



Resilience in Action: Lessons from Public-Private Collaborations Around the World



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Executive Summary

As escalating natural disasters thrust climate change into centre stage, global leaders in business and government are increasingly looking to the private sector for the resources and solutions to adapt. New forms of formal and informal partnerships between government and business are emerging which overcome traditional market barriers to deliver resilience-building solutions.

Public-private collaborations offer a strong model that leverages the strengths of both government and business to help meet the growing need for investments in climate and disaster resilience-building. Government policies can help create an enabling environment and foster partnerships which help overcome the barriers that would otherwise inhibit private sector action. Public-private collaborations can thus engage businesses in activities that manage risks and unlock opportunities, providing benefits to the organisation, both internally and externally.

This report discusses nine outstanding cases of collaborations that build resilience, selected from an analysis of over 100 examples of public-private collaborations in developing countries. These case studies show how innovative collaborations can make communities, economies, and businesses more resilient to existing and emerging threats. They demonstrate how a wide array of players are involved in resilience-building activities, including government entities ranging from local authorities to international development organisations, and businesses of all sizes from micro-enterprises to multinationals. The collaborations span the full spectrum of sectors and industries most critical for building resilience: agriculture, housing, information and communication technology, health, fishing and aquaculture, transportation, tourism, water, financial services, waste and energy.

The case studies illustrate a wide range of players, projects and partnerships that exist in public-private collaborations that seek to build resilience. Despite their diversity, the case studies share a number of common themes. **Six success factors were identified as key considerations for policy-makers seeking to drive greater resilience through public-private collaborations:**

1. Build on a foundation of local engagement and trust.
2. Start small and local, but position for scale and replicability.
3. Integrate skill building to maximise community ownership.
4. Build adaptive capacity by strengthening businesses and livelihoods.
5. Create partnerships along—or across—value chains.
6. Find innovative alternatives to traditional infrastructure.

As policy-makers explore their options to address disaster risks and adapt to climate change, they should consider the opportunities for engaging the private sector through mutually beneficial public-private collaborations. With proper design and execution, these collaborations can unlock the vast potential of expertise, resources, and networks that each sector can bring, building partnerships that will create a more resilient future.



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About this Study

Communities, businesses, governments and civil society organisations around the world have begun to feel the impacts of climate change. Along with sustained efforts to mitigate climate change's disastrous effects, these players are increasingly taking actions to reduce their vulnerabilities and exposure. To date, the public sector has been the primary driver of disaster risk management (DRM) and climate change adaptation activities which together help strengthen resilience (henceforward called "resilience-building activities").¹

Effectively building resilience requires participation from all members of society. Public officials are increasingly looking to partner with the private sector in order to rapidly deliver the solutions needed today. **Public-private collaborations (PPCs)**—which include both formal and informal partnerships and initiatives—can result in DRM and adaptation activities that draw from the expertise and resources of both governments and businesses to create resilient economies and communities.

Resilience in Action: Lessons from Public-Private Collaborations around the World aims to demonstrate how innovative collaborations, both formal and informal, with the private sector can make communities, economies, and businesses more resilient to current threats and future impacts. Drawing from a set of case studies (see Appendix A), this analysis serves as a supporting document for decision-makers and international organisations seeking to draw from expertise beyond their organisation. Using the featured case studies, this report provides insights on the lessons learned; analyses the roles, opportunities and barriers to private sector engagement (with a particular focus on micro-businesses and small- and medium-sized enterprises); identifies areas for further innovation; evaluates success factors; and offers recommendations

to policy-makers and decision-makers seeking to promote collaboration on climate adaptation and disaster risk management.

This report is structured in four sections beginning with an overview of the opportunity for private sector participation in DRM and adaptation. Section two discusses emerging models of public-private collaboration, drawing from the case studies. Finally, section three identifies success factors and lessons learned from the case studies and offers recommendations for policy-makers and decision-makers seeking to promote private sector engagement in DRM and adaptation through public-private collaboration. The full case studies can be found in Appendix A.

¹ A resilient organisation or community is better prepared for hazards and climate change impacts, and is able to quickly recover from a disaster. Resilience is an outcome that is reached through disaster risk management and adaptation activities, projects, programmes, initiatives, partnerships, collaborations, etc.



1. The Resilience Opportunity

Between 2010 and 2012 there were more than 700 natural disasters that affected over 450 million people.² The cost of damages from disasters increased five-fold during the last two decades, from an annual average of roughly US\$20 billion (1990s) to US\$100 billion (2000s).³ Unfortunately, scientific research shows that the greatest impacts of climate change will fall on the world's poorest nations, which are the most at risk to future climate vulnerabilities.⁴

Responding to climate change will require a wide range of disaster preparedness investments to avoid costly damages and the creation of new adaptive solutions. The estimated costs of these activities are thought to be in the range of US\$49 billion to US\$171 billion annually over the next 30 to 50 years.⁵ Meeting these funding needs and developing innovative solutions will require support from a wide range of actors. While the main driver of disaster and climate resilience in developing countries to date has been the public sector, public officials are increasingly looking to partner with the private sector in order to rapidly deliver the DRM and adaptation solutions needed today. Public-private collaborations (PPCs)—which include both formal and informal partnerships and initiatives—can leverage the expertise and resources of both governments and businesses to create a more resilient future.

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This section introduces the drivers for businesses to provide resilience-building solutions, factors that have constrained their role to date, and how PPCs can help leverage the necessary knowledge and capital to meet resilience goals.⁶

In Brief

Public-private collaborations offer a strong model that leverages the strengths of both government and business to help meet the growing need for investments in climate and disaster resilience-building. Government policies can work to create an enabling environment and foster partnerships which help overcome the barriers that would otherwise inhibit private sector action. PPCs can thus engage businesses in activities that manage risks and unlock opportunities, providing benefits both internally and externally.

WHY BUSINESSES INVEST IN DISASTER RISK MANAGEMENT AND ADAPTATION

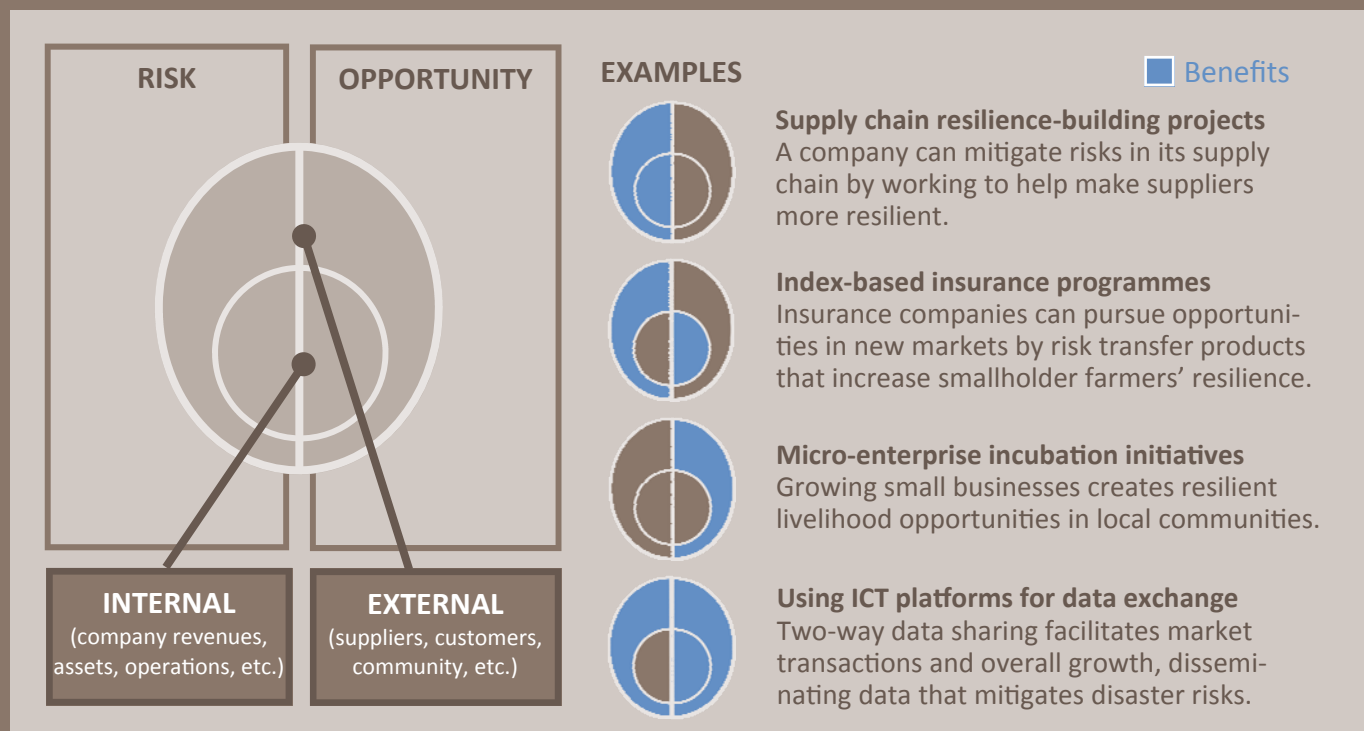
Businesses are beginning to seize the many opportunities to provide solutions that will create a more resilient future. Businesses may choose to provide disaster risk management and adaptation solutions due to internally oriented motivations (such as revenue generation and ensuring business continuity) and externally oriented drivers (corporate citizenship). Risk and opportunity influence these internal and external activities as presented in Box 1.

- **Revenue generation.** Addressing climate risks requires a collection of products and services, both existing and new. The potential to reach new markets, expand product offerings, innovate and strengthen market position are all motivations for businesses to explore possibilities to generate greater revenues. Products and services can reach the target market through a range of channels, including direct sales, public procurement and public private collaborations. New products and services can be applied at multiple levels: from local flood management plans and resilient port infrastructure to regional emergency communication and response networks to national food storage and transportation systems. Products and services that strengthen resilience could include communication systems for disaster warnings and response processes, weather-indexed agricultural insurance, training programmes

Box 1 — Better Business: Mapping the Benefits of Private Sector Resilience-Building Activities

Asking ten CEOs what their business is doing to further resilience will likely result in ten very different conversations. They may talk about their corporate citizenship activities that help vulnerable communities, retrofits of at-risk infrastructure, new product opportunities, or supply chain engagement efforts to ensure a stable supply of raw materials.

As dissimilar as the activities are, they all reflect either a focus on managing **risks** or pursuing **opportunities** and they aim to provide either **internal benefits** (to company revenues, operations and assets) or **external benefits** (to outside stakeholders or the broader community).



These characteristics are important because they help understand firms' motivations and the benefits expected from undertaking activities that strengthen resilience. They also show how versatile PPCs can be in terms of addressing a variety of business and community interests. Applying this framework can also demonstrate how activities that benefit communities often benefit the private sector partners in similar (or different) ways, as shown in the four project models presented above (see Section 2 for further discussion of these models).

- for supply chain resilience, or efficient equipment that requires minimal water and energy inputs (See Case Studies in Appendix A).
- **Business continuity.** Businesses are already affected by climate change and have the opportunity to take proactive steps today to ensure that their organisation is able to operate continuously. Businesses need to protect their most valuable assets (e.g. employees and equipment) and seek to minimise costly disruptions such as productivity losses and supply chain interruptions resulting from disasters. Developing a suitable business resilience plan can also ensure reliable access to key resources (e.g. water and energy).
- **Corporate citizenship.** Sometimes the wider social context beyond a business's internal operations can also be a driver for companies to engage in resilience. Businesses tend to engage in corporate citizenship activities when the activity simultaneously improves revenues or operations and also has positive impacts on the communities where the business operates. Companies can gain a competitive advantage from proactive adaptation and DRM actions in markets where sustainability is highly valued. Improving resilience along the value chain can also demonstrate a company's commitment to its full range of stakeholders, including shareholders, customers, employees and the community.

BARRIERS TO PRIVATE SECTOR INVESTMENT

This report highlights the diverse range of public and private sector players that have been involved in DRM and adaptation activities to date. While these examples illustrate tremendous potential, current actions—by both public and private sectors—are below the level needed to respond to the world’s rising resilience-building needs. A number of barriers have hindered private sector engagement in DRM and adaptation activities. These vary depending on a given business’s products and services, size, goals, location and access to markets but two primary reasons stand out:

First, building resilience requires **high upfront investment costs and long-term planning**, which often compete with short-term business needs. These barriers affect a range of business decisions including whether to make internal resilience-linked investments, develop new products and expand to new markets or target customers. Micro-, small- and medium-sized enterprises are particularly restrained by upfront investment costs and long-term planning challenges because they tend to have less access to affordable financing for investments and stand to lose more if their efforts to expand their market reach are unsuccessful.

