. In recent years, the students' academic performance has confirmed the effectiveness of the approach. Over 50% of Cardinal Otunga students exceeded sufficiency in the Kenya Certificate of Secondary Education exam in 2012 whereas the national average is only 12%. Despite the low-income status of many of its students, the transition rate to university at Cardinal Otunga was above 55% over the past 3 years.

AVSI has managed to link both schools with international donors and projects to complement the funds generated locally through modest school fees and fundraising efforts, including with local businesses. Rather than a standard twinning model which channels resources to just one or two schools, AVSI's projects almost

[10] UNICEF Statistics for Kenya, 2011.

always have a broader reach to other elementary and secondary schools in the area to raise the level of quality in the educational system overall. For example, Cardinal Otunga Secondary School has become a hub of teacher professional development and lively exchange of best practices among school heads of a network of 50 private and public secondary schools in and around Nairobi, collaborating with the Ministry of Education to identify possible beneficiaries and gaps in training.

Undoubtedly, the financial sustainability of the schools is and will continue to be a significant challenge while the target population being served remains the most vulnerable. The relationship with AVSI helps to bridge the distance between single school and donors, private sector businesses and government. This web of relationships must be cultivated by the school head and Boards of Directors, a role which they are currently playing.

2. In the **healthcare** sector, private, non-profit healthcare providers are civil society actors which address basic needs in a direct way and complement the fundamental obligation of a state to ensure that the basic health needs of a population are met. Health care is much more than a medical issue. Culture, environment, hygiene, nutrition, and family characteristics are just some of the factors that influence a person's or a community's health status. Local, trusted providers that are familiar with the range of issues facing a target population are irreplaceable assets for a country's healthcare system.

The last mile problem in health care manifests itself as one of accessibility to quality care and demand for services. The most vulnerable individuals are those who do not have easy, affordable access to the preventative and curative services they need and those who are unable or unwilling to seek out services. An example of inequality can be seen in Uganda, where the discrepancy in the percentage of women who give birth attended a skilled health professional was 29% versus 77% when comparing the poorest 20% of the population to the wealthiest.[11] A quality problem often surfaces when the public sector attempts to overcome the geographic problem and extend its reach into rural areas; low quality in health care degrades trust and erodes demand.

St. Joseph Hospital in Kitgum, Uganda, has developed into a center of excellence for health care and community engagement in the northern region of Uganda through partnerships with AVSI, local government and other international donors and initiatives. Begun as a clinic in 1925 by an order of religious sisters, St. Joseph's became an officially recognized hospital in 1960 and part of the Ministry of Health system. Today the hospital has 21 departments, 350 beds and treats over 50,000 patients each year. Malnutrition is addressed through clinical care, food demonstrations, and outreach to families. A robust HIV prevention strategy includes a model PMTCT program that integrates counseling and testing, male involvement, support groups, the latest treatment regimens for mothers and babies, feeding support, and post-partum testing and follow-up support.[12] St. Joseph's Hospital is able to provide follow-up with patients at home and to impart information and health messages deep into communities through partnerships with community-based organizations.

AVSI has contributed to the capacity building of St. Joseph Hospital from 1984 to the present through the placement of international medical staff in the hospital, alongside the national staff with attention to transfer of skills and knowledge; linkages with donors such as UNICEF; and strengthening of the network of Catholic hospitals in Uganda. AVSI's Distance Support Program provides the hospital with the possibility to offer the most vulnerable children and their families with sustained care and support.[13]

[11] Source: UDHS (2005/2006), cited in Millennium Development Goals Report for Uganda 2010.

[12] The PMTCT program supported by AVSI at St. Joseph's and other health care facilities in the region has demonstrated exceptional results. For instance, 73.7% of male spouses accompany the female patients to medical appointments and follow-up visits, compared to 15.5% nationally. See the "AVSI FREE" report and resources at http://www.avsi-free.org/index-uk.php for more information.

[13] See the reports on the occasion of St. Joseph's 50th anniversary which provide a historical perspective on the development of this hospital and the role AVSI has played over the years. http://old.avsi.org/AnniversarioOspedale/

The sustainability of the hospital is guaranteed by the sound financial foundation which has been built by its management team, with AVSI's support, over the years. The hospital is owned by the Archdiocese of Kitgum and, as a leading hospital in the region, attracts patients from a wide catchment area. This enables the hospital to charge fees for services on a sliding scale, allowing for some cross-subsidy to assist poorer patients.

3. **Employment and Youth Services** is possibly the area in which trust and legitimacy are most essential. CSOs which are able to cultivate legitimacy among young people can offer an extremely valuable entry point, enabling policies and services to reach the marginalized youth who are often invisible and distant from the mainstream paths to education, employment and alternatives to violence.

In urban slums such as those of Brazil, youth are largely marginalized from the array of opportunities offered by the big cities of emerging market countries. Low quality schools, few internship and employment opportunities, broken family structures which mean few examples of successful working adults, and societal prejudices which devalue their potential all collide on these young people, narrowing their hopes and expectations for the future. Drugs, violence and gang activity are ready alternatives to school and work. Reaching these youth with programs and services which meet their many needs is extremely challenging, and trust is essential.

In many cities across Brazil, the Distance Support Program has enabled AVSI to nurture relationships of trust and common interest with communities, families and individuals over the past thirty years. With particular attention to child care, education and family support, AVSI has accompanied thousands of children, and their parents, along their path in life and into adulthood. Today, AVSI enjoys a privileged and protected space in these slums, a commodity which cannot be bought overnight in a context where drug lords control access and impact all areas of life and work.

In this context and precisely because of this foundation, AVSI was able to partner with a multinational firm, the Italian carmaker FIAT, to develop an integrated program of education and employment readiness for youth.

Tree of Life, or ***Árvore da Vida***, is a joint venture between ***AVSI and FIAT Brazil*** in the area surrounding the FIAT plant in Belo Horizonte, Minas Gerais, Brazil. Started in 2004, the intervention is still in progress. It operates in a 33,000 resident neighborhood, Jardim Teresopolis, where people live in a deep pocket of poverty with low levels of human development and an index of violence among the highest in Brazil. *Árvore da Vida* developed out of the interest of FIAT Brazil to invest in the educational resources of the communities surrounding its plants and to increase the employment opportunities for youth. *Árvore da Vida* provides a social and educational path for youth that effectively keeps them engaged in school and prepares them for the transition to work, addressing both technical skills as well as a range of life skills: around 1,450 youth have been trained to date. Over the last eight years, around 19,000 people have been reached through the project. Community resources and local human capital have become the key factor in the development of the area. The rate of *Árvore da Vida* participants who pass their final school exams has risen from 71% in 2004 to 97.2% in 2012. Over the same period, school attendance rose from 78% to 99.4%. Opportunities for greater income potential for households have also been created: the average growth of household income between 2004 and 2011 in Brazil was 65.5%, while among the families in Jardim Teresopolis involved in the project the average growth rate was 130%.

FIAT's participation allowed the market to inform the technical and professional skill curriculum of the *Árvore da Vida* program, matched with AVSI's life-skills methodologies and tools, resulting in a high quality and relevant service for the target population. A wide range of local partners including educational institutions, cultural groups, small and medium local businesses, and local government entities were effectively brought together in a "citizen network" to collaborate towards the goals of the program. The impressive sustainability of the program is due to both the wide breadth of active collaborators and the returns on FIAT's investment which

have justified continued financial support.

As the mediator between the company and the community, AVSI could ensure that FIAT would reach its target population and protect the channels of communication and active and meaningful participation by the community. This approach leads to development not only of a business but also of the entire community, improving the quality of life of the local residents and leading to a reinforcement of local institutions.

Conclusions

In conclusion, an inadmissible number of individuals, families and communities continue to live in situations of depravity with little chance of breaking the cycle of poverty for future generations, despite the international community's attention to many worthy causes championed in the MDGs. This paper puts into focus one root cause of this situation, conceptualized as "the last mile" problem. The symptoms of this problem are seen when high quality goods and services do not arrive at the beneficiaries or clients most in need. Identified barriers or market imperfections which block the optimal meeting of goods and services and the people most in need are: geographical constraints, cultural differences and preferences and a trust gap.

AVSI has been able to overcome this last mile problem through a unique structure as an INGO with a country-regional local presence; a strong and growing network of local community-based partners who are cultivated to deliver high quality services; sufficient private resources which enable a sustained, long-term engagement; and human resources within its own staff and that of local partners dedicated to meaningful change and human development.

As the case studies demonstrate, partnerships across sectors that safeguard and empower the agency of community level CSOs and initiatives have the potential to mitigate the barriers which create the gap at the last mile. Partnerships which foster the formation of a strong web of human relationships ensure that invested resources enhance the assets which already exist locally, in turn catalyzing processes of transformational change. Concerns about quality and sustainability are surmountable challenges that force all partners to leverage their unique capacities and resources. Looking forward towards the post-2015 development scenario, partnerships of this kind should become a new norm for sustainable development.

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Chapter 32

Global governance and norms for sustainable development

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Abstract

Over the last few decades a small but increasing number of human individuals[i] have begun to become aware of contextual constraints that threaten the future well being of the human species and its capacity to evolve and that hold out the likelihood of a rapid reduction in its material and cultural well being[iv] and the possibility of its extinction. The need to respond to these constraints while preserving the technological capacities, and the extensive material, conceptual and perceptual infrastructures and cultural elements that have been generated by human civilization and which enable the species to be 'human' while also ensuring its continued survival is being expressed as a need for 'sustainable development'[v] . Though several elements from scenarios involving a transformation to sustainable development have been described[vii] progress towards the realization of any of them appears to be negligible and for the most part appear to consist of attempts to shift to non fossil fuel sources with no evidence of a commitment to the wide spectrum of changes in organizational structure, systems, processes, perception, behavior, technology and civilizational objectives that is required, considerably detracting from their credibility and contributing to an apathy and even denial within the majority of human individuals. Not surprisingly then the small number of human individuals who are able to perceive these constraints and the need to respond thereto in order to avoid civilizational collapse[viii] and the possible extinction of the human species have begun to seek ways by which they may collaborate with each other on the task of perceiving and articulating and guiding processes towards this 'sustainable development' which in reality denotes nothing less than a hope for the continued survival of the human species. These individuals recognize very clearly that these constraints are global in their scope and that no individual, no group of individuals, no nation state nor geographical region of the planet can on its own and while excluding all others, successfully address them and that hence attempts at addressing these constraints will be global in their scope. Nevertheless it is equally clear to them that these perceptions arise from discrete identifiable individuals embedded in concrete geographical situations, social institutions and human contexts all over the face of the planet and that the linking together of these discrete individuals to form a global network that can collaboratively and collectively perceive, articulate, initiate, support and sustain processes of global governance and global systems of support that the human species requires for its survival and for the maintenance of its humanity and produce the human resources required for the guidance of global processes towards this objective is the most fundamental and basic task that must be achieved without hesitation or delay and which some of them have commenced to the best of their ability and available resources. The objective of this paper is to share the perceptions and some of the concepts underlying the articulation of this process, supporting them wherever possible with the outcome of supportive scientific research from various related fields and to describe the process itself by which the generation of this network may be facilitated and the individuals through which these perceptions arise linked together, their capacities increased and their outputs harvested through their networking and synthetised to guide the human species through the tasks of transcending the constraints that have emerged and of moving through processes of civlizational transformation and conscious evolution towards possible and credible futures. The process itself may be seen as an 'evidence based solution already in progress, generating specialized human resources, formulating and initiating processes that may lead to the generation of a global network and guiding its functioning as a species wide perceptual mechanism and global strategic guidance system that is a vital element amongst processes of global governance and planetary guidance towards a sustainable world, and identifying global norms that may govern the transition to sustainability'.

Too late to avoid

It would seem that there already is enough heat in the oceans and carbon dioxide in the atmosphere and a firmly entrenched Linear Growth Model of Development that faithfully churns out more heat and more greenhouse gasses to ensure a steady increase in temperature until after greenhouse gas emissions have peaked due to the exhaustion of fossil fuels hundreds of years in the future, amplifying feedbacks begin to resolve and temperatures slowly begin to fall again.[ix] The information contained in the IPCC reports should be sufficient to remove any doubts about this.[x] Independent scientists who are not weighed down by institutional expectations and political constraints are even more outspoken.[xi] The possibility does seem to exist that in the event of attempts being made to sustain the linear growth model of development, earthsystems will turn into a toxic soup that cannot support human life, long before fossil fuels are exhausted.

Sustainable development is for the long term

The term sustainable development has been attributed, by the world bank, to the World Commission on Environment and Development also known as the Brundtland Commission, established by United Nations Resolution 38/161 of 19th December 1983 which was requested to formulate "A Global Agenda For Change" and report on the environment and the global problem to the year 2000 and beyond. The Commission submitted its report titled "Our Common Future" to the United Nations General Assembly at its Forty Second session on the 4th of August 1987. The report is quoted as having defined sustainable development as being "Development that meets the needs of the present without compromising the ability of future generations to meet their own needs."

The challenge at the moment however includes having to survive the carnage likely to be caused by sea level rise within a context of increasingly volatile weather, rising temperature and consequences such as food shortages, collapse of supply chains, and as yet unknown impacts of disturbed thermohaline circulations including possible Canfield oceans and other unanticipated phenomena which have already been set in motion and cannot be avoided even by a sudden overnight shift to sustainable development.

At a conceptual level sustainable development would require the transforming of the current global civilization of the human species into one that consumed only as much resources as could be regenerated at a rate that maintained an equilibrium between consumption and regeneration of resources. The larger the human population the lower the consumption rate of each human individual would have to be unless the generation of resources could also be increased with the increase of population or the frame of the human bio organism as well as its nutritional and other resource requirements could be reduced.

Sustainable development is development that is not based on linear and infinite quantitative growth but is instead based on qualitative non-linear non-deterministic periods of growth, consolidation, maturation, dormancy, decline, decay, reactivation and possibly other states as well. Global Governance for Sustainable Development will in effect have to be a mechanism capable of managing growth and transforming growth processes so that different dynamics of growth are activated as and when required. The size of the population of the human species will have to be determined by its objectives. What do we require seven billion human individuals for? What is the objective of the human species? Is it a question of living to eat/consume? or are we mature enough to perceive the dynamics of the cosmos that has generated us and manage and facilitate those dynamics?

Sustainable development is not a credible response to this global warming but it is a credible response to the long term, that is to say the period beyond the 87 years ahead in this century and stretching far out to

the new millennium and beyond when earthsystems are likely to enter states of dynamic equilibria once more though whether these states will be supportive of earthlife as we know it or not we do not at present know. What we are told with no uncertainty is that at this point the fact of whether the human species is able to survive as well as successfully transform its global civilization into a sustainable one without exceeding the release of 1000 Giga Tons of CO2 into the atmosphere will make a difference in how soon such states of earthsystem equilibria are reached and whether they will be supportive of earthlife as we know it and permit the survival and continued evolution of the human species. If the human species continues along the Linear Growth Model of Development it is likely to release all available CO2 – in the order of approximately 5000 Gigatons – into the atmosphere probably causing its own extinction and creating conditions for earthsystems to generate new forms of earthlife.

So while sustainable development cannot prevent global warming it can lead to credible futures beyond the present century and after earthsystems have found new states of equilibrium. Sustainable development therefore becomes credible only when it addresses the problem of the survival of the human species because if the species fails to survive the coming 87 years of this century as well as the 300 to 400 years it will likely take for earthsystems to find new states of dynamic equilibria then there will be no human species to sustain sustainable development.

Survival is for the here and now

Given what has been stated above it would make sense to avoid what amounts to misleading the public and especially those who are young enough to have to bear the brunt of the responsibility of having to respond to climate change, and the need to transform the Linear Growth Model of Development, by speaking of sustainable development in ways that leave room for the impression that it is some kind of developmental formula that will miraculously bring to a halt the global climate change that is occurring as well as solve all the problems inherent to the linear growth model of development.

Can we calculate the rate at which we are consuming resources? Can we calculate the resources required to make the transition to a sustainable civilization? Can we calculate the amount of resources we have left? Of course we can if we decide to. We can then subtract the quantity of resources that we require to make the transition to sustainability from the total amount of resources that we have left and this will tell us the amount of resources we can consume before we begin to make the transition. If we take this amount of resources that we have left and divide it by the rate at which we are consuming them, then we will have an idea as to the time we have left before the commencement of the transition must begin. If we do not initiate processes of transformation well before this time line, we will find ourselves in a situation where we do not have the resources required to do so.

(Available resources (R1) – Resources required for Civilizational Transformation (R2) / Annual resource consumption (RA) = Number of years left before the process of Civilizational Transformation has to be commenced. (T)) This calculation R1-R2/RA=T may be done at various levels of complexity but at every level it will give us an approximate idea of the time we have at our disposal and an indication of how credible our proposed responses seem to be. The world bank has been requested to bring together a team to make this calculation. The outcome of its efforts are as yet unknown.

Perceivable paths to survival

In the past the human species has shown itself to be resilient and it is said that it has been reduced

to less than a 1000 breeding pairs and yet survived and regenerated itself . However regenerating a species mingling with earthsystems and spread across the surface of the land based biosphere as formations of hunter gatherers takes very little energy and resources compared with what will be required to simultaneously sustain and transform the current global civilization of the human species in its current situation where it is organized along the Hierarchical Pyramid which is the dominant organizational structure of its current global civilization and firmly rooted in systems of resource extraction and consumption that depend on complex global supply chains and high levels of energy consumption.

Facilitating the survival of half a billion breeding pairs requires conscious effort as well as certain identifiable mechanisms, systems and structures. It also requires a strategic guidance mechanism consisting of a global network with high levels of strategic competence perceptual capacity and functional ability. At its highest level this strategic function will have to consist of human individuals who consciously cultivate the human perceptual capacity in order to perceive pathways to credible futures and high levels of strategic competence to guide the species along these paths. The training of human individuals in the cultivation of these skills is one of the most urgent requirements of the moment.

Specialized human resources

The perception of processes and systems is no more spontaneous than the perception of discrete events and objects. Both types of perception require training. Primary formative processes are currently geared towards the production of human individuals who perceive the world as a collection of discrete objects and themselves as autonomous entities created and placed within this world of discrete objects created in time and space by a creator or creators and coming to an end in time and space as well. The current context is the outcome of this type of perception of discrete objects and events. Change requires the ability to perceive the world as a stochastic process with neither beginning nor end and human individuals as being amongst the myriad perceptual mechanisms or systems generated by this process in order to perceive potential pathways through its modes of being becoming and non being.

Whether this is what it is intended to be or not the Global Masters of Development Practice can be perceived as an initiative in the direction of generating the human resources required for the transformation of the current global civilization of the human species into a sustainable one. The framework for the generation of these individuals is in place and the process of their formation has been initiated. Improvement in the selection of students may lead to volunteers with an aptitude for the development of wide conceptual frameworks and complex perceptual paradigms and high levels of strategic competence being identified, activated and their training sponsored. The importance of sponsorship is emphasized because the ones with the greatest aptitude may be the ones least able to afford to pay their way. The species cannot wait for markets or governments to deliver.

Support systems

The following systems are likely to be required to support this critical population required for the survival of the human species:

1) Power Generation Systems. 2) Water Management and Recycling Systems. 3) Food and Agricultural Systems. 4) Habitat, Communication and waste management Systems. 5) Manufacturing and Transport Systems. 6) Health and Social Support Systems. 7) Training, Education and Research Systems. 8) Emergency Rapid Response Systems. 9) Surgical and Medical Systems. 10) Planetary Guidance Systems.

The network, perception and strategic guidance

Spencer R Weart has documented the rise of the awareness of global climate change over the past 200 years[xiii] and in doing so he also exposes the way in which the IPCC was generated as a global network and touches on the contention that earthsystems cannot be engaged by hierarchical structures and can only be engaged by networks. The emergence of a global network around the need to engage earths atmospheric system and its definition as the IPCC has also been described very well by Paul N. Edward who also highlights issues of interest relating to the construction of data. Whether the IPCC will be able to engage scientists from other disciplines and generate a dynamic and ongoing process of scientific synthesis that is broad enough to generate forward movement or whether that task will require the intervention of the United Nations Sustainable Development Solutions Network (UNSDSN) remains to be seen.

The perception, formulation, initiation, support, sustenance and guidance of global processes capable of generating and sustaining such systems requires all those who are able and willing to take on this task to link up globally to form a global network that can function as a perceptual mechanism for the whole of the human species and as a strategic guidance system for planetary guidance. It may be assumed that the human species has become aware of this need and that the United Nations Sustainable Development Network is in fact its first attempt to respond to this requirement.

Virtual survival platforms to store knowledge

The nodes of this global network will include Virtual Survival Platforms (VSP)s where information, data, knowledge, culture and technologies will be stored and made accessible globally. Virtual Survival Platforms may be generated by all those who have linked up with the global network, making their work accessible online. Currently the best known virtual survival platform is the Intergovernmental Panel on Climate Change with its store of data and analysis and projections of possible futures that can be used for strategic guidance.

Virtual Survival Platforms that contain Geographical Information Systems that trace changes in the dynamics of all earthsystems and make projections of their evolution are also required. Platforms that track the availability and use of resources are also required as are those that track the evolution of pathogens and the potential development and dynamics of epidemics and pandemics. Global Systems Dynamics Models that show the likely impact of hazards as they increase in volatility due to global warming will be vital for guidance and Virtual Survival Platforms that can house such models are required. These models will allow adjustments to be made in keeping with observed changes so that their accuracy is increased with time especially as the human species moves forward beyond the manufacture and manipulation of data, the observation of correlations and beyond explanations based on cause and effect to the perception of underlying processes.

Geographical survival platforms to model survival and sustainability

The network will also include Geographical Survival Platforms (GSP)s where the content of Virtual Survival Platforms are used in order to generate model survival platforms in selected geographical locations. Geographical survival platforms will offer off the grid globally linked habitat with resilient supply chains in locations where hazard impacts are minimal or unlikely, to those who understand what the future is likely to hold and are willing and able to use information available on the Virtual Survival Platforms to generate sustainable communities (SUSKIES) and to advocate policies and norms that will facilitate the transformation of civilization into a sustainable one. Geographical Survival Platforms will incorporate state of the art technologies and design as well as communication systems and in time will come to be recognized as prime human habitat.

Sustainable communities for those who must survive

These Geographical Survival Platforms (GSP)s will generate sustainable communities (SUSKIES) that will function as survival habitat for those who choose to survive, by making the technologies required to make this transformation available to all those who may be interested. Initially hardly anyone is likely to be interested but as the impact of global climate change and other elements of the crisis begin to make themselves felt more strongly more and more people are likely to turn to sustainability in order to survive. The quality of sustainable communities will depend on the extent to which these communities incorporate technologies from the Geographical Survival Platforms. Some of them may exceed the Geographical Survival Platforms in their complexity and utility value while others may be limited in their utility. All of them are likely to have technologies designed to harvest solar energy and wind power as well as energy storage systems.

Perceptual basis required

Perceiving credible pathways to the future requires the mastering, the internalization, the activation and the integration of certain concepts within the conceptual framework of the human individual. All those concepts that have been identified so far are given below.

THE PROCESS PERSPECTIVE: The ability to perceive the cosmos as a cyclical spiraling process that has neither beginning nor end and which proceeds along the pathways of its own perception of its being becoming and non being.

SYSTEMS THINKING: The ability to perceive systems and their interactions and to recognize that all elements perceived as discrete things and events are integral parts of systems and dynamics of their processes and that interactions with these elements affect the functioning of the system as a whole.

EARTHLIFE AND EARTHSYSTEMS: Increasing awareness of the climate system has also made it possible for more and more human individuals to perceive a configuration of dynamic interacting systems whose boundaries are not sharply defined and whose elements intermingle and whose processes impact each other consisting of at least the geosystem, the biosystem, the hydrological system and the atmospheric system in place of what was once perceived as a planet called Earth. These systems themselves appear to be generated and configured by and nested within greater and more complex processes and 'fields' that are not entirely known to science as yet and through their interactions generate various intensities of an awareness of itself or 'earthlife' from within which has emerged the human species.

HUMANS AS PERCEPTUAL PROCESSES: The ability to perceive humans as being amongst the myriad perceptual mechanisms generated by this cosmic process in order to perceive possible pathways of its being becoming and non being.

THE HIERARCHICAL PYRAMID AND ITS DYNAMICS: To recognize the nature and dynamics of the hierarchical pyramid with its ability to extract resources and concentrate power, its oppressiveness and its tendency towards stasis as well as its rootedness within earthsystems from which it draws and consumes non renewable resources at an increasingly rapid rate.

THE NETWORK AND ITS DYNAMICS: To recognize the nature and dynamics of the network, its ability to generate synergies and its flexibility and resilience and self generating capacities.

AUTONOMY AS A SIGNIFICANT EVOLUTIONARY ACHIEVEMENT: In the human species earthlife has succeeded in generating the illusion of autonomy required for an increasing of complexity and the generation of objectivity in its interactions with itself. This autonomy however depends for its operation on the

ability of the human individual to perceive itself as being totally free and independent of its environment and delude itself into accepting this perception as reality. It can thus do what it pleases with no thought of the impact of its actions and more importantly it can consequently intervene within earthsystems and processes whatever the consequences, without realizing that it is intervening in its own.

SPECIESWIDE COLLABORATIVE PERCEPTION: The awareness that when two or more human individual link up their perceptual processes they can together perceive what none of them can perceive on their own, thus giving networks the capacity to increase their perceptual capacities infinitely.

PLANETARY STRATEGIC GUIDANCE: The need to guide the hierarchical pyramids and to managed growth and sustainability

NON LINEAR GROWTH MODEL OF DEVELOPMENT: The dynamics of growth reconfigured so that growth proceeds in slowly spiraling cycles that are negligible in their resource requirement and that may also cruise at low levels of negative growth when required until a defined period of acceleration is required in order to reach a particular objective.

FOSSIL FUELS: Essential elements that may be used in combination with periods of objective driven acceleration of growth that are synchronized with cycles (eg: the Milankovitch ones) to manage planetary temperatures and prevent overheating or freezing.

FEED FORWARD TO COMPLEMENT FEED BACK: The making of projections of what is likely to occur based on current dynamics. Feed Forward may be similar or the same as what was termed 'prophecy' in ancient times and integrated as a function of guidance. Unlike 'prediction' it is not deterministic.

THE SPECIES AS EMBEDDED WITHIN A NEXUS OF SURVIVAL SYSTEMS SUPPORTED BY SUPPLY CHAINS: The concept of the human species as dependent on its support systems and supply chains, without which, it is unlikely to survive.

THE TWO KINDS OF PERCEPTION THAT MAY LEAD TO SPECIATION IF NOT SYNTHESISED: The dominant perception being that of the world as a collection of created discrete objects and the human being as a created autonomous entity placed within this collection of discrete objects all created within and coming to an end in time and space. The subordinate perception being that of the world as an ongoing process that has neither beginning nor end and that proceeds on the basis of its own perceptions of potential pathways to its own being becoming and non being and the human being as being amongst the myriad perceptual mechanisms generated by this process.

LIFE AS CONSCIOUSLY EVOLVING BEYOND HUMAN BEING AND SPREADING THROUGHOUT THE COSMOS: Life as being a dynamic system within the ongoing process that tends towards its spread throughout the process.

Norms for sustainability and survival

The most urgently required global norms for survival and sustainable development that can currently be recognized are as follows:

A New Perceptual Paradigm
The recognition of those working on pathways to credible futures

and the facilitation of their work
The recognition of the network as an organizational structure
The acceptance of the need for Planetary Guidance
The shift to renewable energy
The synchronization of population size with species objectives
The dedication of all available resources to species objectives
The recognition that the species is embedded
within a nexus of survival systems and supply chains
The managed manufacture of systems support requirements and survival requirements
in keeping with pre determined specifications.
Resources rationed and issued through support systems
Collaborative, collective Individual housing designed with advanced global communication systems built in enabling work and study from home.
All human habitat removed from hazard prone locations
and areas affected by sea level rise and integrated with workplaces where required.
No private vehicles allowed and vehicular movement restricted.
Development of all-purpose vehicles
that do not need roads to be constructed and maintained.
Freedom of Association and human rights along with gender content
re-configuration and restrictions on reproduction
Reconfiguration of primary formative processes
and integration of civilizational objectives.

[i] Stager, Curt. Deep Future. St Martins Press 2012. New York. Page 4.

[ii] The IPCC http://www.ipcc.ch/ is one of the platforms used by many of these individuals in order to collaborate with each other.

[iii] Amongst these individuals who have published their work would be Rachel Carson, Dennis Meadows, Jeremy Rifkin, James Hansen, Bill McKibben, Lester Brown, Curt Stager, Carolyn Baker, Joseph Tainter, Aric McBay, Lierre Keith, Derrick Jensen, Richard Heinberg, Harald Welzer, Stan Cox, Brian Fagan, Bill Powers, Spencer R. Weart, Keith Smith, Clive Hamilton, James Lawrence Powell, Peter D Ward, Paul N Edward, Tom Wigley, Iain McGilchrist, Tadeusz W Patzek, Thomas H. Greco Jnr, Jeffry Sachs and Jorgen Randers

[iv] Joseph A. Tainter and Tadeusz W. Patzek. *Drilling Down. Springer*. New York 2012.

[v] The World Bank quotes the following definition for sustainable development: "Development that meets the needs of the present without compromising the ability of future generations to meet their own needs." — from the World Commission on Environment and Development's (the Brundtland Commission) report Our Common Future (Oxford: Oxford University Press, 1987).

[vi] Weizsacker, Ulrich Von Ernst, Charlie Hargroves, Michael H.H.Smith. *Factor Five: Transforming the global economy through 80% Improvements in Resource Productivity*. Clup of Rome 2009.

[vii] Frescoe,Jaques. *The Venus Project*. 2011. http://www.thevenusproject.com/

[viii] Paul R. Ehrlich and Anne H. Ehrlich. *Can a collapse of global civilization be* avoided?. http://rspb.royaslsocie-

-typublishing.org/content/280/1754/20122845.full.html#ref-list-1

[ix] Stager, Curt. Deep Future, St Martins Press 2012. New York

[x] All reports may be downloaded from this site http://www.ipcc.ch/publications_and_data/publications_and_data_reports.shtml#.UfyTkFNSb3A

[xi] Hamilton. Clive. *Requiem for a Species*. Allen & Unwin. Australia 2010.

[xii] Hansen. James. *Storms of my grandchildren*. Bloomsbury.2009. Page39.

[xiii] Spencer R Weart: *The Discovery of Global warming* Harvard University Press USA 2004.

[xiv] Weart also recommends the following source. http://www.aip.org/history/climate/index.htm

[xv] Paul. N. Edwards. *A Vast Machine: Computer Models, Climate Data and the politics of global warming*. The MIT Press. 2010.

GLOBAL ASSOCIATION
Master's in Development Practice Programs

Sustainable Development Practices: Advancing Evidence-Based Solutions for the Post-2015 Agenda.