Second, it is **difficult to monetise the investments into disaster and climate resilience**, therefore making it challenging for businesses to realise a payback on investments in internal disaster and climate resilience building efforts. Flood management systems and emergency plans, for example, do not have a direct payback and potential financial savings often cannot be measured.

THE PUBLIC PRIVATE COLLABORATION OPPORTUNITY

The public sector plays a critical role in creating an environment that promotes investment in DRM and adaptation. Regulation and policies such as reducing import taxes on adaptation solutions, changing building ordinances and codes, mandating disaster response plans, and developing private sector engagement programmes (See Box 2) can create an enabling environment that strengthens resilience.

In addition to adopting policies that spur investment in resilience-building solutions, governments can also help reduce barriers that the private sector faces through methods beyond regulation. Governments can encourage, foster, and establish PPCs by identifying areas where private sector ideas will yield multiple benefits to partners or by facilitating and organising projects. Governments can also enter directly into PPCs as active participants who lend their knowledge and experience. Public sector collaborations can help lower transaction costs (see Case #8), facilitating the development of new

Box 2 | South African Breweries

South African Breweries (SAB), one of the largest breweries in South Africa, has partnered with the Department of Water Affairs in the South African government to respond to the country’s water challenges through a public-private expert leadership group named the Strategic Water Partners Network (SWPN). In addition to co-chairing and funding the SWPN, SAB is improving its water consumption efficiency and reducing wastewater throughout its value chain with a comprehensive risk-based approach.

businesses, products and services, and access to new markets (see Case #4). Additionally, governments can apply their local and regional knowledge to identify where private sector solutions can be most effective.

In several instances, as highlighted in the case studies in Section 2, public-private collaborations have engaged the private sector and successfully strengthened resilience. Since the experiences of PPCs in resilience have been largely undocumented to date, this analysis draws from a series of case studies (See Appendix A) to illustrate the nature of current and recent activities. It analyses the resilience-building strategies and techniques employed by PPCs, discusses the roles various sectors play in their implementation, and presents lessons that policy-makers can draw from when designing programmes. Together, businesses and governments can pool their knowledge, capital and expertise to deliver innovative and successful adaptation and disaster risk management solutions.

² <http://www.imf.org/external/pubs/ft/wp/2012/wp12245.pdf>

³ <http://www.imf.org/external/pubs/ft/wp/2012/wp12245.pdf>

⁴ See ND-GAIN matrix: www.gain.org;

⁵ UNFCCC projects USD\$49-\$171 billion per year by 2030. The UNFCCC estimates that 35%-60% of this total will be needed in developing countries (UNFCCC (2007): Investment and Financial Flows to Address Climate Change, Table IX-65, p. 177). World Bank estimates \$75-100 billion annually between 2008 and 2050 (siteresources.worldbank.org/EXTCC/Resources/EACC-june2010.pdf)

⁶ Although not a major focus of this report, civil society also plays an important role in tackling disaster and climate adaptation and in implementing a wide range of PPCs. Their role in PPCs will be highlighted in Section 2.



2. Taking Resilience from Concept to Action

Resilience-building activities are extremely diverse. The case studies reveal a range of actors from all sectors collaborating through both formal and informal partnerships on a wide variety of innovative initiatives. The breadth of activity in part reflects the nature of resilience: unlike climate change mitigation, for example, disaster risk management and adaptation needs are highly place-specific. This demands customised activities and tailored partnerships that meet the needs of a specific community, business, or region.

This section discusses innovative resilience-building projects and initiatives around the world and is broken into three parts. The first discusses **the players** currently involved in PPCs (“who’s involved?”). The second analyses **the projects**, identifying common strategies taken to build resilience (“what are they doing?”). The third looks at **the partnerships** underlying those projects to understand the roles different partners play in PPCs (“how are they working together to do it?”). Box 3 describes industry hotspots of activity.

THE PLAYERS

Adaptation and disaster risk management are traditionally thought of as the province of development banks, national governments and international NGOs, supplemented by a smattering of global corporate citizenship initiatives led by multinational companies. However, the

In Brief

PPCs are building greater resilience through a diverse array of projects. These collaborations engage a wide range of entities and actors, from governments and international organisations of all levels to small businesses, local-level community partnerships, entrepreneurs and smallholder farmers. The series of case studies discussed in this report illustrate some common approaches that have increased resilience around the world.

case studies tell a more complete story. They highlight examples involving private sector actors ranging from multinational companies to local entrepreneurs and smallholder farmers (See Figure 1). The case studies showcase the involvement of an array of public partners from international agencies to provincial governments. They also show how often public and private sector entities are involved in multi-sectoral collaborations with local and international civil society entities. In short, the case studies collectively reveal how a diverse range of actors are collaborating for greater resilience.

The same often holds true even within individual PPCs. For example, a PPC may link global companies and international funders with smallholder farmers and local

Figure 1 - The Actors, from Global to Local

	PUBLIC SECTOR	PRIVATE SECTOR		CIVIL SOCIETY
GLOBAL	International Development Agencies	Multinational Companies	Industry Associations	International Non-Profits
REGIONAL	Regional Collaborations			
NATIONAL	National Governments	National Companies		Domestic NGOs
SUB-NATIONAL	Provincial Governments	Small & Medium-Sized Enterprises	Cooperatives	Local & Regional Non-Profits
LOCAL	Local Governments		Micro-Enterprises	

AGRICULTURE | TOURISM | HOUSING INFORMATION & COMMUNICATION TECHNOLOGY | HEALTH | FISHING & AQUA- CULTURE | TRANSPORTATION | WATER FINANCIAL SERVICES | WASTE | ENERGY

Box 3— Industry Hotspots

Case study research targeted 11 economic sectors and industries (listed above). Four high-activity sectors stood out as “hotspots” of activity for resilience PPCs.



Agriculture

The private sector has been engaged in a number of initiatives focused on increasing yields, conserving water, adapting to changing local conditions and environmental challenges from drought to erosion and flooding. PPCs have focused on expanding the use of adaptive and sustainable agriculture techniques and technologies (e.g. PepsiCo, Lake Chilwa adaptation programme, Thanksgiving Coffee), increasing access to fertiliser and irrigation (e.g. Africafertilizer.org), and repurposing agricultural by-products (e.g. MRHP).



Information & Communication Technology (ICT)

Rising internet use and rapid proliferation of mobile phone access in developing countries have facilitated a number of new platforms for information exchange. Companies like Esoko and initiatives like AMITSA and AfricaFertilizer.org (Case #2) are using this infrastructure to collect and disseminate agricultural and market data to farmers. ICT infrastructure is also enabling initiatives focused on gathering and sharing weather information to implement early warning systems. For example, the U.S.-based company Earth Networks collects weather data from a network of global weather monitoring stations and has been involved in a number of PPCs, including projects in Brazil and Haiti (Box 4).



Financial Services

A number of initiatives focus on increasing access to financial services among small-holder farmers and pastoralists who face significant risks such as increasing rainfall variability and drought. Weather-based index insurance initiatives have been proliferating in recent years, frequently focusing on addressing risks in the agriculture and livestock segments. Programmes like R4 (see Box 5) aim to take a more comprehensive approach to risk by helping build financial safety nets and promoting prudent risk taking as well as offering insurance. Other programmes focus on micro-lending, access to savings accounts (e.g. Lake Chilwa adaptation programme), and other forms of micro-insurance such as flood insurance. Successful livestock insurance programmes have been implemented in Kenya, Ethiopia, and Mongolia among others.



Water

Companies need reliable sources of clean water for products and production processes. They also benefit from helping ensure that the communities they operate in have access to safe drinking water. Often companies respond to opportunities for providing innovative, low-cost solutions for extending access to clean drinking water to rural communities where vulnerability to water-borne illness is high. This includes manufacturing low-cost filtration technologies, water infrastructure expansion, and other innovative solutions such as water distribution kiosks locally-operated by micro-enterprises (see Case #3).

Box 4 | Earth Networks

Earth Networks (EN), an American operator of the largest weather, lightning and climate observation networks, is deploying US\$1.5 million in state-of-the-art weather alerting infrastructure and tracking technology for Haiti in 2013 through the Clinton Global Initiative (CGI)'s Commitment to Action initiative. EN aims to partner with CGI and the Government of Haiti to provide easy-to-use weather visualisation and alerting tools to address the need for extreme weather monitoring and early warning throughout Haiti.

SMEs. In other words, global organisations are not collaborating merely with other global organisations; SMEs are not exclusively partnering with regional or local governments and non-profits; and many smallholder farmers and community members are participating

“Innovative partnerships need not be constrained or segregated by participant size or location.”

programmes driven by national or international initiatives. In short, the case studies illustrate how innovative partnerships need not be constrained or segregated by participant size or location.

PPCs not only unite individual actors but also often involve collaboration among existing networks, programmes, and collaborations. This includes international or regional industry associations, local and regional cooperatives, regional inter-governmental entities, and other collaborations that may themselves have many layers. For example, AfricaFertilizer.org (Case #2) collaborates with another agricultural data-sharing initiative, AMITSA. AMITSA, in turn, is a partnership that involves regional public sector collaborations like the East Africa Community (EAC) and the Common Market for Eastern and Southern Africa (COMESA) together under the STAR (Strengthening Trade at the Regional Level) project. This shows how often a complex network of organisations and initiatives may underlie an individual PPC.

THE PROJECTS

Resilience is highly place-specific and is subject to varying local conditions and contexts. Most projects analysed for this report focus on specific climate or disaster-related vulnerabilities in a particular community or region (See Figure 2). As a result, the projects are highly diverse and demonstrate a wide variety of approaches. Box 3 shows the industry hotspots for PPCs that build resilience.

Yet many patterns emerge in the execution of PPCs. Common **strategies** illustrated in the case studies are

discussed below, along with one or more **techniques** that can be used to implement each strategy:

STRATEGY 1: Start small and keep it local. Resilience-building PPCs tend to focus on implementing small-scale (but potentially scalable and replicable) measures that benefit local communities.

- **TECHNIQUE: Engage stakeholders in the local community.** Small scale PPCs tend to focus on engaging smallholder farmers, micro- small- and medium-sized businesses, cooperatives, community leaders, and local community organisations. In comparison, large-scale initiatives such as infrastructure projects are typically implemented through public procurement contracts, PPPs, and other formal, fee-for-service type arrangements. Large infrastructure projects also tend to be built through public procurement processes and are less likely to be conceptualised as DRM or adaptation activities. Instead, they usually focus on more traditional development goals and the provision of basic services.

STRATEGY 2: Focus on sharing knowledge and building skills. Nearly all of the case studies involve some form of knowledge sharing, education, training, or capacity building. In general, the emphasis is on providing skills and knowledge needed to generate local resilience that is sustainable and not dependent on permanent outside support.

- **TECHNIQUE: Link infrastructure and skills.** Capacity building is often coupled with the provision of physical infrastructure or equipment. For example, the Zambia water kiosks programme (Case #3) provides physical kiosks as well as training in their operation and general business skills. PepsiCo (Case #7) also couples farmer access to DirectSeeding machinery and training in its operation.

Box 5 | R4

Swiss Re, a multinational insurance company, partnered with Oxfam America and WFP to develop an innovative business model called R4 that integrates financial risk management tools and index insurance for farmers in Ethiopia and Senegal who face increasing threats from climate change. Building upon the highly successful 'the Horn of Africa Risk Transfer for Adaptation (HARITA)' project, R4 uses a holistic approach to risk management, including risk reduction, prudent risk-taking, risk transfer, and risk reserves. Through R4, farmers are able to pay for their insurance premiums through labor, by food-and-cash-for work programmes.

- **TECHNIQUE: Provide structured education in disaster preparedness.** Educational tools and training programmes have been a popular mechanism for building local capacity to reduce disaster risks. For example, Deutsche Post DHL helped initiate the GARD programme (Case #1) which trains airport personnel in disaster-prone regions. In Indonesia, tsunami awareness and emergency preparedness planning (see Box 6) is supported with a toolkit that is distributed to hotels through a tourism industry association.

STRATEGY 3: Strengthen livelihoods to build adaptive capacity. While directly addressing climate and disaster risks is front and centre in every case, building alternative and resilient livelihoods is a close second—if not equally important—goal. This reflects an understanding that a key part of building local-level resilience is to make sure individuals can make a living even in the face of unpredictable disasters and changing climates. Building resilient livelihoods is thus more than a convenient by-product of PPCs—it is a core part of the mechanism for addressing climate and disaster risks (See Box 4).