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Chapter 33

Refining the Evidence-based Approach: Requirements and recommendations for improved policy learning

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Abstract

Learning or knowledge exchange networks are a potent tool for accelerating progress towards sustainable development. Effective knowledge exchange, however, is not as simple as just sharing successful solutions. To address this challenge, the evidence-based approach is emerging as standard for identifying and assessing promising solutions for dissemination. This is a positive step, but insufficient, as the evidence-based approach has certain limitations, so caution is necessary. In this paper, I examine those limitations, as well as some broader consequences of adopting the evidence-based approach. I then propose some guidelines for addressing these limitations, and highlight potential further options for doing so, in order to help learning networks achieve their maximum potential as a positive impact multiplier.

Introduction

Learning or knowledge exchange networks are an important tool for advancing sustainable development. Generally, such networks are loosely-organised complex constellations of multiple actors across multiple levels of governance, not necessarily acting in a coordinated fashion, but sharing information and ideas about technologies, policies, institutional arrangements, and so on (Ostrom 2010, Galaz *et al.* 2012).[1] While the practice of sharing knowledge and good ideas is not new, there have recently been increasing attempts to formalise and facilitate the knowledge-sharing process (e.g. Sabel & Zeitlin 2008, SDSN 2012). This International Conference on Sustainable Development Practice is an example of one such attempt. These attempts are driven by a growing recognition of the potential multiplier effect of knowledge exchange networks.

The multiplier effect is twofold. First, by fostering multiple diffuse attempts at addressing sustainable development problems, learning networks can help speed up the identification of promising potential solutions to these problems. Second, networks can promote the faster dissemination of working solutions. The combined result is an increased rate of tangible improvement in on-the-ground conditions (Ostrom 2010). Facilitating the learning or knowledge exchange process could therefore be a disproportionately effective means to achieving progress towards sustainable development.

[1] There is substantial theoretical debate on the nature of policy learning (e.g. Bennett & Howlett 1992, Dunlop & Radaelli 2012), and knowledge transfer through networks (e.g. Reagans & McEvily 2003). This debate is inform¬ative, but not the focus here. For our purposes, we treat learning networks as arising from polycentric sys-tems (Ostrom *et al.* 1961, Ostrom 2010), and engaged mostly in reflexive learning (Dunlop & Radaelli 2012).

This effect, however, can cut both ways. The promotion and proliferation of inaccurate knowledge or ill-conceived ideas through learning networks could greatly exacerbate problems, at a similarly magnified rate. Which raises the question, how do we minimise the risk of this undesirable outcome while maximising the positive effects of learning networks?

At present, the answer of choice seems to be the 'evidence-based' approach (Sanderson 2002). The central actors in learning networks – those seeking to actively facilitate knowledge exchange and promote promising solutions, such as the World Bank or the UN Sustainable Development Solutions Network – frequently emphasise the importance of promoting evidence-based solutions (e.g. IPA 2011, SDSN 2012, World Bank 2013). While helpful, though, an evidence-based approach has its own weaknesses, and is insufficient to maximise the potential benefits of learning networks.

In this working paper, I shall highlight some of the potential pitfalls of the current emphasis on the evidence-based approach, drawing on a range of disciplines including policy studies, development economics, organisational behaviour, anthropology, and more. I shall also outline a number of guidelines and other means to avoid these problems, and more generally to facilitate effective learning through knowledge exchange networks. This paper, especially the latter part, is very much a work in progress, and will be refined over time to improve its effectiveness; its core message, however, will likely remain pertinent.

This paper is written premised on a few core assumptions. Firstly, I assume a shared understanding of the overarching purpose and meaning of sustainable development, and a *bona fide* intent to work towards it. Second, the notion of individual freedom *sensu* Sen (2000), particularly "the liberty to participate in social choice and in the making of public decisions" (Sen 2000, p.5), is here considered a *sine qua non* of development. Third and following from this, the implementation of any development intervention must ultimately have some impact at highly localised scales to matter; put another way, while development inter¬ventions can have effects at multiple scales, their effects at the local level must take primacy. Finally, I am here considering the evidence-based approach to sustainable develop-ment specifically in the context of learning or knowledge exchange networks, and therefore assuming the common instrumental aims of identifying, sharing, refining, and promoting the dissemination of successful, practical, evidence-based solutions (e.g. SDSN 2012).

Potential Issues with the Evidence-Based Approach

The potential issues explored here fall into two broad categories. Those in the first category are limitations internal to the evidence-based approach itself; these concerns are therefore not foreign to proponents of this approach, though they do bear repeating. Concerns in the second category are not inherent to the approach, but arise rather as consequences of its wholehearted embracing as the litmus test of choice (e.g. Earth Institute 2013) by which to select development interventions to promote through knowledge exchange networks.

Limitations

The evidence-based approach to sustainable development stems largely from the current paradigm of development economics (or 'new development economics', Banerjee 2007), which itself took a leaf from the book of the natural and biomedical sciences. It entails using rigorous quantitative methods along with careful observational or experimental studies to scientifically assess the efficacy of various development interventions. Those found to be effective (or cost-effective) are promoted, while others are abandoned.

The pinnacle of rigorous quantitative analysis in this context is often considered to be the randomised controlled trial (RCT) (Banerjee & Duflo 2008, IPA 2011, CEGA 2013). I expect that the majority of evidence-

based solutions promoted in the near future will be RCT-supported. Accordingly, the strengths and weaknesses of RCTs feature most prominently in the discussion here. There already exists an ongoing and well-developed debate in develop-ment economics about the utility of RCTs (Heckman 1992, Heckman & Smith 1995, Cartwright 2007, Banerjee & Duflo 2008, Deaton 2009). While this section of the paper draws heavily on some of this literature, it is not my intention to wade into this debate. Rather I seek to call attention to it, reiterate the points most pertinent in a learning context, and expand upon their implications. In addition, the concerns highlighted in this paper are largely not restricted to RCTs alone, but point to deeper epistemological, methodological, or behavioural issues pertinent to any approach focused on quantitative evidence of success.

Finally, lest the purpose of this paper be misunderstood, a final clarification is in order. My aim is categorically not to reject the use of quantitative, empirical, or experimental approaches to sustainable development, nor to deny the great utility of a positivist worldview or the possibility of generating factual knowledge. It is rather to urge caution, and indeed to institutionalise it. Sustainable development interventions take place in immensely complex real-world situations and there are a myriad of ways in which even the most theoretically sound projects could go wrong. And when they do, it is real people's lives and livelihoods that are affected. Under such circumstances, caution is not only wise, but also necessary.

What is successful? – the measurement of success

Learning networks are supposed to help disseminate successful sustainable development solutions. But this begs the questions, what does 'successful' mean? How is success defined, and by whom? To what end? These are important questions which get to the foundations of the entire endeavour of development; the answers may not always be to our liking (see e.g. Ferguson 1990). Their relevance goes beyond the evidence-based approach, and they will be touched on later. In the specific context of evidence-based development, any claim of success must be supported with rigorous quantitative evidence. The definition of success must thus lend itself, or a reasonable proxy thereof, to easy quantification and measurement. Therein lies an additional danger.

The overarching goals of sustainable development projects are frequently nebulous or intangible as well as multidimensional. When goals are intangible, there is a high risk of goal displacement from true goals to more measurable ones, or from less tangible to more tangible dimensions of goals (Warner & Havens 1968). This goal displacement frequently manifests as an emphasis on outputs rather than outcomes (Perrin 2007). Measurable outputs are typically more narrowly defined than overall goals. When overall goals entail trade-offs between multiple dimensions, overemphasising certain dimensions or measurable outputs (e.g. strict economic efficiency) could therefore lead to suboptimal outcomes.

The key point here is not so much that goal displacement exists, but that an emphasis on 'objective' or quantifiable measures of success can seriously heighten the risk of displacement (Kerr 1975). This risk is further exacerbated when there is pressure to appear successful, e.g. when projects are being evaluated by potential funders, potentially even creating an incentive to game the measurement system (Bohte & Meier 2000).

One way to minimise the negative effects of goal displacement while retaining the advantages of objective quantifiability is to ensure that measurable indicators are appropriate proxies for the actual goals to which they are linked (Dörner 1996, p.52). Here, however, another potential difficulty arises, in the context of transferring or scaling up interventions – a proxy may depend on certain contingent factors which hold in one context but not necessarily elsewhere.[2] This difficulty is a specific instance of a much broader problem of context-dependence and heterogeneity, to which we now turn.

[2] Conceptually, this problem is similar to the phenomenon of crossed reaction norms in genetics (Stearns 1989) – just as the *relationship* (or correlation) between phenotype and environment can differ based on genotype, so the correlation between measured proxy and desired outcome can differ based on context.

Evidence of what, exactly? – external validity and heterogeneity

The issue of context-dependence (and the related problem of heterogeneity (Deaton 2009)) poses great difficulties for effective learning. An evidence-based approach seeks empirical support for the success of a development intervention, but that success is often time- and context-dependent, and success does not necessarily imply transferability or scalability. This troublesome fact is sometimes called the problem of external validity.

Rothwell (2005) provides a thorough review of the determinants of external validity in a medical setting. He includes a long list of potential determinants, including such categories as the setting of RCTs (country, healthcare system, selection of participating clinicians, etc.), the selection of patients, the characteristics of patients, the differences between trial and routine protocols, and more. Differences, irregularities, inconsistencies or mistaken assumptions about any of these factors could raise questions about whether results from an RCT apply in a given specific case.

Rothwell's list is specific to medical RCTs; but the use of RCTs in development was inspired by their use in clinical settings (Duflo & Kremer 2005, p.228), and a similar list could be constructed for development RCTs. Such a list would include the political, financial, social, cultural, physical and other factors, known or assumed, on which the operation and success of an intervention depends. Where these factors differ from the specific context in which a development intervention is tested and 'proven', its effectiveness cannot be safely assumed, due to the heterogeneity of responses – the simple fact that different people (or fields, communities, companies, etc.) often react differently to the same intervention (Heckman et al. 1997, Deaton 2009). As Ravallion puts it,

> "The essential problem is that if you allow properly for contextual factors it can be hard to make meaningful generalisations for scaling up and replication from trials. The same program works well in one village but fails hopelessly in another, not far away." (Ravallion 2005, p.243)

One way to address this problem is with adapted replications of RCTs under different conditions (Duflo & Kremer 2005, p.222). While helpful for expanding the validity of evidence, such replications can prove expensive and time-consuming (Deaton 2009). Furthermore, they do not help to address the internal dimensions of heterogeneity.

RCTs achieve internal validity by controlling for certain variables, and randomising by certain others; the latter step ensures that comparisons occur between groups that are, on average, identical (Duflo & Kremer 2005). Similarly, the reported effects of an intervention are reliably (assuming an RCT is well designed) the average, i.e. mean, effect of the intervention (Deaton 2009). But no individual beneficiary of a development intervention is entirely average, and no individual beneficiary cares about its average effects. In the context of agricultural planning, for instance,

> "Standardized solutions to field preparation, planting schedules, and fertilizer requirements always have to be adjusted when they are applied to, say, a stony, low-lying, north-facing field which was just grown two crops of oats… Each farmer's field is a unique concatenation of circumstances, actions, and events, some of which are noble in advance (soil composition) and some of which are out of anyone's hands (the weather)." (Scott 1998, p.296)

This difficulty is not unique to farmers and fields, but applies to any case more specific than an RCT's treatment groups (Deaton 2009). It is therefore important for the evidence supporting any development intervention to be usefully applicable not only in different contexts, but in specific ones.

While these issues are widely recognised among leading development economists and other academics, they are rarely explicitly highlighted. Nor are the assumptions and contextual factors needed to address them – the equivalent of Rothwell's list – usually made available. Ravallion points out that

> "Often a crucial factor in programme success is adapting properly to the institutional and socio-economic context in which you have to work. That is what good project staff do all the time. They might draw on the body of knowledge from past evaluations, but these can almost never be conclusive and may even be highly deceptive if used mechanically." (Ravallion 2005, p.244)

But without clear information about the determinants of validity of any evidence, it is difficult for 'good project staff' to make the necessary adjustments – let alone ordinary project staff! The discrepancy between these uncertainties and caveats, and the certitude with which many evidence-supported solutions are presented, is itself a further problem, which we will address later.

How does it work? – causal logic and theory

Strictly speaking, within the Popperian paradigm that still forms the foundation of the modern scientific method, it is impossible to empirically prove causality. This fundamental difficulty extends also to the social sciences, including development economics (Basu 2005).

This deep epistemological issue is in itself only a concern for philosophers of science. For practical purposes, however, it is the effects of this concern on research that matters. For fear of the correlation-causation fallacy (and other biases), the majority of quantitative studies of development policies, including most RCTs, are intended "not to understand the underlying structure of the system of relationships generating the outcomes, [but] only the statistical outcome impact of certain policy treatments" (Mookherjee 2005).

The limitations which strict quantitative standards of evidence impose on the domain of policy learning can unnecessarily restrict its potential utility, a point to which we shall return later. For now, the crucial point is firstly that it is not indefensible to connect theories of change or causal logics with empirical studies (Mookherjee 2005) – in the medical sciences, for instance, Hill's criteria (Hill 1965) set a widely accepted standard for evidence of causation – and more importantly, it would often be beneficial or even necessary to make these connections, far more than is currently the case.

All policies or development interventions function through particular causal mechanisms, operating in specific contexts; understanding the effects of a policy requires at least a working understanding of its causal logic (Pawson & Tilley 1997). Without this causal understanding, it can be difficult or dangerous to make inferences about the effects of a development intervention in different contexts (Deaton 2009). Conversely, a clear theory of change can guide the adaptation of policies across contexts, in part addressing the challenge of external validity (Banerjee 2005, Duflo & Kremer 2005, p.222).[3]

Causal logic is even more important when dealing with complex systems, such as the nested human-natural systems which sustainable development projects frequently address. Every development intervention depends on some theory of change; sometimes clearly stated and thorough, more often implicit and rife with

[3] So crucial is causal understanding for turning empirical evidence into cumulative knowledge that some political scientists define 'policy learning' as the generation of causal knowledge about policies (Cashore *et al.*, forthcoming).

assumptions. In the latter case, there is usually an expectation that relationships between causes and effects are relatively linear and intuitive (Dörner 1996, p.90). But the behaviour of complex systems is frequently non-linear, discontinuous, or otherwise non-intuitive (Holling 1995). Clarifying expectations about causal relationships and expectations can help minimise the risk of failure due to complex system behaviour. The recognition of equilibrium effects when policies are scaled up (Banerjee & Duflo 2008, Deaton 2009) represent an attempt to address one such nonlinearity, but other such complexities exist as well, and should be accounted for.

As with validity issues, the importance of linking empirical work to causal knowledge is well understood by leading academics, whom Deaton (2009) praises as "too talented to be bound by their own methodological prescriptions." However, that much of the empirical work supporting particular development policies neglects to make explicit its theories of change, 'means-ends chains' (Warner & Havens 1968), and assumptions about causality. Yet in order to ease the transfer or generalising of evidence-supported solutions, doing so should be de *rigueur*.

Beyond just making explicit the theoretical assumptions of empirical work, the interface between theory and empirics could become even more comprehensive. Experiments could be designed explicitly to test theories or ideas, which are in turn constructed or refined based on empirical observations, each feeding back into the other. Many development economists have been calling for experiments and RCTs to move away from project evaluation toward hypothesis testing (Mookherjee 2005, Banerjee & Duflo 2008, Deaton 2009). Such a shift would indeed bring the evidence-based approach to development closer to the standards of 'strong inference' to which it aspires (Platt 1964).

Consequences of Adoption

Despite the limitations discussed above, the evidence-based approach to sustainable development has produced some impressively successful results. Notable examples include the use of remedial education programs in India (Banerjee *et al.* 2007), chlorine dispensers for water purification in Kenya (Kremer *et al.* 2011), health services contracting in Cambodia (Bloom *et al.* 2006), and the flagship of development RCTs, school-based deworming in Kenya (Miguel & Kremer 2004). The discussion of limitations is in no way meant to depreciate these achievements, but rather to highlight some of the fundamental obstacles to matching them. These obstacles are inherent to the evidence-based approach and, epistemo-logically speaking, insurmountable. For practical purposes, though, as these successes show, it is possible to largely circumvent them with careful work and clear presentation of results.

In contrast, the difficulties described in this section are both easier and harder to address. Easier, because they do not stem from some fundamental metaphysical intractability; but also harder, because they are rooted in deep psychological tendencies. Though the line between them and the limitations discussed previously sometimes blurs, for analytical traction, they could be considered potential consequences of adopting and scaling up the evidence-based approach – general equilibrium effects, of sorts, which could arise from making this approach the dominant paradigm of sustainable development practice.

Monopolies on useful knowledge – the dangers of exclusion

The limitations discussed above restrict the scope of applicability of any given quanti-tative analysis. In a broader sense, though, the scope of quantitative analyses as a whole is itself limited. Too intense a focus on evidence of this nature could exclude the consideration of certain types of sustainable development problem, to our detriment (Basu 2005).

The majority of evidence-supported development interventions are in public health, education, or microeconomics. Interventions addressing issues like conflict prevention, environmental protection, or governance are rarely addressed (Blattman 2008). To some extent, this exclusion is incidental; Blattman points out that development economists are at the forefront of the evidence-based approach and so their focus, unsurprisingly, has been primarily on issues traditionally within their disciplinary purview. Insofar as exclusion is incidental, e.g. crime reduction programs, it is easily corrected, though *until corrected* it remains a problem.

A far more pernicious problem is that certain issues are excluded simply because they do not lend themselves well to quantitative or experimental (RCT) analysis (Basu 2005). These include issues on larger geographical or temporal scales, such as conflict prevention or the structural roots of poverty (Bernstein et al. 2000), as well as those where changes could often be unique and irreversible, such as biodiversity conservation and many other environmental problems. The exclusion of the latter class is especially problematic, as it runs counter to the successful integration of the three dimensions of sustainable development (UN GSP 2012), perpetuating the separation of the environmental dimension which has previously been a frequent problem (UNGA 2012, para.87).

To avoid this exclusion problem, we need to expand the range of knowledge we consider admissible as evidence, rather than assuming that quantitative empirical studies or, even more narrowly, RCTs alone have a "monopoly on useful knowledge" (Scott 1998, p.247). We will return to the dangers of this assumption later. First, two points in support of other forms of knowledge generation.

Firstly, within the realm of quantitative research, Cartwright (2007) argues that RCTs do not hold some epistemological primacy in a hierarchy of research methods, in part for the reasons already discussed. Concato *et al.* (2000) famously showed that well designed observational studies are not systematically inferior to RCTs in the medical field, prompting calls to supplement RCTs with other study designs (Victoria *et al.* 2004). To assume that RCTs trump other forms of evidence would be misguided.

Similarly, quantitative methods in general are not necessarily superior to or more useful than qualitative ones. Particularly for large-scale issues, such as conflict prevention and security, rigorous qualitative 'forward reasoning' (Bernstein *et al.* 2000) can provide more analytical traction and predictive power than a contrived quantitative approach. The use of forward reasoning and other qualitative methods can complement quantitative empirical approaches, both by generating plausible causal logics and by allowing the consideration of issues that would otherwise be excluded (Bernstein et al. 2000, Levin *et al.* 2012).

At the risk of belabouring the point, it is critically important to avoid excluding certain issues. Sustainable development problems are highly interconnected, with multiple linkages across space, time, and sectors (SDSN 2012). In contrast, evidence-based solutions – and solutions in learning or knowledge exchange networks in general – tend to be relatively piecemeal. The necessity, and difficulty, of integrating and coordinating sustainable development efforts across networks and adopting a more systematic perspective is well-known and will not be detailed here (e.g. Thompson *et al.* 1986, Ch.5, Dörner 1996, p.80, UN GSP 2012). The important point here is that not excluding certain classes of knowledge or evidence, or certain issues based on the classes of evidence we can generate about them, is a necessary prerequisite of improved integration.

Ways that don't work – the importance of failure

The evidence-based approach to sustainable development tends to emphasise success. This tendency is especially pronounced in the context of learning networks, which by their nature are intended to promote and disseminate successful solutions while disregarding unsuccessful ones. Publication bias in evaluating studies is thus supplemented by 'publicity bias' from implementing or knowledge exchange organisations.

Focusing on success to the exclusion of failure, though, is problematic for learning in a number of ways. It impedes the accumulation of causal knowledge, which depends on examining not only what works, but why things work – for which failure can be as informative as success, if not more so (Deaton 2009). This holds even more in cases where failure is contingent on contextual specifics; in these cases, knowledge of failed interventions can help elucidate the limits on the transferability of similar, successful interventions. Furthermore, the underreporting of failure can compromise (exaggerate) the statistical significance of apparently successful interventions – the so-called 'file drawer problem' (Rosenthal 1979, Dickersin *et al.* 1987).

Systematic underreporting of failures is not a new phenomenon, nor unique to the evidence-based sustainable development (Easterbrook *et al.* 1991, DeLong & Lang 1992). Some development economists have recognised the obstacle which publication bias poses. Banerjee (2005) and Duflo & Kremer (2005), for instance, have suggested establishing a database of experimental studies, in which all results – failures as well as successes – are required to be reported, and cited as appropriate. This suggestion is helpful, but will likely be far more effective if we simultaneously recognise and address the root causes of the problem.

The unfortunate fact is that both publication and publicity bias stem from deep institutional pressures. The pressure to publish in academia is well-known. It can drive even 'objective' natural scientists to follow fads in the topics of study (Wei *et al.* 2013); in the context of development, this is especially problematic as the problems which most need studying rarely coincide with those which will most easily yield publishable results. Practitioners too face pressures to make their development interventions seem successful, in order to gain or retain prestige, power, and resources (Ostrom *et al.* 1993, Scott 1998, p.245).

In order to better embrace failure as a means to learning, we need to correct for these institutional pressures. But that is not the only reason to do so; these pressures also contribute to an even greater problem, to which we finally turn our attention.

Looks like a nail – instrumentalism and imposition

Sustainable development efforts are embracing the evidence-based approach in an attempt to ensure that policy and practice are grounded in reality. A long and failure-ridden history of fad-following in environment and development policy has taught us that there are "no global panacea[s]" (UNEP 2012, Ch.17) or silver bullets for addressing sustainable development problems (Ostrom *et al.* 2007). Yet the frequency with which this litany is repeated is testament to how much we need to be reminded of that lesson.

Powerful as it is, the evidence-based approach has its limitations, as we have seen, and for that reason the reminder is sorely needed. The great irony of adopting the evidence-based approach is that, both in seeking to promote proven solutions and in making it the modus operandi of learning networks, we predispose ourselves to falling into the very trap we are seeking to avoid.

This problem is not unique to the evidence-based approach. Rather it arises simply because the evidence-based approach is powerful, but has certain important limitations; and like any powerful but limited approach, it runs the risk of being oversimplified and indiscriminately applied. Duflo & Kremer describe one aspect of the problem:

> "… the differences between good and bad non-randomized evaluations are difficult to communicate, especially to policymakers, because of all the caveats that must accompany the results. In practice these caveats may never be provided to policymakers, and even if they are provided they may be ignored; in either case, policymakers are likely to be drastically misled." (Duflo &Kremer 2005, p.210)

They are writing about non-randomised evaluations, but the same applies to RCTs or to quantitative evaluations of development interventions in general.

When policymakers are not fully conscious of the necessary caveats, and particularly when they are buoyed by confidence borne of having 'scientific proof' of their chosen policy interventions, the outcomes can be counter-productive or worse. Development interventions can become increasingly imperialistic, with 'proven' solutions imposed from upon high; the unique specifics of local conditions, and with them the importance of local knowledge and participation, can be increasingly ignored (Scott 1998). Practitioners can come to identify themselves with their chosen instruments as ends in their own right, and consequently [mis]construe problems through a narrow lens (Ferguson 1990, p.67). An evidence-based hammer makes every problem look like a nail.

After decades of 'pathological' development, we might like to think ourselves immune to these possibilities. But the psychological and behavioural tendencies which lead to pathological development are still very much present, as are the institutional pressures of organisational self-promotion and -perpetuation (Barnett & Finnemore 1999). We favour simple solutions even in the face of irreducible complexity (Dörner 1996, p.80); we suffer optimism bias (Sharot 2011); we overgeneralise and decontextualise; and we engage in doublethink and self-deception (Dörner 1996, p.68). And we continue to seek panaceas.

In adopting the evidence-based approach, we must therefore be especially careful to always remain aware of its shortcomings and limitations, to accept that "there may be other modes of acquiring knowledge" (Basu 2005), and that these alternative modes may sometimes be more appropriate (Cartwright 2007). We should embrace the evidence-based approach, but in contrast to some of the rhetoric surrounding it, we should do so with caution, open-mindedness, and humility.

Recommendations

We have thus far examined the inherent limitations of the evidence-based approach, as well as potential consequences of its unreserved or exclusive adoption for learning net¬works. To reiterate, the point of this critique is not to find fault, but to find practical, func¬tional ways to correct for these shortcomings, thereby utilising the full power of the evidence-based approach to maximise the impact of learning networks, while minimising the risks.

What is needed, therefore, are ways to refine and improve the sharing of knowledge through learning networks, beyond the straightforward presentation of evidence-supported solutions. Many of the cognitive tasks involved are things that, as Ravallion (2005) puts it, "good project staff to *all* the time"; the idea here is to make it easier and more natural for all participants in learning networks to do these things. To this end, a set of streamlined guidelines or 'best practices' for participation in knowledge exchange networks could be a useful development, as could decision support tools or knowledge management systems (Alavi & Leidner 2001) geared towards facilitating the process of knowledge transfer.

Considering the relatively diffuse nature of these networks and the multitude of actors involved, encouraging the adoption of such practices or tools may take some time. In the interim, the central actors facilitating learning across networks provide a convenient leverage point. Such actors are relatively few and are only recently stepping into the facilitation role as networks become increasingly organised (Galaz *et al.* 2012). They are also pivotal in helping to identify and promote solutions, and thereby in the application of the evidence-based approach to learning. They could therefore function as 'cognitive checkpoints' of sorts, applying various analytical frameworks to problems and solutions, as well as reframing knowledge to ease transfer and sharing. The recommendations here therefore focus on the role of central actors, while bearing in mind that all

actors in knowledge exchange networks, whether implementing, testing, presenting, or adopting solutions, can contribute to the effectiveness of the learning process.

Some Possible Guidelines

1) Ensure problem orientation

When considering any development intervention, ensure that the problem it is meant to address is clearly defined. Define problems in terms of goals, rather than the instruments to achieve them. This helps minimise the risk of goal displacement or instrument attachment.

Clarify that the goals are, in fact, desirable, and for whom – whose interests are served by achieving particular goals, whose are not, and whether this distribution is justifiable.

Consider whether the goals as defined are appropriate in other contexts, with different actors in a different environment.

2) Clarify causal logic

Ensure that the causal mechanisms underlying how an intervention achieves its effects, and how those effects address the actual problem, are clearly and explicitly laid out. Clarify whether each of the causal links is known or assumed, and with what degree of certainty.

State clearly which aspects of the causal mechanisms or theoretical foundations may be contingent on context, and in what ways.

Consider what implications of the possible outcomes of an intervention, and the known or possible outcomes of similar interventions elsewhere, may have for the proposed causal mechanisms.

3) Clarify contextual factors and assumptions

Ensure that the factors on which the operation of an intervention depends are clearly and explicitly stated. These include, *inter alia*, political, social, economic, financial, cultural, biological, and physical factors. State clearly whether the state of each of these factors is known or assumed, with what degree of certainty.

Consider what the state of each of these factors may be in different contexts or on larger scales, and how they may change over time. Consider also any heterogeneity in the state of these factors *within* any area or population of interest. In combination with clear causal knowledge, this helps develop realistic expectations of the potential effects of interventions in different contexts.

4) Involve stakeholders, especially local actors

Consult with all parties potentially involved in or affected by an intervention. Consider how their interests may interact with the goals or effects of an intervention, and how they may respond to it. Be aware that the interests of stakeholders or local actors are rarely homogenous may sometimes be in conflict with each other.

Involving stakeholders and local actors in interventions is of both substantive and instrumental value – it is necessary to respecting individual freedom, but in addition, local actors often have valuable practical

knowledge and local expertise crucial to successful implementation (Scott 1998, Ch.9). Ensure that interventions fully utilise this knowledge.

5) Consider linkages

Examine a problem and its proposed solutions in their broader context. Consider how the existing situation interacts with the larger state of affairs, and how an intervention might affect that.

Ensure that any potential negative side-effects are clearly stated, and make explicit whether any such effects or changes are desirable or undesirable, particularly if the impacts are 'external' (sectorally or geographically) to the problem as defined. This can help minimise the risk of unintended negative consequences (Dörner 1996, p.57, Levin *et al.* 2012). This guideline is especially important for central actors, who have a breadth of perspective which implementing actors may lack.

Further Developments

Beyond these guidelines, which are still very much a draft version, there are two main avenues for further development of these ideas. The first is to design improved practical cognitive aids or knowledge management systems to ease appropriate knowledge transfer. There is substantial research into how the organisation and presentation of information can affect decision-making, including improving decision-making in complex situations (e.g. Reason 1987, Shim *et al.* 2002, Hevner *et al.* 2004). Literature on knowledge management could also hold useful insights for developing this informational architecture (e.g. Alavi & Leidner 2001). The guidelines above are a preliminary step in this direction; a possible next step could be some kind of online, open access, highly-interlinked knowledge portal. Further technological developments could open up even more possibilities.

The other approach is to create institutional arrangements to ensure appropriate knowledge exchange. Certain information reporting practices such as the recording of failed interventions could be formalised, and a review body could be explicitly charged with considering, for instance, the broader linkages and potential side effects of interventions intended for promotion and dissemination. This approach is complementary to the first, and in fact they are best used in combination.

Conclusion

Learning or knowledge exchange networks are a potent tool for accelerating progress towards sustainable development. The use of an evidence-based approach as a standard for identifying and assessing promising solutions for dissemination is a positive step, but the evidence-based approach has certain limitations, so caution is necessary. As learning networks grow, we should devote attention to ensuring that they have appropriate institutional arrangements and informational architectures in place to allow them to reach their maximum potential as a positive impact multiplier.

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Section 12

Redefining the Role of Business for Sustainable Development

GLOBAL ASSOCIATION
Master's in Development Practice Programs

Sustainable Development Practices: Advancing Evidence-Based Solutions for the Post-2015 Agenda.

Proceedings of the 2013 International Conference on Sustainable Development Practice

Chapter 34

Fostering Women and Youth entrepreneurship through the Inclusive Value Chain Approach in Latin America rural communities.

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Abstract

CATIE systemic approach-The CATIE program in Development Practice is, definitely, redefining the Role of Business for Sustainable Development by teaching and training the students to look further than the financial statements, the return of the investment and the profit margin. They will look for and support the people to find the best way to improve their sustainable livelihoods and determine the input that business is bringing to their lives, families and communities wellbeing. It could be achieved by making rural areas attractive places to live and creating new economic opportunities for smallholder farmers and entrepreneurs along the value chain, especially for women and youth, as stated by the SDSN. CATIE systemic approach, applied through the combination of different methodologies as the community capitals framework, sustainable livelihoods approach, appreciative inquiry, inclusive value chain, and others, allows our professionals to develop practical solutions to address the complex challenges of sustainable development at local level, in the most needed rural communities of Latin America.