- **TECHNIQUE: Foster the development of micro-enterprises.** A number of initiatives help develop locally owned and operated micro-enterprises. These provide significant alternative sources of income, strengthening the community’s resilience to future climate and disaster impacts. For example, MRHP (Case #6) created a private social enterprise to help develop brick-making micro-enterprises that enable more widespread use of stronger, flood-resilient building materials. In Sri Lanka (Case #8), micro-hydropower systems provided power that enabled new businesses to develop. And commercial utilities in Zambia used a network of entrepreneurial kiosk operators to sell bottled water in areas not yet served by water infrastructure (Case #3).

STRATEGY 4: Leverage existing relationships. Existing partnerships, programmes, and business relationships can make an ideal foundation for a PPC. This reduces the transaction costs associated with finding partners and it

“Building resilient livelihoods is more than a convenient by-product of PPCs – it is a core part of the mechanism for addressing climate and disaster risks.”

allows the PPC to benefit from the trust and rapport of existing relationships. Focusing on shared interests also helps identify opportunities for PPCs to create mutual benefits.

Box 6 | Getting Indonesia’s Tourism Industry “Tsunami Ready”

The Bali Hotels Association (BHA) and the Indonesian Ministry of Culture and Tourism (BUDPAR) have developed and disseminated a ‘Tsunami Ready Toolkit’, to help hotels prepare for tsunamis. BHA provided expertise and staff resources to develop the toolkit, and is using the toolkit to train its 90 member hotels on tsunami preparedness, while the BUDPAR is promoting its use in the tourism industry across the country with funding from the German Centrum für Migration und Entwicklung (CIM). The toolkit includes guidance on natural early warning signs, sources for early warning data, evacuation planning, among others, and is available free of charge.

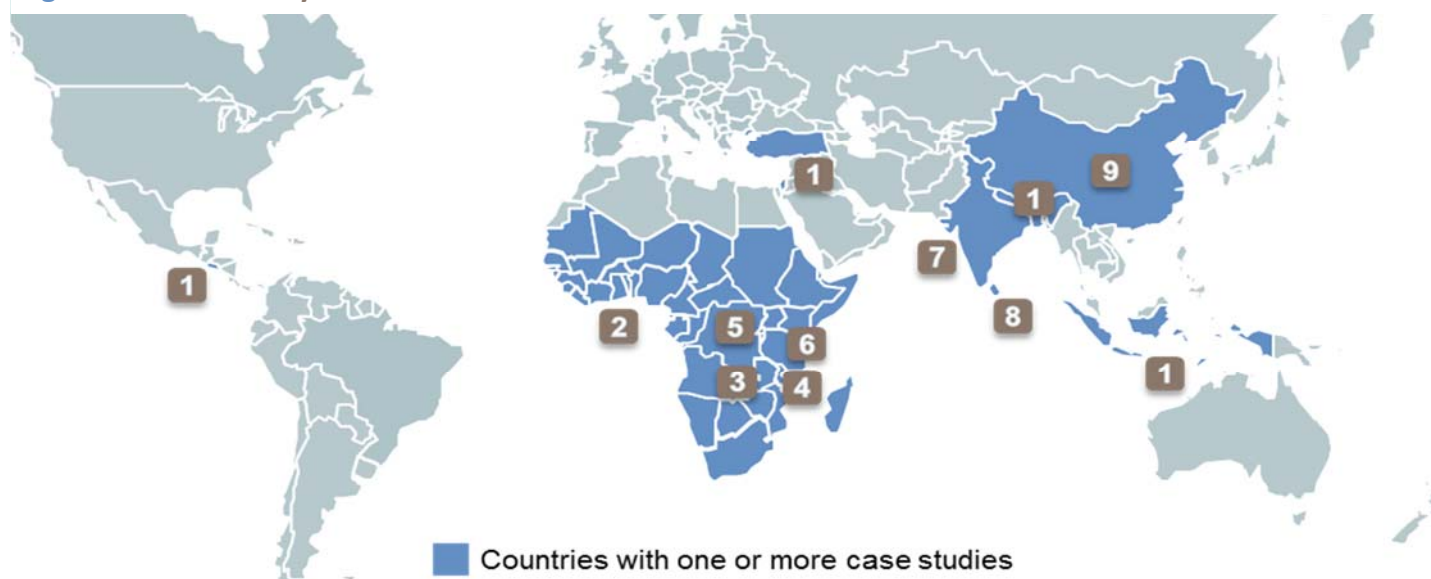
- **TECHNIQUE: Create partnerships along the value chain.** Companies are increasingly focusing on the risks in their supply chains, particularly for agricultur-

“Working with existing initiatives reduces the transaction costs associated with finding partners and allows a PPC to benefit from the trust and rapport of existing relationships.”

al products. Working with suppliers helps avoid supply shortages or a costly shift to new suppliers. In many cases, a multinational company initiates supply chain resilience-building projects by launching a formal programme to work with their smallholder farmers or other suppliers. However, a notable exception is Thanksgiving Coffee (Case #5), a California-based SME that responded to requests for support initiated by a smallholder cooperative in its supply chain. This example shows how supply chain resilience is not just for MNCs – some SMEs are also recognising and responding to their suppliers’ needs to become more resilient. PepsiCo (Case #7), Lipton, Coca Cola, Café Direct, and Green Mountain Coffee have also undertaken supply chain initiatives focused on building agricultural resilience.

Not all strategies and techniques are evident in all cases, nor is this list intended to be comprehensive. However, these observations lay the foundation for understanding what lessons can be learned from each example and what best practices future PPCs and PPC-focused policies should be kept in mind. These issues are discussed further in Section 3.

Figure 2 — Case Study Short Summaries



1

GARD (Nepal, Bangladesh, Indonesia, Lebanon, Turkey, and El Salvador) - DPDHL, UNDP, and humanitarian relief agencies together prepare airport personnel to manage disasters with training from the “Get Airports Ready for Disasters” (GARD) programme.

2

AfricaFertilizer.Org (Sub-Saharan Africa) - The International Fertilizer Development Center partners with international food and fertiliser organisations to improve farmers’ productivity through access to fertiliser markets and policy information by using information technology.

3

Water Distribution Kiosks Programme (Zambia) - The Zambian “Devolution Trust Fund” Water Kiosk programme works with commercial water utilities and village level entrepreneurs to create decentralised water kiosks throughout Zambia.

4

Lake Chilwa Basin Climate Change Adaptation Programme (Malawi) - The programme partners with wholesalers, NGOs, and government agencies to strengthen micro-enterprises and advance climate-resilient livelihoods.

5

Thanksgiving Coffee Supply Chain Partnership (Rwanda) - Thanksgiving Coffee Company and Dukunde Kawa Farmers’ Cooperative co-developed climate-resilient farming strategies and trainings with support from NGOs and governments.

6

Mwanza Rural Housing Programme (Tanzania) - The programme addresses flooding challenges by training local villagers to use agricultural waste as kiln fuel for brick production, creating brick-making enterprises.

7

PepsiCo Direct Seeding Programme (India) - In collaboration with government-supported scientific research institutes, PepsiCo launched a less water-intensive technology for climate-resilient rice farming in India.

8

Micro-Hydropower for Rural Electrification (Sri Lanka) - Two community-driven long-term partnerships that have enhanced rural livelihoods by improving access to electricity with low-cost, climate-resilient micro-hydro projects.

9

Biomass Business to Combat Desertification (China) - The Maowusu Biomass Thermoelectric Company developed a sustainable business model that produces electricity and food using desert shrubs and sequestered CO₂ emissions.

THE PARTNERSHIPS

Public, private, and civil society entities partner when they each have something valuable to offer and something valuable to gain. Partners may offer funding or financing, implementation capacity or expertise, innovative products or access to a network. Their motivations may be to increase profits, gain recognition, acquire information on new markets, or explore opportunities to scale or replicate a high-potential DRM or adaptation solution. Whatever the contributions and benefits of participating, successful PPCs recognise the value each partner brings and the importance of ensuring their strengths are leveraged and their needs are met.

Generalising about each sector's role can be surprisingly difficult. Past studies on PPPs have emphasised the profit-maximising, innovative nature of the private sector, the enabling and monitoring role of the public partner, and civil society's ability to facilitate project implementation.⁷ However, the case studies show a wider variety of roles and responsibilities in PPCs and less consistency from project to project (see summary of roles in Figure 3).

One reason for this may be that PPCs include a wider range of types of arrangements than PPPs. PPPs are usually formalised arrangements in which private entities bid through a public procurement process to deliver services under the oversight of a public entity, sometimes in conjunction with public and civil society partners. In contrast, PPCs include both formal contractual arrangements as well as more informal and ad hoc partnerships.

It can also be challenging to generalise about roles and responsibilities because they are sometimes poorly defined or subject to change throughout the evolution of a given PPC. It can be difficult to disentangle the many layers of partners, funders, public sector agencies, and other initiatives to identify what specific actions are being taken. This is particularly true for PPCs that are loose collaborations of other projects and initiatives (see e.g. discussion on page 9). Roles may also change as projects mature. In many cases the public sector helps initiate a PPC by providing funding and facilitate connections between partners but then scales back their role as the project reaches implementation or a later stage of development. For example, in MRHP (Case #6), the government helped facilitate initial brick-maker trainings but later spun off the programme into an independent social enterprise.

Public sector. Funding projects and programmes remains a central function of the public sector. However, this does not mean that PPCs are dependent on public money or incapable of being self-sustaining. Often public sector partners step in to fund start-up costs, training and capacity building, micro-enterprise incubation and other early-stage activities but then take more of a

backseat role once the initiative reaches a more mature stage of development. This is sometimes by design—for example when the Rwandan government and USAID helped develop a coffee farmer co-op (see Case #5). In other cases spin-off enterprises grow out of publicly funded programmes, such as the social enterprise Nyumba Bora Brick Company, which grew out of work conducted by the public entity MRHP (see Case #6).

“Often public sector partners fund start-up costs, training and capacity building, micro-enterprise incubation and other early-stage activities but then take a backseat role once the initiative reaches a more mature stage of development.”

The public sector also contributes expertise and services, although they are usually not as central in the implementation of projects as the private sector and civil society partners. Often government agencies will participate in PPCs as advisors, facilitators, or evaluators. For example, in the PepsiCo Direct Seeding project, the quasi-public Indian Agricultural Research Institute helped by evaluating the impacts of Direct Seeding methods. Similarly public sector partners provided consultation and information in the AfricaFertilizer.org (Case #2) and MRHP (Case #6) projects.

Finally, the public sector often brings access to a global or in-country network which can help connect and align partners. For example, UNDP facilitates GARD trainings (Case #1) through its connections to various authorities and stakeholders in the countries where trainings are offered. Like funding, network facilitation can be an early-stage role that declines as the programme develops.

Private Sector. The case studies suggest that private sector partners are usually more likely to make in-kind contributions than write a check. Where the private sector acted as a direct funder, the amounts were often small (IFA's funding of AfricaFertilizer.org – Case #2), coupled with in-kind contributions (PepsiCo – Case #7), and/or made through an affiliated foundation (for example, MRHP's brick-making initiative was funded by the ERM Foundation – see Case #6).