The Community Economic Development

The community economic development has been traditional focused on generating more income, with a lack of knowledge about the community capitals. Often the ideas and initiatives come from different institutions and governmental programs, which did not take into consideration the people and the community needs and preferences. Therefore, sustainability is not the main issue, the short term results are the driver, and only 80% of the new small business created, survive 5 years of life (MEIC, 2013).

The inclusive Value Chain approach

The business development process in rural communities in Latin America has been oriented to the community leaders and land owners (mainly men), causing a bigger gender gap and leaving the youth excluded of any opportunities. Any Women initiative is seen as self employment, and not considered a business and their labor is not paid or paid less, as is considered part of the family labor. In the case of youth is not even taken into consideration.

The inclusive value chain approach allows the associative enterprises (small farmer's organizations) to find themselves and identify the potential opportunities to climb into the value chain, aiming to create the direct link between the farmer and the market. `And taking into account, the women and the youth, empowering and giving them space to become active members and able to benefit directly from business.

The community capitals facilitate the learning about the potential value chain development to strengthen rural livelihoods and improve the performance of rural enterprises (Donovan, 2012). The strengthening of rural enterprises increases the wellbeing and resilience of families. Therefore, will be able to face the changing conditions in the different dimensions they live.

The access to credit is one of the limitations rural enterprises face and stops its development. The rural organizations must be able to understand and disseminate the various innovative schemes being developed for value chain finance and its potential repercussions for the competitiveness of the chains themselves and their direct actors (Junkin, 2009). In this condition is essential to have professionals able to coach the organizations and leaders.

Empowering Women in Development

When expanding the value chain approach to inclusive value chain, opportunities rise for the excluded. As an example, the value chain analysis for bananas (*Gross michelle*) in Costa Rica demonstrated the key role that women play in the most critical value chain links: processing and quality control (Escobedo, 2013).

This is confirmed also in the study of the cocoa productive chain (Escobedo, 2013) where only in the links of secondary processing and inputs the role of women is key, this attributed to their motor skills and the type of activity performed. But it also showed that the presence of women in organizations is low (7, 7%) and most do not hold positions within the board, therefore do not participate in decision making.

We are sure that, a key topic to work with women entrepreneurs is empowerment. To achieve it is necessary to influence their individual and collective capacities to insert in better conditions into the value chains and entrepreneurship (Ramirez, 2012).

Youth and innovation

When addressing the youth, their participation is clue, regarding innovation and the use of ICT, both indispensable for a successful value chain. Fostering youth entrepreneurship helps they become effective leaders equipped with the life skills needed to lead and motivate others while increasing organizational productivity. The value chain development needs the integrations of different actors, have access to information, markets and finding new products and services according to actual demand, and capitals of the community. For all this, innovation is clue and youth can provide the knowledge and creativity required.

There is also a growing need to incorporate youth in the value chain, as in Latin America around 40% do not finish secondary education and will have limited access to job opportunities. Developing business with the inclusive approach will provide space for the youth and give the opportunity to avoid migration to the cities, where they will, probably, get underpaid jobs and perpetuate the evil poverty cycle.

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Chapter 35

Designing incentives for sustainable development: An exploratory analysis of business motivation to engage in sustainable development

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Abstract

Businesses are expected to play a key role in helping achieve the goals of sustainable development. The hopes are high that businesses will deliver technologies, organizational models, and management systems that are needed for sustainable development. Yet, how can business best be engaged to contribute to this societal goal? How can private firm interests be aligned with the public objective of sustainable development? On the one hand, businesses may be induced to follow a particular course of action through the use of incentives. These may either come in the form of coercive measures or in the form of 'formal' economic incentives such as charges, fees, taxes, tradable permits. Economic incentives are designed to induce agents to increase their contributions to public goods as well as to promote other pro-social behavior. On the other hand, businesses may be incentivized to engage in corporate social responsibility practices beyond legal obligations through 'informal' incentives, and a set of motives and drivers. Informal incentives include e.g. governance gaps or stakeholder activism. This paper sheds light on the complex set of formal and informal incentives influencing the engagement of businesses in sustainability. Based on a set of two case studies of business engagement in sustainable development practices, we review the role played by different incentives in the adoption of the practices. The selected case studies present the engagement of two Global Compact LEAD companies in developing countries in sustainable development projects in the areas of public health and electricity. The aim of this research is to synthesize current understanding of the complex influence of incentives on sustainable development to be able to derive recommendations on the design of formal incentive mechanisms and other informal motivational levers for a post-2015 governance architecture. This paper is part of a larger project on the role of business in sustainable development.

1. Introduction

Over the past years, businesses have received increased attention regarding their role in the transition to sustainable development (Barkemeyer *et al.* 2011, Kolk and van Tulder 2010). This increased attention also manifests itself in recent publications around the post-2015 process, in which the role and responsibility of businesses for sustainable development is particularly highlighted. The post-2015 process refers to the overhaul of the Millennium Development Goals (MDGs) that are due to expire in 2015. New to the debate on poverty eradication is the insight that "[t]here is a fundamental link between [poverty and] global environmental sustainability" (European Commission 2013). This insight has led to the advancement of the idea of integrating sustainability issues into a future development agenda and thus possibly transforming the MDGs into Sustainable Development Goals (SDGs) (European Commission 2013). At the start of the century, when the Millennium Development Goals were first devised, businesses played virtually no role. The negotiation of developmental issues was perceived to be primarily the matter of states. This time round, however, the United Nations (UN) Secretary General has called upon the business community to actively contribute to the definition and design of the architecture for a post-2015 agenda. Not only have businesses been called upon to contribute, but they are also expected to play a key role within a sustainable development framework for the post-2015 era. The rationale for assigning businesses this central role rests upon the intuition that businesses not only are "principal engine[s] for economic growth and job creation" but are also to be relied upon to "deliver many of the new technologies, organizational models, and management systems that are needed for sustainable development" (SDSN 2013a, p. 7). Not least, businesses are to play a key role in the post-2015 development agenda due to the

fact that businesses account "for some two thirds of natural resource use" (SDSN 2013a, p. 7). It is hoped that if the business world can comprehensively be engaged in sustainable development, ecological collapse and social crises may be averted. However, as pointed out by Elis (2013), it is still unclear which role in particular the private sector is supposed to play in a post-2015 setting. It is consequently also unclear how business can best be engaged to contribute to the societal goal of sustainable development. Moreover, it is an unresolved question how the private interests of businesses can be aligned with the public objective of sustainable development.

The alignment of private and social choice has been discussed by the literature on environmental economics through the lens of incentives for some years now. By changing pay-offs for agents, through a penalty or bonus, incentives are a means to alter economic agents' preferences and thus to induce a particular course of action (Brousseau 2012, p. 375). In the area of environmental policy, incentive mechanisms are already widely applied to induce businesses to alter practices and to achieve environmental objectives, either by providing incentives for agents to minimize their external effects or to increase their contributions to public goods (Barbier 2012, p.167). Incentives thus play an important role in facilitating sustainable development.

As businesses are expected to be a central driver of sustainable development, it is pivotal to understand which incentives are needed to induce businesses to engage in more sustainable business practices. However, in contrast to discussions on the environmental impact, regarding the social impact of business and the reality of weak enforcement of regulation in developing countries, it is still largely unclear which types of incentives are needed to scale up the sustainability practices of business.

This paper therefore reviews the role played by incentives, motives and drivers in the adoption of sustainability practices by firms. To this end, an exploratory analysis of business' motives to engage in sustainable development is undertaken. Businesses impact on sustainable development in various ways. The provision of public goods by firms represents one particularly interesting way in which firms impact on sustainable development in so far as the provision of public goods not only is perceived to be a central state function but also because it can be argued to have immediate developmental effects. Thus, in the following, business motives to engage in the provision of public goods are explored by means of two case studies. The studies represent the engagement of two Multinational Corporations (MNCs) in the areas of healthcare and energy. The article explores underlying motives and drivers for businesses to engage in this particular sustainability practice in order to be able to derive whether this form of action can be triggered through incentives in analogy to those incentives suggested by the environmental economics literature.

This paper starts with a brief outline of the concept of sustainable development. The notion of businesses as agents for sustainable development is then reviewed. It is argued that businesses contribute to sustainable development by providing public goods. Thereafter the idea that incentives can be used to promote societal objectives is introduced. By means of two exploratory case studies the motives and drivers for firms to engage in sustainable development are then explored. The results are analyzed in a subsequent section, in which ultimately an integrated framework for drivers, motives and incentives is proposed. Finally, a short conclusion rounds up this essay on incentives for sustainable development.

2. Dimensions of Sustainable Development

Preoccupation with sustainable development dates back more than 20 years. Discussions on sustainable development typically start by citing the definition of the concept laid out in the landmark publication 'Our Common Future' issued by the Brundtland Commission in 1987 (WCED 1987). According to the report sustainable development "seeks to meet the needs and aspirations of the present without compromising the ability to meet those of the future" (WCED 1987, para.43). Another well-known definition of sustainable development was coined by Elkington (see e.g. Elkington 1994, Elkington 1998). According to Elkington, sustainability has three distinct but interrelated dimensions, i.e. an economic, a social, and an environmental dimension. His conception of sustainability also became known as the 'triple bottom line'.

In the Rio+20 outcome document a fourth dimension was added to the understanding of sustainable development, which is good governance (UN 2012). The rationale for adding good governance as a fourth dimension was "to highlight several enabling conditions for sustainable development, including transparency, effective institutions, the rule of law, participation and personal security, accountability, and adequate financing for public goods" (SDSN 2012, p. 2). Thus the Rio+20 and consecutive UN documents (e.g. from the UNSDSN) are promoting a vision of sustainable development, as "a holistic concept addressing four dimensions of society:

economic development (including the end of extreme poverty), social inclusion, environmental sustainability, and good governance including peace and security" (SDSN 2013a).

As firms represent the productive engines of an economy, businesses are increasingly viewed as central agents for sustainable development (UNGC 2012). Moreover, with an increased awareness of society of sustainability issues, concerns regarding the social and environmental externalities of business operations have grown (Kolk and van Tulder 2010). The question of how sustainable development is to be translated into practice by and through businesses therefore is of great importance. To be able to find an answer to this question, it is pivotal to first understand how and by what means businesses can and do affect the four dimensions of sustainable development as presented above.

3. Businesses as agents of sustainable development

According to Blowfield (2009), over the past years confidence in the state as being capable of delivering development has declined. In turn, the expectations of society towards business providing developmental functions have broadened. Corporations are increasingly expected to internalize environmental and social concerns into their strategies and operations (Barkemeyer et al. 2011, pp. 3–4).

In our analysis we focus on MNCs, i.e. companies that are operating and investing internationally. Moreover, in our discussion we particularly focus on the role of business in developing countries. The presence and influence of MNCs in developing countries has increased over the past decades, as MNCs have expanded geographically either with direct operations or through their supply chains (Barkemeyer *et al.* 2011, p. 2). We study MNCs in this paper due to the fact that they, in particular, are expected to play a positive role in sustainable development and in combating pressing global issues as diverse as climate change, diseases such as HIV/aids or human rights violations (Kolk and van Tulder 2010, p. 119).

A firm's relation with and its responsibility towards society is an inherent part of the concept of corporate social responsibility (CSR). The concept of CSR, which has been discussed in the business literature for more than 60 years now, broadly refers to the responsibilities of the private sector towards society "including the economies, ecosystems and institutions on which functional societies depend" (Blowfield 2009, pp. 124). Many core developmental issues, such as labor standards, human rights, education or transparency are central matters of companies' CSR agendas such that corporate actors are increasingly acknowledging the need to manage their social and environmental impact in developing countries (Fox 2004, p.33). Thus, as Sagebien and Whellams (2010, p. 484) point out, the task of CSR has expanded to also redress or minimize social and environmental externalities that often go along with increasing commercial and industrial activity in the developing world.

A recent report of the United Nations Global Compact (UNGC) and the World Business Council of Sustainable Development (WBCSD) points out that businesses in developing countries are gradually "expanding beyond 'do-no-harm' approaches in order to produce deliberate positive outcomes (i.e. 'doing good')" (UNGC and WBCSD 2013, p. 3). Businesses engage, for example, in the supply of water, energy, and food. Such activities usually become necessary in situations where the government of a developing country is not capable or unwilling to provide such public goods or services. While businesses impact on sustainable development in various ways, e.g. through Foreign Direct Investment, through their innovative capacity or simply by providing jobs, the provision of public goods by firms such as healthcare, infrastructure, security, energy, etc. is of particular interest, because coordinating such efforts is generally seen as a central state function. In other words, firms basically assume state-like roles when they fill in governance voids by engaging in the provision of public goods. Moreover, it can be argued that the provision of public goods by firms is particularly worth scrutinizing, as this has immediate effects on the life of people in developing countries. If we assume that the provision of public goods by firms represents a form of sustainable development, then how can this sort of engagement be scaled up, i.e. how can more firms be induced to provide such goods that are generally in dire need in developing countries? The notion of business as private providers of public goods shall be outlined and scrutinized in the following.

Business as private provider of public goods

Public goods are generally defined as being both nonrival and nonexcludable in their consumption (Bowles 2006). Private goods in contrast are both rival and excludable. The non-exclosure and non-rivalry principles imply that in certain local areas, nobody can be feasibly excluded from consuming the particular good, or put

differently, "a certain amount of a public commodity, which is provided by an individual, can also be consumed by others" (Wiesmeth and Marquardt 2012, pp. 66–67). These characteristics however pose problems in the incentive structure for the provision of public goods to the extent that there tends to be an underprovision of public goods. Moreover, public goods show intense external effects due to the fact that if one agent offers a unit of a (pure) public good, this has an effect on the wellbeing of others, i.e. there is an externality on others (Wiesmeth and Marquardt 2012, p. 67). External effects occur when "one agent's actions impact on another in a way that is unintended an uncompensated" (Perman *et al.* op. 2011, p. 134). As there are little incentives for the market to supply public goods, the provision of public goods is generally seen as a central state function. Moreover, in the developed world, the state usually defines rules such that the market internalizes externalities (Scherer *et al.* 2006, p. 511). However, in the developing world state capacity tends to be weak. Public goods are thus often underprovided.

According to a recent study by the UN Global Compact and Bertelsmann, business involvement in "the delivery of public goods has increased significantly in the past decade" (UNGC and Bertelsmann Stiftung 2010, p. 20). Firms either provide public goods on their own or enter into partnerships with local governments. The integration of businesses into government frameworks on public goods such as health care, water, or food security is usually referred to as public-private partnerships (PPPs) (UNGC and Bertelsmann Stiftung 2010, p. 20). As firms are seen to have more resources than developing world governments, they are also increasingly relied upon to step in where governments fail to supply public goods (Kobrin 2009, p. 354).

A number of authors have argued that the provision of public goods by companies represents a new quality of corporate engagement. These authors hold that once firms start to engage in the provision of public goods or when participating in negotiations on regulatory standards they assume state like roles and turn into quasi-governmental actors (see, e.g., Matten and Crane 2005, Crane et al. 2008a, Palazzo and Scherer 2006, Kobrin 2009, Scherer and Palazzo 2007, Scherer and Palazzo 2011). This stream of literature has become known as 'Political CSR'. However, as pointed out e.g. by Scherer et al. (2006, p. 523) when firms assume such 'political roles', legitimacy issues arise, as "firms are neither elected nor democratically controlled to exert political power". While future research certainly must address the question of legitimacy it goes beyond the scope of this paper to do so.

It should be noted that many of the public goods that firms presently provide do not constitute pure public goods in the sense outlined above as, exclusion may be feasible or consumption may be rival. Healthcare is one such example, as people can in principal be excluded from it but which is often publicly provided since it has socially valuable external effects.