Typically the primary value the private sector brings is providing products and services. Not surprisingly these are usually related to the business' core activities: for example, financial institutions provide loans and banking services (see Cases #4 and #8). Likewise in the Lake Chilwa adaptation programme, wholesalers help get

Figure 3 — Partner Roles in PPCs

Role	Public Sector	Private Sector	Civil Society
FINANCING / FUNDING	<p>Zambia Water Kiosks (Case #3)– KfW provides funding</p> <p>MBTC (Case #9) - China's Forestry Administration and the NDRC provide funding and subsidise electricity</p> <p>MRHP (Case #6) – MRHP provided seed funding to establish Nyumba Bora Brick Company (NBBC)</p> <p>Sri Lanka micro-hydro (Case #8)– WB, GEF, and Sri Lankan Gov. were funders</p> <p>AfricaFertilizer.org (Case #2) – IFDC is a funder and leads implementation</p> <p>Thanksgiving Coffee (Case #5) – Rwandan government and USAID funded creation of the coffee grower's cooperative</p> <p>Lake Chilwa adaptation programme (Case #4) – Government of Norway provided funding</p>	<p>PepsiCo direct seeding (Case #7) – Funded and developed the machine</p> <p>MRHP (Case #6) – ERM Foundation provided start-up capital to create NBBC</p> <p>AfricaFertilizer.org (Case #2) – IFA provides funding</p>	<p>Thanksgiving Coffee (Case #5) – Dutch NGO Progreso provided funding for training programme</p> <p>MRHP (Case #6) – Ashden provided funding and technical assistance to develop a business plan</p>
EXPERTISE & SERVICES	<p>PepsiCo direct seeding (Case #7) – Indian Ag. Research Inst. provides technical assistance</p> <p>AfricaFertilizer.org (Case #2) – Policy data from NEPAD</p> <p>Zambian DTF Water Kiosks (Case #3)– Zambian National Water Supply and Sanitation Council support the water kiosk procurement process</p> <p>Lake Chilwa adaptation programme (Case #4) –MBC Radio 1 broadcasts climate change news</p> <p>MRHP (Case #6) – Dept. of Community Development provides consultancy</p> <p>Sri Lanka micro-hydro (Case #8)– Provincial Councils channelled subsidies to village co-ops</p> <p>Lake Chilwa (Case #4) – Dept. of Trade and Dept. of Fisheries promote new income generating activities</p>	<p>GARD (Case #1) –DP DHL conducted trainings</p> <p>Lake Chilwa adaptation programme (Case #4) –Malawi Savings Bank provides onsite banking service. Wholesalers and retailers purchase goods from micro-enterprises</p> <p>MRHP (Case #6) – NBBC provides business incubation and training through a fee-for-service model</p> <p>Sri Lanka micro-hydro (Case #8)– Credit institutions provide loans</p> <p>Thanksgiving Coffee (Case #5) – Facilitated co-op engagement and developed strategic framework</p>	<p>PepsiCo direct seeding (Case #7) – Technical assistance from the International Rice Institute</p> <p>Sri Lanka micro-hydro (Case #8)– ITDG developed a community model (donation) and training; ECS groups lead project implementation</p> <p>Thanksgiving Coffee (Case #5) – Dukunde Kawa Co-op developed and implemented trainings and REDI developed curriculum and administrated the programme</p> <p>Lake Chilwa adaptation programme (Case #4) – LEAD SEA and World Fish Centre implement and lead the programme</p>
PRODUCTS		<p>PepsiCo direct seeding (Case #7) – Technology transfer of DirectSeeding machinery</p> <p>MBTC (Case 9) – Maowusu (Company) generates biomass power and produces spirulina</p> <p>Zambia Water Kiosks (Case #3)– Kiosk operators sell water; utility establishes kiosks</p> <p>MRHP (Case #6) – Brick-making enterprises produce and sell clay bricks to customers</p>	
NETWORKS	<p>GARD (Case #1) - UNDP and UNWF provide a professional networking ground for disaster response experts at a country level</p>	<p>Thanksgiving Coffee (Case #5) – Brought in NGO partners to the project through its business network</p>	<p>Sri Lanka micro-hydro (Case #8)– Energy Forum supports community engagement</p> <p>Lake Chilwa adaptation programme (Case #4) - Emmanuel International provides market connection</p>

community enterprise groups' products to market (see Case #4). In other cases, the link is a little more indirect. PepsiCo and Thanksgiving Coffee are in the business of buying agricultural products but saw an opportunity to build capacity for resilience in their supply chains. This led to non-core activities, such as the development of agricultural machinery (PepsiCo) and the development of frameworks for climate adaptation (Thanksgiving Coffee).

Businesses can also make significant contributions through PPCs simply by sharing their expertise. Training and knowledge transfer have significant value in areas like disaster preparedness and micro-enterprise incubation. This is the central idea behind the GARD programme, which leverages Deutsche Post DHL's expertise in logistics to train airport staff (see Case #1). It is also a central part of the role the Nyumba Bora Brick Company plays in incubating brick-making micro-enterprises (see Case #6).

Civil Society. Civil society partners often bring critical local knowledge, implementation capacity, and strong working relationships in local communities. They can be effective connectors and implementation partners, making public and private resources more effective by linking them with existing initiatives to avoid duplication and streamline implementation. Their presence in—and relationships with—the communities is also a vital success factor, as discussed more in Section 3. For

“Civil society partners often bring critical local knowledge, implementation capacity, and strong working relationships in local communities.”

example, LEAD's relationship with the local communities made them a trusted implementation partner for many of the initiatives implemented in the Lake Chilwa adaptation programme. For this reason, civil society organisations can also play an effective role using their networks to engage stakeholders and communities (see e.g. Case #8). Civil society partners, such as foundations, may also provide programme funding, but often focused on specific aspects or early-stage activities. For example, start-up capital for the Nyumba Bora Brick Company (Case #6) was provided by the private company ERM (through its foundation) after the foundation Ashden funded development of a business plan .

⁷ Roeth, Helen (17 April 2009) Final Report: Consultancy Project on the Development of a Public Private Partnership Framework and Action Plan for Disaster Risk Reduction (DRR) in East Asia. United Nations International Strategy for Disaster Reduction (UNISDR). Retrieved from: http://www.unisdr.org/files/10840_UNISDR.pdf



3. What's been learned?

As the case studies discussed in Section 2 illustrate, the players, projects and partnerships vary widely. The array of goals, scale, partners and longevity makes it difficult to create a definitive list of best practices that all PPCs should follow. However, policy-makers can apply these six lessons learned from these cases as they explore the possibility of using PPCs to address resilience challenges.

1. Build on a foundation of local engagement and trust.

Local level resilience-building programmes require active participation and support from residents and the community. Building trust and developing relationships with community leaders are critical success factors that require a deliberate and long-term investment and a commitment to supporting the community's needs in ways that may sometimes extend beyond the specific mission of the programme. For example, staff managing the Lake Chilwa adaptation programme (Case #4) remained attentive to the community's needs and maintained flexibility in their mission so that they could support the community when it faced imminent threats, such as an infectious disease outbreak. Not only did this

“Building trust and developing relationships with community leaders are critical success factors that require a deliberate and long-term investment and a commitment to supporting the community's needs in ways that may sometimes extend beyond the specific mission of the programme.”

help build trust but it also addressed an essential prerequisite for the adaptation programme's success. This example shows how addressing the community's near-term problems is often necessary before they can turn their attention to longer-term resilience challenges.

Policymaker considerations:

- **Policy-makers should leverage existing relationships.** Existing partnerships, programmes, and business relationships can make an ideal foundation for a PPC. This approach reduces transaction costs, builds on existing trust, and efficiently uses existing capacity.

In Brief

The experiences featured in these case studies provide many insights for policy-makers wishing to foster greater public-private collaboration around resilience-building. Successful projects often draw from the skills of multiple partners and many are able to engage a wider range of partners by offering flexible levels of involvement. Many leading cases are structured to ensure repeat exposure, continuity, and institutionalisation where they are implemented, while being easily scaled and replicated elsewhere, or spun off into profitable and self-sustaining businesses. This requires a balance of clear and deliberate structure while maintaining the flexibility needed for projects to be tailored to local circumstances. Finally, the cases demonstrate the importance of early engagement of local community leaders, which often involves working with trusted local partners.

- **Provide information and build trust before rolling out new programmes independently.** When working with a local partner is not the best option, start by providing information and resources to build a foundation of trust and awareness. Consider holding meetings and workshops with a wide range of community members and leaders (district leaders/political leaders, faith leaders, etc.) prior to starting technical interventions and taking other steps to solicit input, develop relations and build trust with community members.
- **Take a broad view of adaptation and addressing community needs as they arise.** Maintain sufficient flexibility in the resilience-building programme's mission to help the community address near-term challenges when they arise. Flexibility not only builds trust but also recognises that addressing near-term problems is often necessary before the community can begin to cope with comparatively long-term resilience challenges.

2. Start small and local, but position for scale and replicability.

Highly replicable resilience-building PPCs tend to have simple structures; do not involve proprietary technology; have broad applicability in different climates and cultural, political, and institutional contexts; and include innovative ideas, strategies, or processes. Process-oriented PPCs, such as the Lake Chilwa adaptation programme (Case #4) or Thanksgiving Coffee's supply chain partnership (Case #5) can be easily replicated by different entities. Scalable PPCs benefit from a strong champion and a self-sustaining source of revenue (in the case of commercial activities). GARD (Case #1), for example, developed a standard training that could be scaled up to be applied at different airports regardless of geographical location. In this case, scaling up was possible because DPDHL could utilise its expertise in different countries as a logistics champion.

Policymaker consideration:

- **Design for replicability and scalability.** Consider scaling and replication goals early on to design the PPC with long-term programme development in mind. Develop a plan for financial sustainability so that programmes can be scaled without permanent reliance on external support.

3. Integrate skill building to maximise community ownership.

Many PPCs focus on sharing knowledge and developing skills with the aim of creating programmes that are sustainable and not permanently dependent on external support. Several of the successful PPCs featured in the case studies recognise that learning is continual and that on-going training processes are necessary for sustained success. The GARD PPC (Case #1), for example, has a follow-up programme called GARD Plus and has also embedded their methodology into facility- and country-level policies and processes. This example shows how DRM practices can be integrated in ways that extend

“PPCs must be flexible and adaptive, responding to market changes and the evolving needs of programme constituents.”

beyond the individual or group that directly receives the knowledge transfer. When turnover or political change occurs, loss of a champion can end an initiative if it has not been institutionalised. Indonesia's tsunami readiness PPC (see Box 6) ensures the continuity and institutionalisation of disaster preparedness knowledge by developing a continuing, living action plan with the hotel industry.

PPCs must also be flexible and adaptive, responding to market changes and the evolving needs of programme constituents. The Mwanza Rural Housing Programme (MRHP) (Case #6), for example, successfully adapted its training programme as the needs of its entrepreneurs evolved from creating products to managing and scaling a business. The programme has been adapted to include trainings targeting women-owned businesses, tree planting initiatives to provide necessary shade cover for the bricks, and business skill building workshops.

Policymaker considerations:

- **Design education and training programmes for continuity and institutionalisation.** PPCs that have a strong education or training element should be designed to ensure repeat exposure, continuity, and integration into policies and procedures. Repetition and integration help ensure that principles are retained and ingrained and that they outlast staff turnover.
- **Make sure collaborations evolve as their beneficiaries do.** The needs of programme constituents will change as the PPC develops. This requires PPCs to be flexible and adaptive.

“PPCs create and reinforce economic opportunities—from fostering spin-off businesses to reducing up-front investment costs—making communities more resilient to climate change.”

4. Build adaptive capacity by strengthening business and livelihoods.

Addressing climate and disaster risks head-on is essential. However, building resilient livelihoods is more than a parallel goal or a convenient by-product: it is a core mechanism for addressing climate and disaster risks because it increases the ability of communities to adapt and prepare. The case studies reveal the many ways in which PPCs create and reinforce economic opportunities—from fostering spin-off businesses to reducing up-front investment costs—making communities more resilient to climate change.

Policymaker considerations:

- **Implement strategies that support the growth of self-sustaining small businesses.** PPCs can help micro-enterprises and small businesses develop by implementing key growth-oriented strategies. These include (1) identifying alternative income sources (e.g. Zambia water kiosks programme) using waste products to create secondary revenue streams (e.g. MBTC); (2) forming spin-off businesses from

profitable projects (MRHP); and (3) finding ways to add value to existing products (Lake Chilwa adaptation programme). Self-sustaining micro-enterprises contribute to greater economic stability and build resilience in their local communities.

- **Link infrastructure access with skill building.** Policy-makers can consider ways to link infrastructure or equipment access with skill building programmes, so that beneficiaries have the tools they need and the ability to use them effectively.
- **Eliminate up-front costs through unconventional models and partnerships.** High first costs are a persistent barrier for start-ups. PPCs can eliminate up-front costs through contract-based models, removing a major upfront cost of launching a retail micro-enterprise.
- **Address up-front costs by facilitating access to finance.** Affordable access to finance is a challenge for many businesses, small and large. PPCs can also help overcome high start-up costs by helping secure access to financing or by engaging a network of financing institutions to increase access to credit.

5. Create partnerships along—or across—value chains.

Companies are increasingly focusing on risks in their supply chains, particularly in the agriculture sector. Working with suppliers helps avoid supply shortages or a costly shift to new vendors. Section 2 demonstrates how supply chain partnerships are not exclusively the domain of multinational corporations—smallholder farmers are becoming more aware of the opportunities to request assistance from end buyers. Thanksgiving Coffee (Case #5) is an example of a SME that launched a supplier-focused climate adaptation programme after receiving a request for support from its Rwanda-based supplier. Building partnerships across industries can also enable creative and profitable new solutions. For example, MRHP (Case #6) identified opportunities to link rice growers with brick-makers to use rice husks as a kiln fuel, reducing costs for brick-makers while creating an additional revenue stream for farmers.

Policymaker considerations:

- **Encourage SMEs to initiate partnerships along their supply chains.** Supply chain partnerships are not only for multinational corporations and are not always initiated by large retailers. Public-private collaborations should create opportunities for SMEs to engage with their supply chain to build resilience and for suppliers to be able to have a leadership role in implementing resilience-building activities.
- **Create synergistic relationships between micro-enterprises.** Build new markets by connecting sectors that do not ordinarily interact. Look for opportunities to connect suppliers and buyers in unconventional ways. In particular, help foster

business relationships that use a low-value or traditionally wasted product to address needs in another sector or industry.

- **Involve trade associations and industry groups.** Industry associations can provide valuable information and support and often have an interest in fostering the development of new markets. Participating in PPCs can also be valuable to them as a cost-effective way to gain market intelligence in emerging markets.

6. Find innovative alternatives to traditional infrastructure.

Traditional models for providing essential services tend to involve extensive infrastructure with high up-front costs. Developing countries often require more efficient and creative solutions, but offer unique opportunities to leverage emerging 21st century solutions. For example, the business model used by the Zambia water kiosk programme (Case #3) extends many of the benefits of water infrastructure while avoiding the barriers of high capital costs. While it does not offer a fully comparable level of service, water kiosks provide other benefits such as long-term job creation and entrepreneurial opportunities.

“The proliferation of internet and mobile phone access is creating new markets and opportunities in developing countries. These tools can often be leveraged by PPCs in ways that build greater resilience.”

Policymaker considerations:

- **Where conventional infrastructure is impractical, find efficient solutions to deliver key benefits.** Encourage unconventional thinking and innovative approaches to delivering basic services in areas where traditional infrastructure is inefficient or cost-prohibitive.
- **Creatively leverage emerging technologies and platforms.** The proliferation of internet and mobile phone access is creating new markets and opportunities in developing countries. These tools can often be leveraged by PPCs in ways that build greater resilience.
- **(Em)power small businesses using off-grid and micro-grid energy sources.** Using micro-grids in rural communities to facilitate energy access can enable communities to independently manage their electricity supply. This can benefit the local economy by enabling small business development. It also allows for greater control over power supply management, making economies more resilient.



Appendix A — The Case Studies

Nine projects and programmes are presented in this report in the form of 2-page case studies. These include:

1. Deutsche Post DHL: Getting Airports Ready for Disaster
2. AfricaFertilizer.Org: Using IT to Share Fertiliser Market Intelligence
3. Clean Drinking Water Distribution through Water Kiosks
4. Building Resilient Communities through Multi-Sectoral Partnerships
5. Creating Supply Chain Partnerships to Safeguard Smallholder Livelihoods
6. Mwanza Rural Housing Programme: Building Flood Resilience in Tanzania
7. PepsiCo: Direct Seeding Methods in Indian Rice Paddies
8. Micro-Hydropower for Community-Based Rural Electrification in Sri Lanka
9. Building a Sustainable Biomass Business while Combating Desertification in China

Each case study includes the following sections:

- Summary
- Key messages
- Icons indicating type of resilience-building activity and activity sectors (see Box 7)
- Introduction
- Project Activities
- Project Partners
- Project Structure Diagram
- Outcomes and Impacts
- Lessons Learned

Box 7 — Guide to case study icons

Icons are used to indicate three aspects of the project’s purpose and focus: the type of resilience-building activity (climate adaptation, disaster risk management, etc.), the economic sector (agriculture, energy, etc.), and the social sector (public, private, civil society).

Type of Resilience Activity

Disaster Risk Management	Climate Change Adaptation	Alternative & Resilient Livelihoods

Social Sector

Private Sector	Public Sector	Civil Society

Economic/Activity Sector

Transportation & Logistics	Energy	Waste	Tourism
Water	Financial Services	Housing	Information & Communication Technology (ICT)
Health	Agriculture	Fishing / Aquaculture	



1. Deutsche Post DHL: Getting Airports Ready for Disaster

Deutsche Post DHL (DPDHL) has provided “Get Airports Ready for Disaster (GARD)” trainings in Nepal, Bangladesh, Indonesia, Lebanon, Turkey, and El Salvador since 2010. This programme has successfully prepared over 150 airport personnel to manage the logistical challenges posed during and immediately following natural disasters. Deutsche Post developed the GARD programme in close cooperation with United Nations Development Programme (UNDP), leveraging the company’s expertise in logistics to address a significant disaster risk management issue.



Transport &
Logistics



Disaster Risk
Management

Key Messages:

- **Trainings make lasting impacts when they are designed to overcome institutional inertia and provide continuity throughout staff turnover.** GARD enables this by working to embed training principles in public policy and airport procedures.
- **GARD’s model has global applicability as airports around the world seek to prepare for increasingly severe disasters.** Not only can GARD be easily replicated, but the model of publicly-facilitated, private sector-led training programmes can also be applied to other preparedness issues.

Introduction

When extreme disasters occur, the surge in traffic at local airports is often overwhelming and can delay or disrupt the transport of humanitarian relief supplies. In countries vulnerable to major natural disasters, it is important to prepare communities and infrastructure before a major disaster strikes so that they can respond effectively and efficiently.

Project Activities

The GARD programme is implemented through a collaboration between Deutsche Post DHL (DPDHL), United Nations Development Programme (UNDP), United Nations World Food Programme (WFP), the International Committee of the Red Cross (ICRC), and local governments. The mail and logistics company DPDHL co-developed the programme with a long-term partnership with UNDP. DPDHL serves as a consultant and trainer, providing materials, lectures, and consultation for GARD trainings, while UNDP coordinates with government officials to organise the trainings. A country can participate in GARD’s training through an official country

request issued to UNDP at no cost, as UNDP and DPDHL employees donate their time and knowledge for the GARD programme. Participating countries are responsible for hosting trainings; implementing follow-up activities; and managing and updating the airport assessment report, which is one of the workshop outcomes. Although trainings primarily target airport personnel, government officials, representatives from disaster management agencies and non-profit humanitarian organisations frequently participate as well, including organisations such as WFP and the ICRC. In addition to benefitting from the shared information, these agencies also enhance the conversation by offering valuable insights and expert networks from their experience in disaster relief management.

The GARD programme, now in its 4th year, has provided trainings at 14 airports in 6 countries. Because the trainings often draw personnel from multiple airports in the region, these trainings have reached over 150 airport personnel representing more than 36 airports. The first GARD training was held in Nepal in 2010. It included 24 airport employees and provided an opportunity to

Project Partners & Structure



DEUTSCHE POST DHL | Shares technical expertise in logistics, allocates logistic experts and aviator trainers as well as the workshop materials.



UNDP | Organises and facilitates trainings by aligning relevant authorities and leveraging its in-country network and expertise.



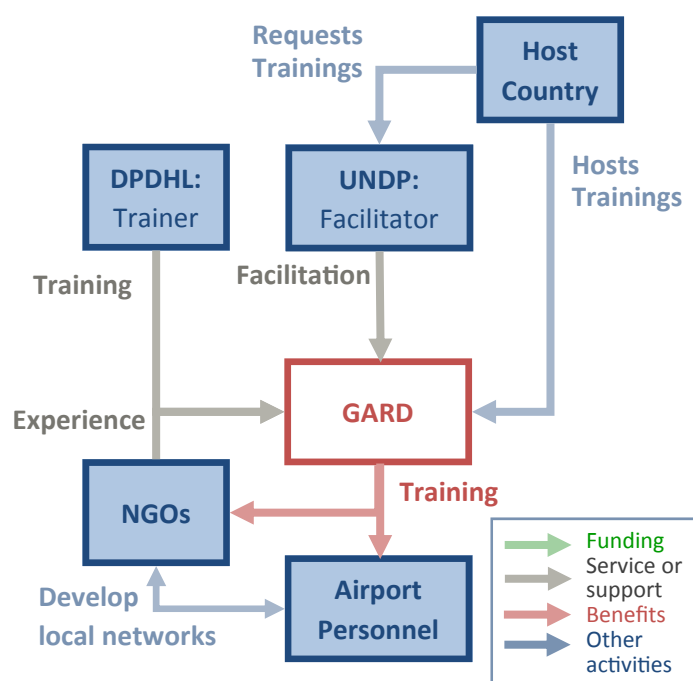
UN WFP | Participates in trainings and enhances the conversation by offering insights.



THE INTERNATIONAL COMMITTEE OF THE RED CROSS (ICRC) | Participates in trainings and provides a professional networking ground for disaster response experts at a country level.



Host country governments | Requests training and follow-ups and hosts training activities.



evaluate five different Nepalese airports' disaster preparedness. In 2011, the programme was expanded to Bangladesh and Indonesia where 4 GARD trainings included representatives from 19 airports. In 2012, an international airport in Beirut, Lebanon, and another in Istanbul, Turkey held GARD trainings with a wide range of participants from multiple airports. In 2013, a GARD workshop was held in El Salvador for the first time, with more trainings planned for the Philippines and Armenia. These 4-5 day trainings are held at the airports to allow on-site fieldwork and include in-class instruction as well as assessment work. Participants are taught how to evaluate their airport storage options for relief goods and to assess whether the necessary equipment (e.g. forklifts, pallets, gloves, and boxes) is available for cargo handling. An outcome of GARD trainings is the development of an Airport Surge Capacity Assessment Report, a tool used to analyse an airport's capacity to deal with a sudden inflow of disaster relief goods and services.

Outcomes and Impacts

Over 150 airport employees in 5 countries and numerous representatives from government agencies and disaster relief organisations have received GARD trainings since the inception of the programme in 2010. The approaches taught through GARD have had implications beyond facility-level preparedness: for example, GARD methodology is now standard practice for annual airport-security trainings and disaster risk management plans at Bangladeshi airports. In addition, the Nepali government

has made the GARD's Airport Surge Capacity Assessment method a part of its National Disaster Preparedness Plan. Through its follow-up programme, GARD Plus, participating countries can hold a follow up training one year after the initial training, an option which includes repetition and application of the entire training content.

Lessons Learned

- **Leveraging core competencies can result in mutual benefits for partners involved and long-term partnerships.** The GARD Programme has been successful because it leverages the unique knowledge and experiences of its partners in clearly defined roles. DPDHL's experiences in logistics and mail business enable UNDP to offer a training that can have a stronger impact on the preparedness for airports and government officials.
- **Follow-up training is important for preparedness.** GARD seeks to foster an on-going airport preparedness training by developing assessments reports and making participating countries or airports responsible for managing the living documents. Additionally, GARD has standardised its approach, making it possible for past participants to support wider knowledge development for airports personnel and government officials. GARD Plus helps ensure long-term sustainability of institutional knowledge by repeating the training contents and exercises, increasing the chances that the principles will be integrated in policies and practices.



2. AfricaFertilizer.Org: Using IT to Share Fertiliser Market Intelligence

Sub-Saharan Africa faces the combined challenges of declining soil health and crop yields, rising demand for key staples, persistent malnourishment, and poor access to affordable agricultural inputs, all of which could be exacerbated by climate change. AfricaFertilizer.Org (AFO) was started in 2010 to help address the challenges of food insecurity and climate change by increasing farmers' access to fertiliser markets and policy information. AFO utilises the internet, social media and mobile applications to facilitate the development of the nascent fertiliser market in Sub-Saharan Africa by providing fertiliser statistics, policy information, market news, product catalogues, and business directories to agro-dealers and farmers.



ICT



Climate Change
Adaptation



Agriculture

Key Messages:

- **Creatively leverage the African ICT revolution.** AfricaFertilizer.Org uses SMS to both collect and disseminate information from farmers and agro-dealers, helping reach the approximately 475 million people now using cellphones in Sub-Saharan Africa.
- **Participating in public-private collaborations (PPCs) can be a cost-effective way for private sector partners to gain market intelligence in emerging markets.** Collaborating with domestic and research organisations can facilitate knowledge exchange that provides mutual benefits. In this case, the International Fertilizer Industry Association provided data but is also positioned to gain knowledge about African markets that would not be cost-effective if done independently.

Introduction

Sub-Saharan Africa faces significant challenges including deteriorating soil health, falling crop yields, limited access to agricultural inputs, rising demand for key staples, and persistent malnourishment. Aggravating the challenges of providing for a growing population is the fact that soil health in Sub-Saharan Africa has been steadily declining. An estimated US\$4 billion worth of soil nutrients is lost each year due to over-use and repeated planting without recharging the soil.

Climate change threatens to add to these challenges, with regional warming projected to be greater than the global average and average rainfall projected to fall. As a result, key export crops are projected to decrease by 2050. Addressing these challenges requires an “all-of-the-above” solution that increases resilience through sustainable farming but also leverages the capabilities offered by modern agricultural methods.

Sub-Saharan Africa currently has the world's lowest use of fertiliser at approximately 10-12 kg per hectare per

year. This is due in part to the high cost of fertiliser in rural regions, with prices often reaching two to four times the global average.

Project Activities

The AfricaFertilizer.Org (AFO) project was started in 2010 to foster the growth of the fertiliser industry in Sub-Saharan Africa by facilitating information sharing at all levels of the value chain. Access to reliable data is a fundamental prerequisite for the development of any modern market. However, many of the institutions and information channels are still taking shape in many parts of the region. AFO works to address gaps in knowledge by connecting a wide range of partners and facilitating information exchanges through web and mobile platforms.