4. Incentives

How can firms be 'motivated' to provide public goods as outlined above? The alignment of private motives with social objectives as well as the question of how to get agents to contribute to public goods has been discussed by the environmental economics literature through the lens of incentives for many years now (Hanley *et al.* 2007, pp. 126–127). Incentives change an economic agents pay-off structure by introducing penalties or bonuses such that the agent may be voluntarily induced to favor a particular course of action over an alternative one (Brousseau *et al.* 2012, p. 375). Thus, economic incentives basically manipulate price systems by altering relative prices of particular courses of action (Perman *et al.* op. 2011, p. 195). The term 'economic' incentives is generally used for those incentives that specify a particular goal, but allow for private flexibility thus leaving it up for the agents to decide how the outcome shall be reached (Brousseau *et al.* 2012, p. 24), (Hanley *et al.* 2007, p. 83). Agents usually have superior information on how to select the best means of meeting an assigned responsibility (Tietenberg and Bennett 2010, p. 515). Economic incentives become relevant in situations that are characterized by market failures. According to Hanley *et al.* (2007, pp. 42–43), market failures refer to situations in which the "market does not allocate scarce resources to generate the greatest social welfare". Market failures can take different forms; the existence of external effects is one of them (Hanley et al. 2007, pp. 42–43). External effects however can be internalized through the use of incentives (Wiesmeth and Marquardt 2012, p. 66).

Economic incentives can be grouped into two broad classes: price and quantity-based instruments. The first group, i.e. price-based incentives, in turn can be classified into three categories, offering negative, positive or mixed incentives. Negative incentives tax environmental 'bads' such as environmental destruction (Driesen 2006, p. 284). By increasing the costs of such detrimental behavior agents are encouraged to engage in better environmental practices. Positive incentives in turn provide a financial reward, e.g. through a subsidy, for

improved environmental practices. Mixed incentives represent a combination of positive and negative incentives. Driesen (2006, p. 287) cites deposit-refund systems as one example of mixed incentives. In this system a deposit is paid to a person when returning e.g. bottles, which provides a powerful incentive to reduce litter.

Quantity based incentives, on the other hand refer to incentives such as e.g. in tradable permit programs, through which a government sets an obligatory quantity of emission reduction, while the "private sector retains some control over the price through its ability to choose techniques to meet the quantitative limit" (Driesen 2006, p. 287).

Economic incentives are often contrasted with traditional coercive command-and-control policies which man date prescribed actions (Tietenberg and Bennett 2010, p. 515). Such coercive command-and-control policies usually take the form of rules and regulations prohibiting, limiting or requiring certain forms of behavior (Perman *et al*. op. 2011, p. 131).

To function however, economic incentives require a particular legal design and a certain amount of regulation and enforcement (Faure 2012, p. 276). This highlights the fact that the adoption of economic incentives has a number of institutional prerequisites. First of all, to make use of economic incentives, "an adequate information base and administrative capacity, a strong legal structure, competitive markets, administrative capacity, and political feasibility" are required (Hanley *et al*. 2007, p. 125). Particularly in developing countries but also in the international realm these conditions are not met (Hanley *et al*. 2007, p. 125). This fact raises questions about how and by whom incentive structures for a post-2015 framework could be devised, which we will discuss further below.

Besides traditional command-and-control instruments and the economic incentives outlined above, the literature also discusses so-called information based incentives (Veisi *et al*. 2012, p. 388). Hanley *et al*. (2007, p. 82) refers to them as "cooperative institutions to share information between regulators, polluters, and victims" such as e.g., voluntary agreements. These types of incentives include 'right-to-know' programmes in which polluters are urged to report their emissions or to eco-labels or voluntary certification systems are further examples of informational incentives (Driesen 2006, p. 290). Information based instruments provide `indirect' incentives for agents to enhance their environmental performance, as consumers or suppliers may reduce their interactions with a firm if they perceive the environmental performance of a company as being unsatisfactory.

Another category of incentives that may induce agents to certain kinds of actions are moral incentives. In recent years, economists have started to question the classical model of the homo oeconomicus, i.e. the perfectly rational but selfish utility-maximizing agent, as the only way to understand human motivations. Brousseau *et al*. (2012, p. 3) argue that it is important to understand what actually motivates humans to be able to device incentive mechanism that enhance and do not deter contributions to public goods. They note that humans exhibit so called 'social preferences', i.e. ethical and altruistic preferences that may be crowded out by a sole appeal to economic self- interest (Brousseau *et al*. 2012, p. 367).

Therefore, to be able to devise a policy framework for a post-2015 era and to be able to incentivize businesses to increase the provision of public goods it is relevant to understand the underlying 'unincentivized' motivation without ruling out social behavior. Moreover, as in developing countries the rule of law tends to be weak, it is relevant to understand what induces agents to take certain forms of action in the absence of a strong mandating government that intentionally sets incentives to achieve certain forms of alignment of private with public interest. These questions will be explored in the following.

5. Case Studies

Crane *et al*. (2008b, p. 572) state that while the issue of drivers and motives for CSR certainly is a central one, it is usually left unexamined. Those authors that have dealt with the question of drivers and motives of CSR usually focus on distinct aspects and have arrived at recurring but yet disparate results. Moreover, both terms drivers and motives are used interchangeably in the literature and are sometimes also referred to as incentives. Definitions and delimitations, of the three terms, incentives, motives or drivers have so far not been provided. This underlines the need to further explore why firms engage in CSR activities to contribute to sustainable development and to synthesize current understanding of the complex influence of incentives for more conceptual clarity. In the following in particular the provision of public goods by firms in developing countries is explored by means of two case studies. The cases represent the engagement of two Global Compact Lead Companies that

also have been appointed as industry leaders by the Dow Jones Sustainability World Index in 2012. The two companies can thus be argued to range at the higher end of engagement in the area of sustainable development. Case material was collected from secondary sources, i.e. from the companies' publications as well as from third party resources.

Case Study BMW – drive to combat HIV/AIDS

Inequality looms large in South Africa. While the country counts as a middle income country, 70 percent of total income accrues for the top 20 percent of the population while 20 percent lives with less than a dollar per day (BMZ 2013). South Africa will most probably fail to meet two of the eight Millennium Development Goals by 2015: the eradication of extreme poverty (MDG1) as well as the containment of HIV/AIDS (MDG6) (BMZ 2013). The HIV and AIDS epidemic presents a huge challenge for South Africa. According to a recent household survey, in South Africa more people are infected with HIV than in any other country (Statistics South Africa 2011, p. 45). In total, about 5.4 million people lived with HIV in 2011, which represents a rise from 4.2 million in 2001(South Africa Info 2013). 16.6 percent of the adult population (aged 15–49 years) was found to be HIV positive, and about two million orphans were registered that had lost their parents due to AIDS (South Africa Info 2013). AIDS puts an almost insurmountable strain on the South African welfare system (BMZ 2013). South Africa has a two-tier health care system, consisting both of private and public provision of healthcare (South Africa Info 2013). Most basic primary health care is offered by the state while specialized services are generally provided by the private sector (South Africa Info 2013). However, due to poor management as well as a funding gap of nearly one billion dollars per year the public sector system has proven to be inaccessible to a large portion of the South African society (BMZ 2013, South Africa Info 2013).

In the year 2000, as one of the first companies in South Africa, BMW, the German car and motorbikes manufacturer, 'decided to take matters into its own hands' and launched an HIV /AIDS program at its Rosslyn plant (BMW Group 2013). Besides the manufacturing plant in Rosslyn, which assembles around 55,000 cars per year, BMW is present in South Africa with a corporate and wholesale administration unit (Mayet 2002). All in all BMW has about 3000 employees and works with 1,800 contractors; through contracts with local suppliers and dealers BMW indirectly employs further workers (Mayet 2002). In order to minimize the social, economic and developmental impact of the HIV/AIDS virus to its staff and the company, BMW engages in a profound effort to fight HIV/AIDS. BMW has come to realize that absenteeism due to HIV, "loss of productivity and the cost of replacing workers lost to AIDS threaten the survival of [its] business and other sectors of the economy" (BMW South Africa 2002). In 2000, BMW started its HIV/AIDS initiative by devising a policy to provide the firm with guidelines on how "to enable the accommodation and management of associates with the HIV/AIDS virus" (BMW South Africa 2002). Through the initiative at the Rosslyn plant, a total of 2846 employees have thus come to benefit from workplace programs that consist of educational programs, testing and counseling as well as treatment provisions (Mayet 2002). The Rosslyn clinic, for example, offers treatment for HIV infected employees including anti-retroviral medication and supports them with psychological counseling. Besides the employees also their families receive treatment (GBC Health 2013). Over the years the program has expanded its reach. As of 2012 the BMW's clinic in Rosslyn was attended by 7000 patients every month (Mail and Guardian 2012). In 2002, the company's HIV/AIDs budget mounted to about 54 US dollar per employee per year (Mayet 2002).

BMW has further committed to reach beyond the boundaries of the workplace (BMW South Africa 2013). In 2005, for example, BMW entered into a public private partnership with the German Federal Ministry for Economic Co-operation and Development to build a health and wellness center in a nearby community. The community center amongst others provides HIV/AIDS advisory services as well as training facilities, which about 700,000 people can utilize (Mayet 2002). The community center in particular targets at those sections of the population that so far have not been reached by any services (SEQUA 2010). Moreover, at present, BMW is extending its program to its Dealer and Supplier network (BMW South Africa 2013).

BMW counts social engagement as a foundational aspect of its corporate self-image (BMW Group 2013). Accordingly the communicated company slogan claims: „We assume responsibility". According to the South African company site, the HIV engagement forms part of an ongoing "People Development Programme" with which BMW wants to build a "culture of trust amongst Employees". BMW has announced that it aims at rolling out its South African HIV strategy internationally to other affected plants (BMW South Africa 2013).

Case Study Siemens – let there be light

Electricity is a precious commodity in the hills of Querétaro. While the Mexican state of Querétaro only

lies about two hours northwest of Mexico City, many of the highland villages of Querétaro are not connected to the public power grid and have no access to running water (Siemens 2012a). Infrastructure in the region is poor and many of the villages can only be reached by foot or on unpaved roads. Even though Mexico has an electricity penetration rate of about 97 percent (as of 2010), still 3.5 million people live without access to energy (Siemens 2012b, p. 19). Due to the fact that the highland regions are inaccessible and as communities up in the hill tend to be quite small, the cost of connecting them to the power grid are particularly high. In those regions people usually spend up to 40 percent of household budgets on candles and batteries. The lack of electricity implies that only few people have the opportunity to read a book in the evening or listen to the radio. As a consequence education levels in these regions usually are comparatively low.

However, for 182 households in the hills of Queratéro, access to electricity was recently provided. In a partnership with the local government of Queratéro, Siemens in summer 2011 brought renewable energy to remote villagers in the course of the charity project named "luz cerca de todos", i.e. "light close to everyone". Siemens, the German electronics and electrical engineering company, had opened a switchgear manufacturing plant in the state of Queratéro in 2009. The company soon realized that the region was facing severe electricity challenges. "We not only want to create jobs and expand our business in the region, but to contribute to the development of the communities where we operate. That's why we organize programmes that improve people's quality of life through technology," said Louise Goeser, CEO of Siemens Mesoamérica (WEF 2012). Adjuntas Dos and nine further villages of Queratéro received 182 solar modules including batteries to be able to store electricity during the day. Private homes, the school, church and several community centers thus received access to utility. The small-scale systems are able to generate enough electricity to operate a lamp, a fridge, a radio or a TV for some hours. In sum, Siemens placed equipment worth 230.000 Euro at disposal (Siemens 2012a). Siemens not only provided the systems but also took over the transport of the panels into the hills and worked hand in hand with the local population. All in all, the project took eight weeks, as some of the villages were only accessible by foot (Siemens 2012b, p. 20). Many Siemens employees voluntarily supported the project and helped carry the equipment to the communities. For the people in Adjuntitas Dos and the other villages, the free solar energy brings about considerable savings and helps improve the education of their children. Siemens intentionally provided renewable energy sources as they do not create any operating costs and allow for a low-carbon future. One important aspect of the project, as noted by Siemens, was training the community in how the panels work and how to fix them (WEF 2012). According to a Siemens publication, the company wants to be a role model for other firms and "show that it pays off to support social development" (Siemens 2012b, p. 20). A video on the project has been produced for the company website. In this video the viewer strongly gets the impression that to José Hernández, the Siemens project leader, the 'luz cerca de todos' project also matters a lot personally. Hernández, states that the project has symbolic value: "The people in Querétaro represent all those many people that do not have access to electricity, we want to express how importantly life can improve through electricity" (Siemens 2012b, p. 20).

Case Analysis: Incentives, Motives and Drivers – towards an integrated framework

Both cases represent the engagement of firms in sustainable development through the private provision of public goods. By providing healthcare to its employees, BMW can be argued to have a positive impact on development in so far as the provided health services have both immediate and long-term benefits for their workers and the community at large. The provision of anti-retroviral drugs to their HIV positive workers has an immediate positive effect on their health. Moreover, the program provides BMW's employees with the ability to continue their work, such that they will be able keep their job which in turn prevents themselves and their families from falling into poverty. The healthcare education programs have the potential to reduce infection rates, with the positive external effect of less people having a chance to get infected and thus being prone to falling into poverty due to an infection.

The provision of electricity through solar systems to the communities in the Mexican highland villages by Siemens in turn has positive developmental effects in so far as it gives the villagers more freedom. For example, having electrical light gives children the possibility to study in the evening, after having helped out the family during the day. A better education generally helps improve choice sets in terms of future job opportunities. Moreover the availability of electricity allows people to become small scale entrepreneurs e.g. by offering cold drinks or 'selling' access to TV sets.

In the developed world it is usually the state that ensures that people have access to healthcare and receive a connection to the power grid. However, in both case studies the state is apparently not capable of fulfilling such central functions. In the BMW case the health care system is hopelessly underfunded and the scale of the HIV/AIDS disease too large to be stemmed by public services. In the Siemens case, the cost of connecting the

highland villages to the power grid exceeds the local authority's budget. In both cases, firms have taken on the responsibility to get active – why so?

In the BMW case a direct link of the disease to the company's productive capacity is given. The disease negatively affects the plant's productivity as constantly replacing workers comes with costs. The performance aspect of improving productivity by lowering fall-out costs can thus be recognized as one prime driver of BMW to start providing healthcare. In this case the provision of the public good seems to be an obvious necessity. To have a healthy workforce BMW needs to provide healthcare. Another driver that is mentioned on the company's website is that through the program BMW wants to improve relations with and among employees. Improved employee relations also have a performance improving aspect as they lower costs by retaining valuable employees. An interesting aspect however is that BMW in the provision of the health services has gone beyond the boundaries of the immediate workforce and has extended the services to their workforces' families and to the wider community. This was done through the public private partnership with the German Ministry of Development. While no details regarding the financing of the partnership were available, the involvement of the German Ministry most certainly came with a form of a subsidy. The motive behind this engagement can be traced to the company's slogan "We assume responsibility". BMW seeks to retain legitimacy among its stakeholders in South Africa but also among those in the developed world. The acceptance of a company's operations by stakeholders is also referred to as the 'license to operate'. Retaining the license to operate means that a firm will be able to produce future revenue streams as it is able to retain both suppliers and customers for their products.