In particular, AFO sources, aggregates, filters, and shares Africa-based fertiliser statistics and fertiliser intelligence among farmers and agricultural industry specialists. This includes (1) aggregating official statistics and private

Project Partners & Structure



FAOSTAT | Statistics division of the FAO. Provides access to its database and offers consortium management and technical assistance to improve data sharing.



IFDC | Public international fertiliser advocacy organisation that provides financial assistance and project management.



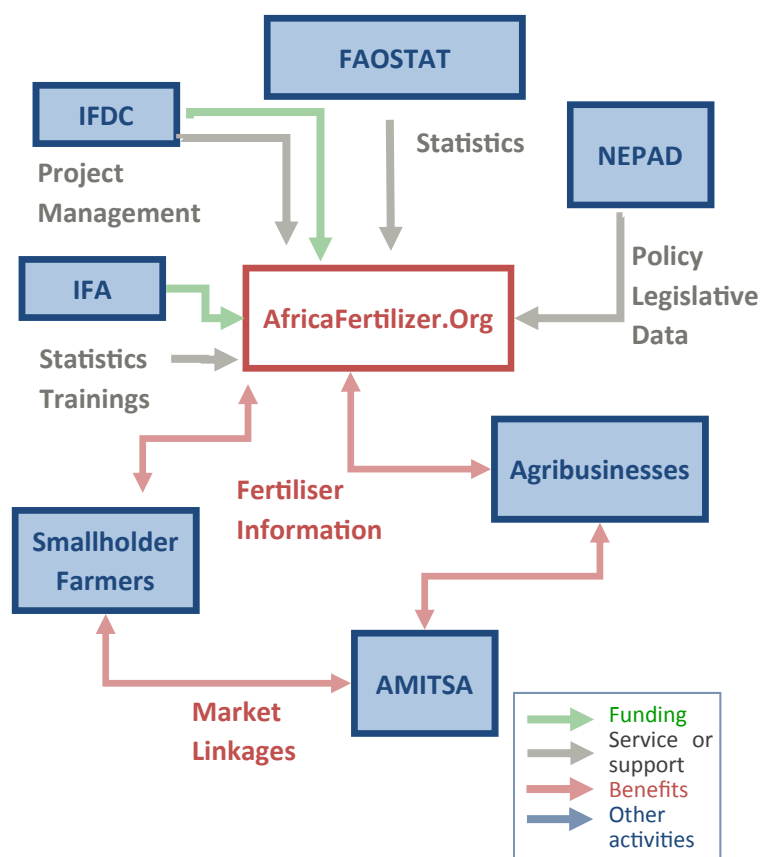
NEPAD | African Union initiative that provides policy and legislative data and advocates among policymakers to improve access to fertiliser.



IFA | Global not-for-profit that represents the fertiliser industry and provides financial support, access to fertiliser statistic database and trainings for statisticians in data collection and processing methods.



AMITSA | Multi-sectoral collaboration that provides access to market intelligence and up-to-date price data.



sector data; (2) surveying production and storage capacities; (3) building a network of agro-dealers who can provide real-time market intelligence using mobile platforms; (4) providing information on proper fertiliser use through trainings, conferences, and mobile platforms; (5) training statisticians to improve the development of reliable data; and (6) building a “yellow pages” of fertiliser producers and dealers.

The project structure is complex and involves collaborations not only between individual organisations but also other regional entities. The partner organisations are the International Fertilizer Development Centre (IFDC), the International Fertilizer Industry Association (IFA), the Food and Agriculture Organization’s Statistics Division (FAOSTAT), and the Regional Agricultural Input Market Information and Transparency System (AMITSA). All partners contribute to one or more of the following key inputs: funding, information, administration, training or platforms for gathering or disseminating information.

Outcomes and Impacts

By engaging the publishers of major international databases such as FAOSTAT and IFADATA, AFO has helped extend access to data, reaching an estimated 10,000 agro-dealers and millions of farmers across Eastern and Western Africa. Because AFO’s resources contribute to

overall market development, its impact is indirect and hence difficult to measure. However, fertiliser use in Sub-Saharan Africa is growing, having increased from 8 kg per hectare per year in 2004 to 10-12 kg per hectare per year in 2010.

Lessons Learned

- **PPCs can take a multi-pronged approach to address near- and long-term food supply needs.** The AFO project successfully leverages partnership strengths and skills to achieve cost-savings and improve fertiliser use. Through its multiple stakeholder approach, the AFO project is able to fill gaps in knowledge specific to Sub-Saharan Africa and provide valuable data and market intelligence to other partnership members. The project strengthens the local capacity of statisticians and research institutions to collect and process data by offering specialised trainings to statisticians.
- **The private sector may invest in PPCs with an eye toward more distant benefits.** Currently, Sub-Saharan Africa only represents 1.5 per cent of the world fertiliser market and production in the region is very limited. However, IFA’s involvement is driven in part by a recognition of the long-term benefits of growing the market while acknowledging that its investment will not yield any near-term payoff in the traditional sense.



3. Clean Drinking Water Distribution through Water Kiosks

Many people in Zambia lack access to safe and reliable sources of drinking water. Without a central water supply, many residents rely on natural river streams, which can be infected with diseases. It is anticipated that droughts, floods, extreme heat, and a shorter rainy season will increase the spread of water-borne diseases and reduce the availability and quality of drinking water. The Zambian “Devolution Trust Fund” (DTF) Water Kiosk project works with commercial water utilities and village-level entrepreneurs to create decentralised water kiosks throughout Zambia.



Key Messages:

- The water kiosk model facilitates entrepreneurship by eliminating major upfront investment costs to launching a retail micro-enterprise.
- The water kiosk model extends many of the benefits of water infrastructure while avoiding the barriers of high capital costs. While it does not offer a level of service equivalent to that of conventional water infrastructure, water kiosks provide other benefits such as long-term job creation and entrepreneurial opportunities.

Introduction

In Zambia, over 2.85 million residents in low-income areas lack access to safe and reliable sources of drinking water. The centralised water and sanitation network often cannot be extended to low-income areas due to high-density housing and concerns around cost recovery, forcing residents to rely on natural river streams or expensive and unregulated private providers for water. These sources can be infected with diseases such as cholera and roundworm. Climate change is expected to further exacerbate this problem by reducing the country’s already scarce access to potable water.

Decentralised water kiosks can help provide a safe, local water supply at affordable prices. The decentralised kiosk network is owned, maintained, and regulated by commercial utilities, while the day-to-day sales operations of the kiosks are managed by village-level entrepreneurs. In this way, villages gain access to safe, reliable, and affordable sources of water while receiving valuable training in business operations that promote community and economic development.

Project Activities

The Zambian “Devolution Trust Fund” (DTF) Water Kiosk project manages health and disaster risks by addressing the growing need for access to safe drinking water through a decentralised approach. Funded by the German government-owned development bank Kreditanstalt für Wiederaufbau (KfW), the project works with commercial water utilities to create decentralised water kiosks throughout Zambia. The commercial utility is responsible for the construction and maintenance of the water kiosks, and maintains ownership of the physical assets. However, the daily sales operations are carried out by small, entrepreneurial businesses that earn a 30 to 40 per cent commission on the sale of water, which is sold at the national, regulated price. Because a single kiosk can serve 500-1500 people, this commission can become a significant source of income. Kiosk operators generate additional income by selling other household items ranging from condoms and cigarettes to flour and sugar.

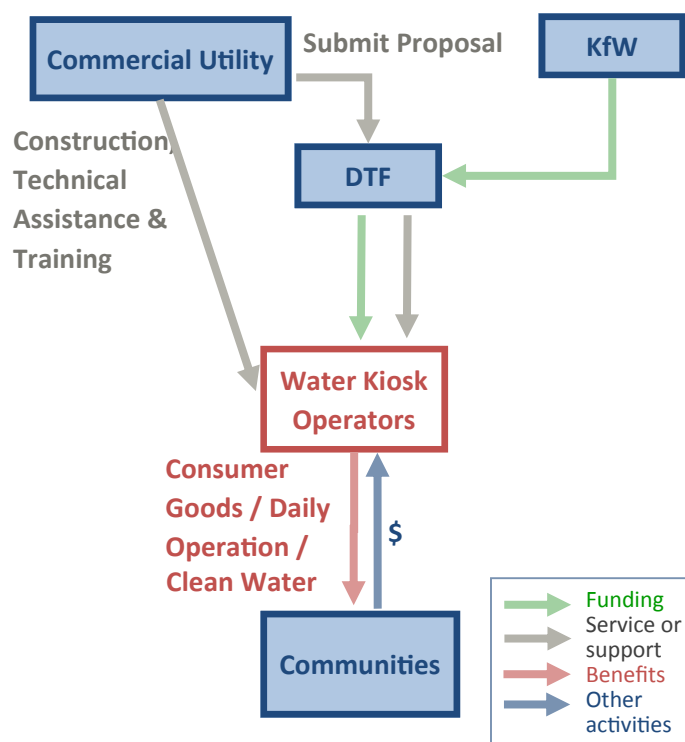
Project Partners & Structure

COMMERCIAL UTILITY | Responsible for construction and maintenance of kiosks. Kiosks construction requests are submitted through the DTF procurement portal.

WATER KIOSK OPERATORS | Local entrepreneurs who receive training in kiosk operation and management. Responsible for daily business operations and marketing.

DEVOLUTION TRUST FUND (DTF) | Fund established by the Zambian National Water Supply and Sanitation Council, which is responsible for the water kiosk public procurement process. Provides financing and technical assistance to successful bidders, as well as monitoring and evaluation.

KfW | German international development bank that provided funding.



Outcomes and Impacts

Since the project began in 2008, more than 500,000 people have been provided with access to safe and affordable water distributed through more than 300 water kiosks. A notable indication of success is that more than 70 per cent of households in a low-income area will use a water kiosk when one is available.

In selecting kiosk operators, DTF gave special attention to creating opportunities for women's economic participation in the formal sector. As a result, approximately 50 per cent of kiosk operators are women. This involvement creates potential opportunities for important information dissemination, as water collection is typically a female household task.

The project has not only provided residents with access to safe and affordable water, but has also catalysed valuable improvement in business development, women's economic security, and resilient community economic development.

Lessons Learned

- ***This innovative business model has been successful in rewarding entrepreneurs.*** A factor of success is the innovative business model employed by the water kiosks project. Central to an entrepreneur's success is not only his or her marketing strategy for attracting customers, but also the additional

commercial activities conducted at the kiosk. To keep water affordable and close to the regulated social tariff price of water, kiosk operators sell additional items to generate income, such as standard household supplies.

- ***Strengthening the quality and supply of the water sector can yield multiple societal benefits,*** such as enabling women to participate in the formal economy, increasing productivity and wellness through clean water access, and fostering community economic development.



4. Building Resilient Communities through Multi-Sectoral Partnerships

The Lake Chilwa Basin Climate Change Adaptation Programme (LCBCCAP) works to enhance the resilience of rural communities around Lake Chilwa, a threatened watershed area in southern Malawi. LCBCCAP brings together a wide range of public, private, and civil society partners to support farmers and community enterprises by providing access to training, information, markets, and banking services. The improved access to markets and awareness of climate change impacts has helped promote sustainable farming techniques and build climate-resilient livelihoods in the region.



Key Messages:

- **Provide information and build trust before rolling out technical interventions.** LCBCCAP built trust early on by engaging key community leaders, resulting in greater community participation and engagement in the programme.
- **When climate change leads to decreased yields, adding value to products can be an effective adaptation solution.** In this case, solar fish drying and improved packaging has helped community enterprise groups sell a more valuable product.

Introduction

Climate predictions suggest that Malawi's Lake Chilwa, a wetland of international significance, could dry up completely by 2014 as the effects of climate change worsen. Already communities have seen more than 70 per cent of the lake recede during the dry season in 2012, crippling the livelihoods of local fishermen and triggering outbreaks of diseases such as cholera and bilharzia. Communities are also impacted by erratic rainfall and erosion which threaten farmers that rely heavily on rain-fed agriculture, increasing labour requirements and use of inorganic fertilisers to maintain soil productivity. The LCBCCAP has been in operation since 2010 to mitigate these climate change effects in the basin and to increase the adaptive capacity of communities around the lake.

Project Activities

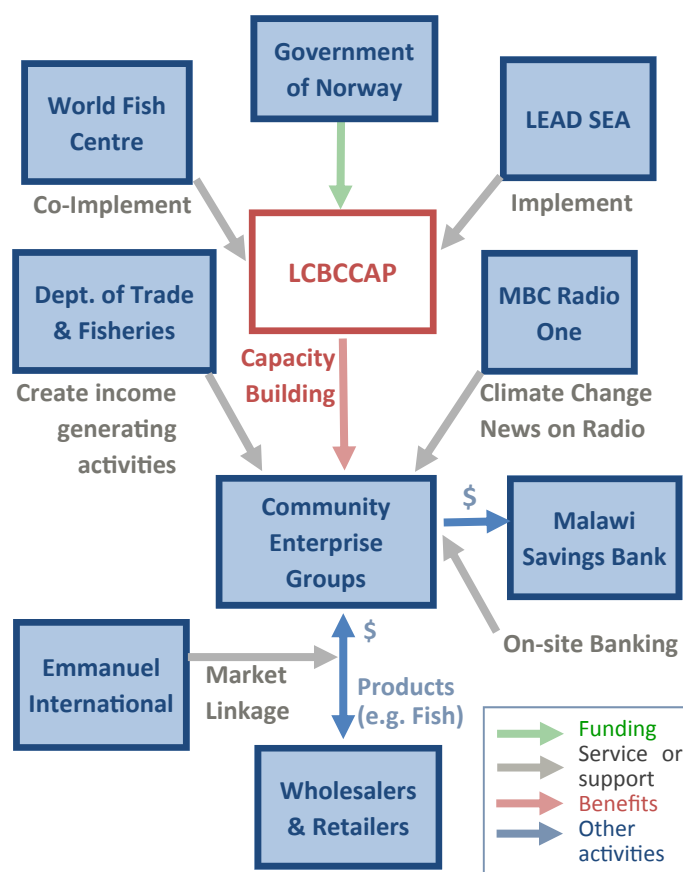
LCBCCAP has partnered with wholesalers, retailers, NGOs, and government agencies to improve the business environment of community enterprises and advance climate-resilient livelihoods.

Capacity building for micro-enterprises to add value to their products. In 2012, LCBCCAP trained three chilli and three rice producer groups on marketing strategies and packaging techniques that can enhance their competitiveness. LCBCCAP also supported eight fish processing and trading groups by helping construct solar fish dryers which enable more sanitary and effective drying and allow the traders to market a higher value product.

Connecting community enterprises to market. LCBCCAP and Emmanuel International helped link community enterprise groups directly to wholesalers and retailers in order to safeguard micro-enterprises' access to market.

On-site banking services. Malawi Savings Bank has begun providing local on-site banking services 1-2 times weekly to allow farmers in the remote Lake Chilwa region to build a financial safety net. The Bank's service is essential for local farmers because the nearest bank branch is more than 50-75 km away, connected by poor roads with no bus transportation system. The on-site banking service was implemented in late 2012 and the initial response has been positive with significant uptake among the communities.

Project Partners & Structure



Climate change training and education – The LCBCCAP has hosted numerous trainings on climate change adaptation and sustainable farming techniques targeting a wider range of community members and stakeholders, utilising radio programmes and in-person workshops.

Outcomes and Impacts

LCBCCAP has resulted in greatly increased awareness of climate change with tangible improvements to livelihoods. A total of 53 stakeholder groups (973 people) have been trained in climate change adaptation since 2010, greatly increasing local knowledge on impacts and actions they can take to adapt. Trainings on sustainable farming techniques have also helped promote crop diversification and water conservation in the region. The livelihoods of many in the farming and fishing producer groups have improved as a result of the programme. For example, women-operated fish processing and trading micro-enterprises saw a revenue increase of 125 per cent as a result of the addition of solar fish dryers and improved packaging methods. The pigeon peas sold in bulk to the wholesaler Rab Processors have increased the revenue by 20 per cent as well. Thanks to the success of the Programme, the LCBCCAP is currently in transition to a next-phase project called the Harmonisation for Enhanced Livelihoods (HEAL) to be funded by the Government of Norway's Development Fund.

Lessons Learned

- **Provide information and build trust before rolling out technical interventions** – When launching the programme, LCBCCAP first held numerous training and workshops with a wide range of community members and leaders (political leaders, faith leaders, etc.). Engaging with various community members and stakeholders early on helped raise the awareness of climate change and sustainable development issues and build trust between LCBCCAP and the community.
- **Take a broad view of adaptation and addressing community needs as they arise** – Programme staff has remained attentive and flexible in the face of emerging needs and responded even to challenges not strictly within the Programme scope. For example, the LCBCCAP team responded to requests for help when Bilharzia, a disease caused by parasitic worms, emerged as an imminent threat in the region. The Programme conducted a disease prevalence survey and provided treatments to over 9,100 people through funding from the Government of Norway. Ultimately LCBCCAP recognises health, gender issues, economic stability and other sustainable development issues as intricately linked—and often necessary prerequisites—for climate change adaptation.



5. Creating Supply Chain Partnerships to Safeguard Smallholder Livelihoods

Coffee farmers in Rwanda are increasingly facing hardship as climate change raises average temperatures in coffee-growing regions and makes conventional cultivation methods less effective. Responding to the concerns expressed by farmers in its supply chain, Thanksgiving Coffee Company, a California-based coffee roaster, initiated the “Responding to Climate Change, Building Community-Based Resilience” partnership to implement climate-resilient farming strategies that can effectively combat future droughts, flooding, and loss of surface soils. By utilising a market-based demand-driven approach, the partnership mobilised Rwandan farmers to adopt more sustainable agriculture techniques that build resilience.



Key Messages:

- **Smallholder farmers are increasingly aware of the opportunities to request assistance from end buyers, many of whom are increasingly focusing CSR efforts on their supply chains.**
- **Supply chain management is not only for multi-national corporations.** Small- and medium-sized companies, such as Thanksgiving Coffee, are taking leadership roles to strengthen the adaptive capacity of farmers in its supply chain.

Introduction

Coffee farmers in Musasa, Rwanda are expected to face increasing hardship due to changes in their local climate. Coffee farms are most productive within specific temperature ranges, and warmer climates can reduce yields, alter taste, and even make certain bean varieties unsuitable. Farmers are also likely to face more extreme weather, which will cause erosion, loss of surface soils' water-holding capacity, and crop loss due to drought and flooding.

Project Activities

Thanksgiving Coffee Company initiated the “Responding to Climate Change, Building Community-Based Resilience” programme after farmers in the Dukunde Kawa Cooperative expressed concern about altered weather patterns—such as droughts and flooding—and the potential impact on coffee yields. The project was implemented in coordination with the Cooperative and

the Rwandan Economic Development Initiative (REDI) and funded by the Dutch NGO Progreso. The project utilises a resilience-building curriculum that was designed to utilise ecosystem services through techniques such as intercropping, erosion control, and adaptive farming methods.

A unique component of the training is the use of trees and grasses to provide shade canopy, prevent soil erosion, and slow the desertification process in farms. In the beginning of the project, five tree and grass nurseries were established in order to: (1) protect topsoil by preventing erosion; (2) decrease farm temperature by developing shade canopy; (3) increase soil fertility by introducing nitrogen-fixing trees and leaf litter; and (4) reduce the risk of drought by increasing aquifer absorption. Project participants were able to purchase seedlings through the project and were taught to plant grass swales in order to control runoff, recharge aquifers, and maintain soil moisture as part of a holistic sustaina-

Project Partners & Structure

THANKSGIVING COFFEE COMPANY | Facilitated stakeholder engagement sessions with cooperative members to determine farmer needs and concerns. Developed the strategic framework and programme approach. Brought in fundraising and implementation partners.

RWANDAN ECONOMIC DEVELOPMENT INITIATIVE (REDI) | Non-profit that provided project administration for curriculum development and farmer training at the local level.

DUKUNDE KAWA COOPERATIVE (COFFEE FARMERS) | Thanksgiving Coffee's long-term cooperative supplier which provided the initial ideas for the project. Collaboratively developed and implemented on-site trainings with REDI.

PROGRESO | DUTCH NGO that funded the project.

USAID | Funded and formed the Dukunde Kawa Cooperative in 2003 through the PEARL Project (Partnership to Enhance Agriculture in Rwanda through Linkages).

THE RWANDAN GOVERNMENT | Helped establish the Dukunde Kawa Cooperative with USAID.



ble agriculture curriculum. Farmers were then separated into 20-25 different zones to showcase best practices in teams, and winners were rewarded with cows. This demand-driven approach incentivised more active participation from farmers and has resulted in strong ownership in the project activities and outcomes.

Outcomes and Impacts

This partnership enabled Thanksgiving Company to strengthen its supply chain by building local suppliers' adaptive capacity. From 2010 to 2011, over 89,000 trees were planted by 567 farmers in 5 different regions. This is an average of 157 trees per farmer. The planted trees have helped reduce temperature on farms, slowed fruit ripening and protected coffee blossoms from damage during heavy rains. In 2012, the project received the 2012 Sustainability Award from the Specialty Coffee Association of America (SCAA). Over the course of the project, farmers received knowledge and training in resource management, ecological restoration, and reforestation techniques that have helped protect their coffee production against climate impacts.

Lessons Learned

- **Strong local partner participation has resulted in community ownership.** Dukunde Kawa's ability to engage directly with beneficiaries proved to be a critical component of the project's success. As a professional organisation with proven expertise in local stakeholder engagement and strong connections to the farmer community, the cooperative was quickly able to secure buy-in. Farmers provided input for innovative farming ideas that were influenced by their own experiences overcoming agricultural challenges. This active participation resulted in strong local ownership of the project participants.
- **A partnership can maximise its impact when each partner focuses on what it does the best.** This project clearly defined partner roles in order to draw from each contributor's key competency. Focusing on strengths enabled cooperative farmers to identify innovative ideas for trainings based on their own farming needs, and helped Thanksgiving Coffee fine-tune the training strategies. Additionally, the local NGO REDI leveraged its experience, trust, and communication expertise to work with local farmers as the administrator.



6. Mwanza Rural Housing Programme: Building Flood Resilience in Tanzania

In Tanzania, the Mwanza Rural Housing Programme (MRHP) created a brick-making programme in 1994 that would address flooding challenges in rural areas by training local villagers on how to use agricultural waste as kiln fuel for brick production. The programme has resulted in the establishment of over 60 brick-making enterprises which have collectively produced over 400 million bricks. This has saved an estimated 110,000 m³ of fuel wood and increased resilience against flooding in the area's housing stock by increasing the use of a stronger building construction material.



Housing



Disaster Risk
Management



Agriculture



Resilient
Livelihoods

Key Messages:

- **Public private partnerships can create markets by connecting micro-enterprises in sectors that would not ordinarily interact.** In building a more robust brick market, MRHP has created a secondary market for an agricultural waste product.
- **Training programmes require flexibility as they mature.** MRHP has successfully adapted its training programme as the needs of its entrepreneurs have evolved from creating products to managing and scaling a business.

Introduction

The city of Mwanza, Tanzania is the country's second most populous city and is in one of the wettest regions in the country, with an annual rainfall of 700-1000 mm per year. Climate change estimates suggest that the wet season in Mwanza will become longer with a higher average monthly rainfall. Most households in Mwanza are made from poor quality mud bricks that require frequent repairs after floods and heavy rains. The surrounding environment has an abundance of clay for brick-making; however, there is a shortage of wood fuel to fire kilns due to deforestation and climate change.







Project Activities

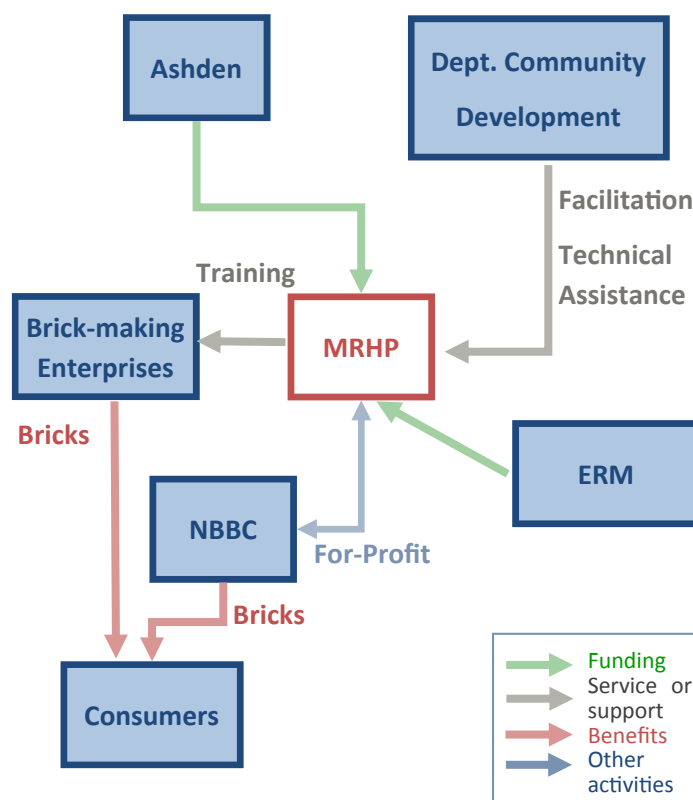
In 1994, MRHP began a training programme to teach residents of rural communities how to produce bricks using agricultural waste (such as rice husks and cotton waste) as a kiln fuel. This technique has allowed village residents to take advantage of local resources without increasing pressure on the forest ecosystem. The increased use of bricks for construction has contributed to disaster risk management by providing stronger, more resilient housing materials.