In the Siemens case the link between the provision of the good and the company's core activity is not as obvious as in the BMW case. Nonetheless, the project can be argued to have an enormous impact on the developmental status of the villages and to deeply affect the ways of life of the families in the communities. Why did Siemens do this? On the website the project is introduced as a charity project which points to some philanthropic motives. However, as indicated in the case study, Siemens wants to create good community relations by giving something back to the communities in which they operate. Good community relations also point to a driver related to the 'license to operate', i.e. safeguarding future revenue streams. This also finds expression in the statement by the company that it 'pays off to support social development'. Another driver that can be attributed to Siemens is that with the project the company intends to raise their employees' morale. The involvement of employees through their voluntary contribution to the project points into that direction. A further motive for engaging in the project can be conjectured to lie in wanting to be attractive to investors. Siemens states that the company wants to be perceived as a role model and pioneer in the area of sustainable development. This can be interpreted as an attempt to be an attractive target for investments. One should however not exclude the possibility that some personal ethics of leading managers also have played a role in inducing the project. In the video one had the impression that it was a dire matter for José Hernández personally. A final driver that can be attributed to the provision of solar panels to the communities by Siemens is that of market access. There are further communities in Mexico and in wider parts of South America, in particular the Andean regions, which are equally inaccessible as the mountain villages in Querétaro. Being known as providing reliable solutions and holding a reputation for being socially responsible can open up considerable potential for doing business in these regions.

However, in both cases policy instruments of price or quantity based economic incentives as introduced by environmental economists in developed countries come little to bear. One could assume that the partnership with the German Ministry of Development, in the case of BMW was linked to a subsidy, which may have presented an incentive to expand the health initiative to the worker's families and the wider community. Yet, due to the governance gaps that are related to the weak capacity of the state to set such 'formal' economic incentives, as we term them, these type of incentives at best play a subordinate role in both cases' settings. In both cases, the firms were rather induced to provide the public goods due to a range of 'informal' economic incentives that are not enforced by external institutions. When taking a closer look, they also alter pay-off structures and represent economic incentives in so far as they imply an opportunity to safeguard or increase revenue, or to safe costs. These 'informal' incentives however are not formalized or enforced by any institution as the 'formal' economic incentives are.

Besides 'formal' and 'informal' economic incentives, a third category of incentives could be identified from the case studies. This category relates to moral incentives that induce actions by relating to social preferences and personal value and belief systems. In the Siemens case study this type of incentive came to bear in the personal ethics of the Siemens manager or the philanthropic motives of Siemens. Here actions are triggered as they are perceived to be conducive to an end in itself and not to a means to an end. For example, if a person has a belief system that life should be valued by all means, seeing a person die, may present an incentive to get active

in improving the health related conditions of that and other persons.

As has been pointed out, so far the terms motives, drivers and incentives have been used interchangeably in the literature on CSR. There certainly is some interplay between the three terms an indeed some overlap in meaning. Yet, we propose that incentives can best be conceived of as externally given triggers that encourage reactions as they alter pay-off structures. Due to a relation with an underlying motive, incentives induce particular courses of action. For example, if one assumes that the underlying motive of a firm is profit maximization, then the formal economic incentive of a tax, or the informal economic incentive of a gap in governance or stakeholder activism against a firm induce responsive actions as a firm wants to minimize exposure and negative effect on the firms profit. Thus incentives trigger reactions. A driver in turn can best be conceived of as something that influences a firm's behavior, or causes a firm to take actions due to either a potential threat or a potential benefit to a company. Drivers thus induce proactive actions in contrast to the reactive responses caused by incentives. Drivers however also relate to underlying motives as they stand in a long term relation to fulfilling or safeguarding a particular motive. Table 1 summarizes the findings of the case studies and illustrates the role of incentives, drivers and motives with examples.

Table 1: Incentives, Drivers and Motives

Incentive	Explanation	Driver	Motive
Formal economic	Institutionalized incentive schemes, e.g., tax, subsidy, cap-and-trade system, accounting and informational regulation etc.	Direct: short term revenue/cost Indirect: long term revenue/cost due to potential effects on reputation, market access, stakeholder relations, organizational legitimacy	generate/maximize profits
Informal economic	Non-institutionalized incentives, posing actual threats to a business' profitability, e.g., governance gaps, missing infrastructure, negative stakeholder activism		
Moral	Actual threats to moral belief-system, e.g. workers dying of AIDS; children having poor access to education	Social preferences, altruism, reciprocity	normative beliefs

Source: own illustration

The motives and drivers that were identified through the case studies largely confirm prior research. However, prior studies have not scrutinized the link and delineation between drivers, motives and incentives. The implication for policy that can be derived from this study is that to be able to design incentive schemes for sustainable development it is relevant to be aware of the underlying logic of drivers and motives to be able to trigger certain forms of reactions through incentives. Moreover, through the case studies, a number of interesting questions have arisen that are highly relevant in the context of a post-2015 agenda. For example, can the informal economic incentives be converted into formal policy instruments so that they can induce further companies to provide public goods? The functioning of formal economic incentives requires a strong institutional set-up. Given the absence of such institutions in developing countries, a related question is: Who could serve as a functional equivalent? Should the governments of the developed world set up such incentive mechanisms to induce actions of firms' abroad (e.g. providing more and enhanced subsidies like in the case of BMW for an extended engagement in the area of public goods)? Or could a UN agency take on such a role? Here, future research is evidently needed to explore these and associated questions. Moreover, future research should address questions around the political role of business. A more fundamental question is whether we want to have businesses taking on quasi-governmental functions such as the provision of public goods. Are firms possibly in a better position to fulfill such functions? Can businesses legitimately act in the public interest? These questions should be addressed by future research.

There certainly are limits to this study. For example, no primary data has been collected from the companies and regions in which the public goods were provided. The underlying motives are hard to discern such that here

there could be some bias in the interpretation of the case studies. These issues should be addressed by collecting more data on the cases, e.g. through interviews with involved parties.

Finally, it also should be noted that the view that firms are to be central agents for development is not uncontested. A number of authors have pointed to weaknesses and difficulties in the debate around businesses as agents for sustainable development. Nonetheless while corporations due to unsustainable business practices and environmental externalities certainly can be considered as part of the problem, finding solutions to the challenges of sustainable development certainly requires the engagement of the private sector.

6. Conclusion

Businesses are increasingly perceived to play a central role in sustainable development. Sustainable development refers to four interrelated dimensions of society, i.e. to economic development, including the eradication of extreme poverty, social inclusion, environmental sustainability as well as good governance. Firms impact on these four dimensions in various ways. One particular way in which businesses impact on development is by providing public goods. Due to certain characteristics of public goods, i.e. due to market failures, public goods tend to be underprovided. To increase contributions to public goods and to align private with public interests, the literature on environmental economics has introduced the notion of incentives. Creating incentives for businesses to engage in the provision of public goods requires an understanding of the underlying motives of businesses to do so in the first place. Therefore, in this paper we have researched the underlying motivation of business to provide public goods such as healthcare or electricity by means of two case studies. Through the two case studies, it has become apparent that the provision of public goods is induced by a set of 'formal' and 'informal' economic incentives. Moreover, a set of drivers that originate in some underlying motives of a company, e.g. to generate profits, may lead firms to proactively engage in the provision of public goods. Yet, due to the fact that incentive schemes require a legal design and enforcement mechanisms, to be able to devise incentive schemes for a post-2015 agenda further research is required regarding possible institutionalizations of incentives.

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Chapter 36

Influencing change in sme's: An irish case study of the smile resource exchange

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Abstract

This paper presents an innovative environmental programme 'The SMILE Resource Exchange' which was started in Ireland by Macroom E, a centre aimed at fostering economic development and encouraging environmental best practise. The paper traces how the programme commenced, its growth, how it is funded and its successes to date. The paper also provides examples of the types of synergies that have been developed between the 1,000 business members who take part in this programme. The methodologies used by the programme are covered to include: 1) Reframing the Message and Promoting a Positive Image of Waste 2) Effective Communication, Awareness Raising and Networking 3) Partnership Building and 4) Collaboration. These methodologies have proved effective for the programme. The paper also provides a brief outline of the future plans for the programme which include: 1) the involvement of multinationals in the programme through their corporate social responsibility 2) the use of participative technologies and digital media and 3) the development of bespoke exchanges for larger organisations.

An Irish case study: smile resource exchange

1. Introduction

It is estimated that the European Union produces up to 3 billion tonnes of waste every year with approximately 360 million tonnes of waste generated from manufacturing activities and 900 million from construction activities (European Commission, 2010). It is clear that the generation of waste is a major contributor to pollution and environmental damage worldwide. The European Union has set challenging targets for member states for the diversion of waste from landfill and if these targets are to be achieved it is vital that the business sector are supported in better management of their resources in order to develop more sustainable consumption patterns. As Janez Potočnik, European Commissioner for Environment, noted at an OECD Ministerial Meeting of the Environment Policy Committee Brussels in March 2012, "Resource efficiency is not a choice, it is inevitable" (Europa, 2012)

So who are the biggest contributors to the problem of waste? A 2010 study suggests that SMEs cumulatively cause 64% of total industrial pollution, and contribute approximately 60- 70% of the total industrial waste in the EU (Constantinos, Sørensen, Larsen, & Alexopoulou, 2010)."

The fact that 99% of all businesses in the EU are SME's and collectively contributes to 85% of EU GDP (Audretsch, et al., 2009), indicates there is a strong need to support SME's to improve waste management practises. Large companies only represent 1% and with larger human and financial resources they tend to perform better in terms of waste management best practise. According to a recent study conducted by a European project FutureSME and Galway-Mayo Institute of Technology (Ireland) in 2011 entitled "The Issue of Waste in European Manufacturing SME's" only 10% of SMEs surveyed knew exactly what waste they generated;

70% were not sure and 20% did not believe that monitoring their waste was important. The majority of the SME owner-managers (60%) could not name any waste legislation that they must comply to and the majority (63%) were also not sure how their waste practices compared with other similar businesses in their sectors. However, the study also suggests that SME's are well intentioned towards engagement with environmental issues, and could be capitalised upon, if systems were in place that would 'nudge' them to transform their intentions into actions" (Mitchell et Al 2011) .

SMILE Resource Exchange, is an Irish publicly funded initiative, which aims to capitalise on the good intentions of SMEs, by providing a system that makes it easier for them to engage in the environmental agenda and aims to transform their intentions into actions.

1.2 Overview of SMILE Resource Exchange

SMILE Resource Exchange was launched in 2010 in Ireland as a free service that assists businesses in re-using each other's materials, by-products and surplus 'waste' products in order to reduce waste going to landfill, to increase the life of resources through reuse and thus reducing costs and promoting more sustainable business practises. Based on the concept of "one man's trash is another's treasure", it supports businesses in identifying what they have in their business that they no longer have a use for and which another business could reuse or recycle. Through identification of such synergies, businesses can save money on both disposal costs and purchasing costs. SMILE stands for Saving Money through Industry Links and Exchanges. Potential synergies are identified through unique networking events, an online exchange facility (www.smileexchange.ie) and a support team which will be explained further in the next section. Furthermore, it aims to provide a database of materials in a region where businesses can identify new product development ideas which could be made from materials that would otherwise have become waste.

The SMILE initiative is funded through a partnership between the Irish Environmental Protection Agency (EPA), 9 County & City Enterprise Boards (CEBs)[1], 7 Local Government Authorities and is project managed by Macroom E. Macroom E, a Projects and Research Office, is based in County Cork in the South of Ireland, is a collaboration of public sector bodies which aims to foster economic activity and to promote environmental best practise to businesses in the region it operates. (www.macroom-e.com)

SMILE came about as a result of a survey of the business users of a website, initially launched by Macroom E, called Waste Matchers (www.wastematchers.com). Similar, to the SMILE concept, it provided an online facility for homeowners and businesses to connect about the potential opportunities to exchange resources. A survey of the business users was carried out in September 2009 by Macroom E. The results of the survey indicated a strong interest in business in a waste networking event which subsequently led to the first SMILE event taking place in County Cork. Following positive feedback and a large business attendance at the event, a six month pilot phase saw the set-up of a Steering Group consisting of the project partners, the development of a project delivery team and the development of the website, www.smileexchange.ie.

Following the success of the six month pilot phase, the initiative expanded into South of Ireland Counties Limerick, Clare and Kerry in October 2011 and this was officially launched by the Minister for Environment, Community & Local Government, Phil Hogan T.D. The initiative saw further expansion into Ireland's capital city, Dublin, in September 2012 with the Prime Minister of Ireland, An Taoiseach, Enda Kenny officially launching the expansion.

[1] County & City Enterprise Boards (CEB's) provide support for small businesses ('micro-enterprises') with 10 employees or less, at local level. CEBs are co-funded by the Irish Government and EU Structural Funds.

Currently SMILE has a growing membership of approximately 1100 businesses. Since its inception approximately 2500 potential exchanges have been identified by SMILE between businesses and 550 have been directly supported. To date, 8 events have been delivered attracting approximately 500 businesses. Approximately 25,700 tonnes of material have been offered at the events representing a potential cost saving of €2 million to €2.5 million if diverted from landfill.[2]

Examples of synergies which have been identified between businesses in the SMILE network include:

- **Old Sail Cloths & PVC Tarpaulin Offcuts to Designer Bags:** SMILE has supported Mamukko, producers of a contemporary handmade handbags & accessories made of upcycled sailcloth, PVC tarpaulin and marine fabrics, in making contacts with approximately 10 companies who they have sourced materials from which they use in the production of their bags, e.g. 1) Cassidy Covers, a tarpaulin manufacturer who supplies Mamukko with offcuts of tarpaulin they no longer have any use for; 2) A large ferry company who were doing a refurbishment and had materials which they were disposing of which Mamukko could use in their designs; 3) IKEA, a large furniture manufacturer who was also doing a refurbishment and had shelving which Mamukko utilised in their workshop and 4) Sailing Clubs who supply them with old sails. A synergy between Mamukko and Howth Yacht Club provided Mamukko with 20 old sail cloths which made parts for 106 bags and which generated sales of €10,600. Mamukko also saved €2120 on purchasing of such virgin material. Twenty old sail cloths were diverted from landfill with a CO2 reduction of 1400 kilograms from just one synergy.

- **Reuse of Styrofoam Packaging:** Through SMILE, a logistic company, Agility Logistics connected with a packaging company who were able to reuse their Styrofoam which they were previously sending to landfill at a monthly cost to Agility Logistics of €500. This connection resulted in cost savings for the packaging company on buying new packaging materials and cost savings for Agility Logistics on disposal costs. As well as this large volumes of Styrofoam have been diverted from landfill.

- **Tyres to Cow Mattresses:** PK Rubber, a tyre re-cycling plant which creates shredded rubber product, was searching for markets for the crumb rubber when he approached SMILE. Through SMILE, the company connected with a producer of mattresses for cow bedding who were searching for a filling material for the mattress. Cow mattresses provide additional comfort for dairy cows and increases milk yield. Each comfort mattresses requires 65kg of crumb rubber as a filling material. To date the synergy has resulted in 600 tonnes of crumb rubber being diverted from landfill resulting in a CO2 reduction of 1400 tonnes. PK rubber have generated additional income of €36,000 and with future demand of 750 tonnes on a yearly basis, this has an annual income generation potential of €45,000.

- **Reuse of Cardboard Packaging:** Force Field manufactures and distributes electric fence energisers. Their fencing supplies come in strong cardboard packaging which they no longer require and dispose of on a regular basis. The company was looking for an alternative to landfill and through SMILE they connected with Aaron PCB, an electronic and electromechanical assembly manufacturer who supplies electronic circuits, cabling and assemblies to markets in Ireland, UK, Spain, Germany and the USA. They buy in cardboard boxes to ship their products. Aaron PCB are located just a few kilometres away from Force Fields. This synergy sees Aaron PCB reusing approximately 20 cardboard boxes per week from Force Field and approximately. 1000 cardboard boxes on an annual basis. The synergy to date has resulted in the diversion of 780 kilograms of cardboard diverted from landfill per

[2] Calculation is based on the total tonnage of materials offered multiplied by the landfill gate fee and landfill tax, which is calculated at between €76 and €101. These figures are based on the FORFAS Report on Waste Management in Ireland, 2010 Update, http://www.forfas.ie/media/forfas101005-Waste_Management_Benchmarking_Analysis_2010.pdf. Economic benefits and savings on purchasing costs are not taken into consideration in this calculation

annum and a CO2 reduction of 1125 kilograms per annum which is equivalent to driving a family car 7264 kilometres. This reuse activity has reduced the need for 12.5 trees and 20,667 litres of water during manufacturing (USA EPA). Zero landfill is now going to landfill and Aaron PCB are saving €3,120 per annum on purchasing costs.

The SMILE initiative has achieved greatly in capturing the attention from both the business sector and the public sector to engage in discussions in relation to "waste as a resource". This achievement has been awarded most recently when SMILE won a Local Authority Members Association Award in 2013 as well as being a finalist in the Ireland Green Awards on numerous occasions. Currently SMILE is competing with 269 projects to be the European Union's most innovative low-carbon initiative in the European Commission's "A World You Like With A Climate You Like" challenge. SMILE was acknowledged in the most recent Irish Waste Management Policy published in 2012 called "A Resource Opportunity" as a project that should be continued to be supported to promote reuse as a concept to businesses. Most recently SMILE was presented to the European Commission as a best practise model in resource efficiency in May 2013.

It is well recognised that trying to engage businesses in the environment discussion and indeed influencing them to change their behaviours in this regard is difficult and can be a very slow process. So what is it about the SMILE approach that has achieved in attracting such attention and engagement from business? The next section will analyse the different methodologies used in the SMILE approach in the delivery of such an environmental initiative.

1.3 SMILE Methodology

SMILE has taken a unique approach in the delivery of such a service to businesses and its methodology can be classified in four different ways including:

- **Reframing the Message and Promoting a Positive Image of Waste:** When talking about resource efficiency, waste often tends to be the area that least interests businesses in comparison to energy and water. The latter often being more attractive as they are associated with being cleaner and solutions are often more obvious. SMILE aims to reframe the message of waste to businesses to be positive and one which presents opportunities for businesses. Therefore a positive brand and logo was developed for SMILE (Saving Money through Industry Links and Exchanges). The project is deliberately not called the Waste Exchange project. SMILE has also been launched by the Irish Prime Minister which served to promote the project and to gain credence from business and the general public. SMILE also involved a former well- known GAA (Gaelic Athletic Association) sports commentator, Micheal O Muirthearthaigh, as a Patron of SMILE, specifically chosen because of his connections with sport, community and not specifically with the environment. SMILE this year also engaged an animator to depict SMILE case studies in a fun way.

- **Effective Communication, Awareness Raising and Networking:** Effective communication with businesses is critical and SMILE prides itself in its communication approach with business.

  a. **Two way communication:** Firstly, SMILE believes in a two way dialogue with business and has listened to businesses through various surveys and feedback mechanisms. Such interaction suggests that businesses want to network, they want to meet face to face (not just online) and they want to promote their business.

  b. **Networking Events:** SMILE offers businesses a chance to network at high quality unique networking events. On average there are 80 to 100 people in attendance at SMILE events. On average 90% of participants at events rate the events as excellent or very good. Unique software that has been modified for SMILE events provides for effective and structured networking (one business has the opportunity to introduce his/her business to between 30 – 40 other businesses in small groups

of approximately 6-8 as well as having the opportunity to search for potential resource exchange synergies.) The software ensures that duplicate meetings are where possible eliminated, providing for a very worthwhile networking experience. While businesses often come to SMILE events to network in the first instance, they are exposed to the "waste as a resource" concept and often many broader environmental issues. The network can be said to be the 'draw factor' for businesses but the benefits in their attending are much wider.

c. **Website:** The SMILE website was designed with the user in mind and to be as user friendly and easy to use as possible. SMILE members can also engage with one another to identify potential synergies in between SMILE events through the online exchange facility on the SMILE website. A separate section on the website also allows businesses to promote their business and see who will be at the matchmaking events.

d. **Direct Contact:** SMILE has taken the direct approach with businesses and engages in email marketing campaigns and direct phone call marketing campaigns. Businesses are invited to be involved.

e. **Social Media:** Social media avenues including Facebook Twitter, LinkedIn, and You Tube are a key element in connecting with potential and existing SMILE members.

f. **Digital Communication:** Examples of synergies between businesses have up until recently been communicated with businesses through words. SMILE is currently trialling the depicting of SMILE synergies through animation.

- Partnership Building: In order to develop and expand the initiative SMILE recognises that it is important to build effective cross sectoral partnerships and relationships between different public sector bodies and between such bodies and groups who represents businesses such as chambers of commerce, business networking groups etc. Thus far SMILE has built a strong partnerships between the Irish Environmental Protection Agency, 9 Enterprise Boards, 7 Local Government Authorities and numerous business associations and chambers of commerce with the goal of working together to support businesses by pooling resources together and thus avoiding duplication.

  Partnerships with the Enterprise Boards (CEB's) is important as they have direct contact with SME's who are in most need of such a support like SMILE. The Enterprise Boards promote SMILE as a service to their clients and also direct new start-up businesses to SMILE, i.e businesses who might be starting an upcycling business, e.g. Mamukko, as mentioned above, were referred to SMILE by the South Cork Enterprise Board as they wanted to make connections with businesses in order to access materials for the production of their bags which are made from upcycled tarpaulin and sail cloths etc.

  Partnerships with the Local Government Authorities are important given that an important function of each Local Authority is the development of Waste Management Plans but also in many cases Local Authorities are becoming increasingly involved in economic development. For example in Cork, SMILE has support from both the Economic Development section and the Environment Section in Cork County Council (the local government authority). The Environment Section like most councils are keen to raise awareness to businesses about better waste management, i.e. prevention and reuse and see SMILE as a strategic way of connecting with businesses to influence their behaviour when it comes to better waste management. The Economic Development section sees SMILE as an opportunity to support new potential start-up businesses in accessing resources but also by helping businesses become more sustainable through more strategic management of their waste. If a business is more sustainable they are more likely to retain staff and to hire staff and new start-up businesses also create job opportunities.

The local partnerships SMILE has developed with Local Authorities and Local Enterprise Offices (CEB's) is important in gathering support for such an initiative in a region and therefore in order to expand the project SMILE has spent much time in raising awareness of SMILE and in building relationships with other Local Authorities and Enterprise Offices nationally.

As well as funding partners SMILE focuses much attention on building relationships with various Chambers of Commerce, LEADER Groups[3] and Local business groups who promote the SMILE initiative to their business networks.

- **Collaboration:** SMILE has become a natural hub for discussing the waste agenda including waste as a resource, reuse and recycling. As well as the exchange of resources, there is much evidence to suggest that the process of connecting organisations has resulted in other types of partnerships. Through SMILE a number of collaborations have developed between social enterprises, the public sector, multinationals and SME's and also projects already part developed have approached SMILE in order to gain contacts in different sectors. SMILE in effect is acting as a conduit between businesses for exchanging, a conduit between the voluntary and private sectors, a conduit between public and private sectors and a conduit between different public sector bodies. Examples of such collaborations include:

  a. **Business to Business** – Much anecdotal evidence suggests a number of partnerships between businesses, as well as resource exchange synergies between business, have emerged as a result of meetings at SMILE events
  b. **Mattress Recycling Facility** – Cork City Council and Cork County Council (Local Government administration organisations), Cork Environmental Forum (local environmental organisation) and Cork City Partnership (local development cCompany)[4] are proposing to develop a mattress recycling facility in Cork based on the need of SMILE members who have quantities of mattresses going to landfill and due to the desire of the partnership to set up a social enterprise to promote economic development in a region in Cork.

  c. **Rehab Recycling and the Probation Service** – Following an introduction by SMILE, both organisations have set up a project whereby Rehab Recycling, a social enterprise recycling initiative, supplies the Probation Service with WEEE (Waste Electrical and Electronic Equipment) which needs to be broken down in order to be recycled.

  d. **Health Service Executive (HSE)** – An approach has been made by the HSE (Administration of Irish Health System) to SMILE for support in the setting up of an intranet exchange system to promote the reuse of items across 2,700 HSE locations

  e. **Scrap Store in South Dublin** – A social enterprise scrap store being set up by Early Childhood Ireland approached SMILE for support in making connections with the business sector in their region in order to access resources for their store.

[3] LEADER – 'Liason Entre Actions pour le Development d'lEconomie Rurale' is a Rural Development Programme part- funded by the European Union. Launched in 1991 LEADER funding is administered by local companies who distribute grants and other supports to projects within their areas.
[4] Cork City Partnership is a local development company operating under the National Development Plan. The Partnership brings together Local Communities, Government Bodies, the Social Partners and Elected Public Representatives in partnership approaches at local level.

f. **LEADER Groups and Business Associations** – SMILE has been approached by a number of business associations and LEADER groups who work with groups of businesses and who have invited SMILE to make presentations to their business groups to showcase the supports available to them in the SMILE project.

g. **Rehab Recycling's Eco Village** – SMILE have collaborated with Rehab Recycling in the launch of their Eco Village, i.e. a free recycling facility for small business. SMILE have a "Reuse Cabin" located in the Eco Village which SMILE members can use as a drop off and collection facility for the exchange of resources.

h. **Supply Network Shannon (SNS)** – SMILE recently collaborated with this business group representing manufacturing suppliers to multinationals in Shannon, a region in the south of Ireland. SMILE partnered with SNS, in the organisation of a manufacturing exhibition for suppliers across Munster, which saw the programme provide SMILE facilitated networking at the exhibition.

i. **Multinationals and SME's** – Through interaction with a multinational company who is a SMILE member, an SME Environmental Mentoring System is being developed which should see the environmental best practise from within the multinational company being shared with a group of SME's.

Future development

The next stage of our planned development, also supported by PhD research, builds on our current work as outlined previously and focuses on three key areas which are as follows:

- The Involvement of Multinationals in the Programme
- The Use of Participative Technologies and Digital Media
- The Development of Bespoke Exchanges for Large Organisations

2.1 The Involvement of Multinationals in the Programme

One of the main obstacles to the behavioural change of SME's in relation to the environment is the cost of implementing effective programmes. Research leads us to believe that programmes tend to work best at a community level, working with a group of businesses to help them to review their current costs and how to reduce them (and thus reducing the impact on the environment). This is an expensive exercise which often does not persist once the intervention has finished i.e. businesses frequently revert to their behaviour pre-assistance. The multinationals can play a very beneficial role in this scenario for two reasons 1) SME's are more likely to be influenced by other businesses/peers and 2) multinationals generally have a high degree of knowledge and skill in relation to managing their environmental practises which could be offered to assist SME's under their corporate social responsibility. Also, this could be self-sustaining on a local basis within a network of businesses.

Having large businesses as leaders in this area, we believe, will have a positive influence on the perceptions of businesses towards the programme. The views of businesses towards the 'promoting body' e.g The Department of Environment, the Environmental Protection Agency, the local authorities etc has a significant impact on how the programme is perceived.

An interesting study conducted by Ipsos MORI (Market Research Company) in 2005 in the UK highlighted the following words as best describing the public service with the highest ranked words in descending order:

- Bureaucratic
- Infuriating
- Faceless
- Hardworking
- Unresponsive
- Unaccountable

With the lowest ranked words as follows:

- Friendly
- Efficient
- Honest
- Open

Government bodies also face a further challenge that alongside trying to promote best practise, they are also acting as the 'environmental police'. In this arena, we can see how corporate social responsibility may be used to assist with some of these issues. By far, the most noticeable global issue affecting corporate responsibility has been climate change.

The next stage of our programme (commencing October 2013) is to work with a multinational company and a number of SME companies from their supply chain in relation to environmental practises in their respective companies. In this pilot, multinationals can bring advice, experience and expertise to inform the SME's and also act as a 'business leader' supporting the government agenda and encouraging SME's to become involved. SME's wish to network with multinationals and each other in order to promote their core business so this may be attractive in terms of persuasion and interest.

This, in itself, could also prove to be a time consuming exercise and so we believe that there is an opportunity to develop communication and relationships online through digital media (alongside some group meetings) which we will cover in the next section.

2.2 The Use of Participative Technologies and Digital Media

Messages and the way in which they are communicated to businesses are key to future change and development. One method of communication which is growing is digital media and the use of ICT and participative technologies in socially orientated projects for the common good.

Participative technologies may provide a platform where 'word of mouth at the speed of light' could happen. Shareef (2012) describes participative technologies as "electronic applications, tools and platforms that facilitate communication and interaction among two or more individuals or groups for the purpose of mutual interest" (Shareef, 2012). Also, it may be possible to consider the ways in which technologies enable membership (who is allowed to interact) and the message content (what the message communicates) to be coupled together. To a great extent, these technologies have a bottom-up orientation such that may be more sustainable in terms of change on a longer term basis. It is no longer unusual for government to use social media technologies, texting or RSS feeds to interact with citizens and stakeholders. However, little is known about the use of participative technologies by government for citizen and business engagement purposes. The public sector has a large range of social problems to address and the PhD research associated with this work will look at examining the use of participative technologies and the effects they may have on behaviours and institutions.

Safko (2012) usefully summarises social media with the following key concepts 1) two-way communication 2) listening to your customers 3) the power of peer-to-peer 4) word of mouth at the speed of light and 5) the fundamental shift in power (Safko 2012).

The development of an online platform to facilitate interaction between SME's and multinationals will be supported by research into other online support facilities already in existence. It is anticipated that this would include: an 'ask the expert forum', animations, blogs, vlogs, digital storytelling, online tools (audits etc) and resource exchanges. We also anticipate that by bringing a diverse group of people and organisations together around the theme of the environment, that this will create some innovative approaches where businesses begin to define their own role in climate change.

Word of mouth is extremely attractive from a cost perspective and could be more influential from an ongoing change of behaviour aspect. The public sector reform is intertwined with information and communication technology (ICT) and the application of the internet in the public sector is changing the way that public administration provides services and information to its stakeholders. As stated by Shareef (2012) in "Transformation Government through eGov Practice", "Societies are being transformed through a new wave of digital communities'. Shareef continues to say that "Research at the integrative end of e- government spectrum where participative technologies are used to engage external and internal stakeholders in decision processes and collaborative technologies has received less attention" (Shareef et al, 2012). In our pilot, we are going to explore how these participative technologies can be successfully applied to the area of environmental issues in three ways: 1) participation of the business community in change 2) collaboration of stakeholders (government, SME's and multinationals towards a common environmental purpose and 3) behavioural change.

This pilot will finish in May 2014 and results will be available shortly afterwards.

2.3 The Development of Bespoke Exchanges for Larger Organisations within Ireland

We have learnt that relationships between peers which are built on trust are more likely to produce results than others. In the next stage of this programme, we see an opportunity to develop resource exchanges within larger organisations which are developed specifically for those working within these organisations. These exchanges will commence as closed communities in which staff all over a country and internationally can exchange materials between branches. Similarly, there will be a behavioural change approach to this pilot which should yield some interesting and informative outcomes.

Conclusion

The SMILE progamme is three years old and in this short time, it has provided some very useful messages in terms of engaging with businesses, communication (both online and in group situations) and collaboration between organisations and partnership. We believe that these have been important factors in the success of the programme to date. Currently, we are growing the SMILE programme by involving multinationals under their corporate social responsibility, researching and developing participative technologies to support the programme and also piloting bespoke exchanges for larger organisations. Further results will be available in May 2014 and this work is also part of a larger PhD project.

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