MRHP, in coordination with the Tanzanian Department of Community Development, recruits and trains villagers in manual, clay brick-making techniques. Villagers organise themselves into brick-making enterprises, where membership requirements and fees are designed on a per-enterprise basis. Frequently, members buy shares or contribute revenue to a general fund which is used to buy new tools for the enterprise or make other investments. When the initiative began, agricultural waste (rice husks) were provided free of charge. As the brick-making enterprises became more successful, farmer entrepreneurs have started new enterprises collecting and selling rice husks to brick-makers.

Initially, MRHP relied on grant funding and foreign assistance. In 2006, however, MRHP began developing the idea for a for-profit brick-making social enterprise. MRHP received US\$30,000 in special assistance from the Ashden Awards for programming and technical assistance to develop a business plan. Once the vision was completed, the ERM Foundation provided an initial loan of US\$40,000 to MRHP to establish the Nyumba Bora Brick Company (NBBC). NBBC receives orders from community members and the government for clay bricks

Project Partners & Structure

-  **BRICK-MAKING ENTERPRISES** | Micro-enterprises trained in manual clay brick-making, which sell bricks to community and government customers.
-  **NBBC** | Social enterprise that produces clay bricks for community and government customers and provides services to members.
-  **MRHP** | Initially a government-sponsored NGO, MRHP transitioned to an independent non-profit that provides technical assistance, training, and access to capital to brick-making micro- and social-enterprises.
-  **DEPT. OF COMMUNITY DEVELOPMENT** | The Tanzanian government agency's engineering consultants advise on brick production processes and rural infrastructure and its community development officers organise trainings and assist in community outreach.
-  **ASHDEN** | Provided financial assistance and technical assistance to develop a business plan for NBBC.
-  **ERM FOUNDATION** | The CSR lending arm of the global environmental and sustainability consulting firm Environmental Resources Management (ERM). Provided start-up capital to create NBBC.



that are used to build school houses, community facilities, and housing. NBBC currently uses manual construction methods for making the clay bricks but is working to import machinery that would enable a more efficient mechanised process.

Outcomes and Impacts

Since beginning in 1994, MRHP has established 60 brick-making enterprises that have produced over 400 million bricks—enough to build more than 150,000 homes. The MRHP programme has spread throughout Tanzania, primarily in areas where rice is already grown. The programme has been able to achieve continued success due to its competitive pricing and targeted introduction in rice-growing areas. Specifically, clay bricks made by the NBBC cost about US\$0.12 versus a machine produced, cement brick, which costs approximately US\$0.74. Not only are the clay bricks less expensive, but they are also larger than cement bricks, making them more resilient to heavy rains. By using agricultural waste as a kiln fuel, the project has saved 110,000 m³ of fuel wood and avoided 75,000 tonnes of CO₂ emissions.

Lessons Learned

- **Choose locations where synergistic relationships between micro-enterprises can be created.** MRHP trainings have been most successful in areas where

rice is grown. This allows clay brick-makers to reduce kiln fuel costs while creating an income-generating activity for farmers who are able to sell a waste product (husks) to the brick-making enterprises—thereby improving the livelihoods of both parties.

- **Evolve training programmes as micro-enterprises mature and new needs emerge.** Initial trainings provided farmers with skills in manual, clay brick-making. These trainings have since been adapted to include trainings targeting women-owned businesses, tree planting initiatives to provide necessary shade cover for the bricks and to combat deforestation, and business skills in market evaluation. Throughout the years, MRHP has maintained flexibility and adaptability to respond to changing environments in demand, supply, and price.
- **Access to finance remains a persistent barrier to growth.** NBBC has struggled to find consistent, reliable, and affordable access to finance in order to purchase the equipment needed to scale up its business. With high up-front investment costs and an extended payback period, long loan terms are needed but may be unappealing to traditional lenders. This emphasises the need for securing financial partners willing to provide more flexible loan terms when investing in micro-enterprises.



7. PepsiCo: Direct Seeding Methods in Indian Rice Paddies

Climate change predictions forecasting an increase in droughts and flooding, posing challenges for traditional, water-intensive methods of rice cultivation. In 2009, PepsiCo India launched a campaign to help farmers in rural India adapt by using PepsiCo's DirectSeeding machine. This technology was created in collaboration with the government-supported Indian Agriculture Research Institute and the Philippines-based International Rice Institute. Utilising the direct seeding method not only results in a 30 per cent reduction in water usage per acre, but also improves soil porosity and reduces methane emissions.



Agriculture



Climate
Adaptation



Water

Key Messages:

- **Efficient scaling through collaboration with scientific partners.** IARI and IRI are helping evaluate the effectiveness and potential of PepsiCo's DirectSeeding machine to identify how and where it can be most productive.
- **Reducing the water needs of a major food staple has global applicability.** Rice is a notoriously water intensive crop that is frequently cultivated in the world's fastest growing regions which face imminent water challenges.

Introduction

The traditional method of rice production is water-intensive. Typically, rice seeds are cultivated in a small nursery for 4 weeks and then transplanted as paddy saplings to a main cultivation area. The main cultivation area is then flooded with 7-10 cm of water in order to prevent weeds from growing. It is estimated that this method of rice cultivation utilises 2,250 litres of water a day.

India has already begun to experience the impacts of climate change. Over the last 100 years the region has seen monsoon seasonal rainfall in major rice production areas decrease approximately 6-8 per cent. Future projections suggest increasing challenges for agricultural producers in India as the quality and quantity of available freshwater declines due to decreasing snow melt, increasing saltwater intrusion, and declining run-off in river basins.

As part of its broader corporate social responsibility commitment to use less water in its facilities and production processes, PepsiCo India developed a new,

less water-intensive technology to aid in the production of rice in 2009. The DirectSeeding Machine sows seeds uniformly at a specified gap and uniform depth and then protects seedlings from weeds through an innovative plastic crop covering. This method eliminates the need for inundation, reducing water usage by 900 kilolitres per acre and lowering the cost of cultivation by approximately US\$30 per acre. To date, the technology has been used in over 13,000 acres of rice fields.

Project Activities

PepsiCo India developed the idea for direct seeding in 2004. Initially, manual direct seeding techniques were implemented in PepsiCo pilot farms in Jallowal, India. By 2005, the trials were extended to include more varieties of rice and local farmers were brought to the trial fields to witness the advantages of direct seeding in terms of water use, yield, and cost of production. In 2006 PepsiCo developed the DirectSeeding machine, which allowed for mechanised direct seeding and greatly reduced the amount of farmer labour required. PepsiCo's rice

Project Partners & Structure



PEPSICO | Developed the DirectSeeding Machine and funded the programme. Participated in selection of suitable rice varieties and trained farmers in direct seeding methods.



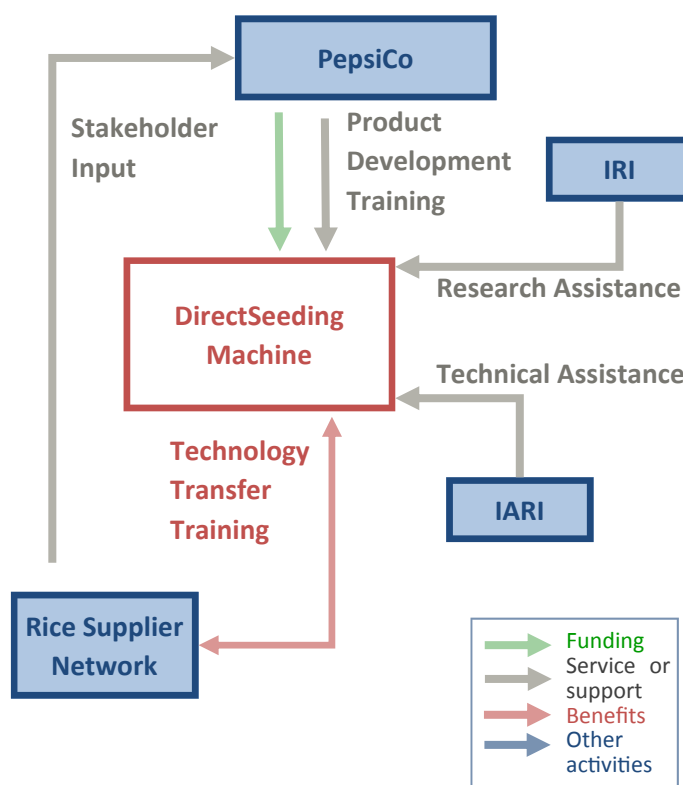
RICE SUPPLIER NETWORK | Individual smallholder farmers who receive free access to the DirectSeeding machine, as well as technical assistance and training in its use.



INDIAN AGRICULTURAL RESEARCH INSTITUTE (IARI) | Quasi-government research institution that provides research and technical assistance through monitoring, evaluation, and measuring greenhouse gas emissions and water use.



INTERNATIONAL RICE INSTITUTE (IRI) | Non-profit institute that has provided research assistance and technical assistance by testing the suitability of different rice varieties for optimal use with the DirectSeeding machine.



suppliers receive training in the proper use of the machine and are able to access the technology for free. The International Rice Institute (IRI) provided technical assistance by testing the suitability of different rice paddy varieties for use with the DirectSeeding Machine. In 2009, the machine was approved by PepsiCo for wider use. Its implementation and effectiveness is being monitored by the Indian Agriculture Research Institute (IARI), which is measuring the decreases in water consumption and avoided greenhouse gas emissions that have resulted from deployment of the technology.

Outcomes and Impacts

Since beginning as a pilot in 2004, the programme has been expanded to more than 5 territories in India and the DirectSeeding machine has been adapted to include more varieties of rice. The number of participating farms has increased to over 13,000 acres, benefitting over 1,500 smallholder farmers. The direct seeding method not only saves 900 kilolitres of water per acre (compared to traditional cultivation methods), but has also reduced methane gas emissions and improved soil porosity.

Lessons Learned

- **Education and extension contacts are pivotal.** The success of direct seeding methods depends upon proper implementation and precision management. Without proper use, direct seeding methods can be more vulnerable to weed infestation and pests. Farmers need comprehensive training in field preparation, timely operations, fertiliser use, and integrated pest management techniques in order to achieve high rice yields through direct seeding methods.



8. Micro-Hydropower for Community-Based Rural Electrification in Sri Lanka

In the late 1990s, almost half of the Sri Lankan population lacked access to electricity. To promote low cost community driven off-grid micro-hydro projects, the Sri Lankan Government, World Bank and Global Environment Facility (GEF) established two long-term programmes which brought various local credit institutions together to provide loan assistance and financing. The hydro systems improved access to electricity and enhanced community adaptive capacity by enabling income-generating activities. Additionally, villagers' ownership of hydro facilities led to increased protection of the upstream environment, which strengthened regional resilience against flooding.



Energy



Climate Change
Adaptation



Resilient
Livelihoods

Key Messages:

- This innovative, replicable model of community-driven micro-hydropower system has created a multiplier effect for public-private collaborations (PPCs) in the Sri Lankan renewable energy sector. The model is still used today for new PPCs aimed at improving grid connectivity of the village hydro schemes.
- Facilitating energy access for rural communities can benefit the local economy by enabling small business development. Excess power can be used as motive power to run small machines for micro-enterprises.

Introduction

In remote areas of the country where there is no access to grid electricity, off-grid micro-hydropower systems (5-15 kilowatts) can be used to power electric lighting (reducing the need for expensive kerosene) and other equipment that enables income-generating activities and the formation of small businesses. Being generally small in scale and community-driven, off-grid hydro projects typically have broad local support and little environmental impact. The capability to generate off-grid power is also essential for emergency communications, especially when the main grid is disrupted due to heavy rains and floods. As such, they represent a flexible energy solution that benefits the rural Sri Lankan communities and builds resilience.

Project Activities

The UK-based NGO Intermediate Technology Development Group (ITDG) initially developed a community-driven micro-hydro model called "Village Hydro" in 1982. Now known as Practical Action, ITDG implemented the projects in Sri Lanka that were entirely villager-owned

and financed through cooperative structures known as Electricity Consumer Societies (ECS). In order to facilitate the financing of more micro-hydro projects, two long-term programmes were later developed with support from both the public and private sectors. With community ownership remaining as an essential characteristic of the long-term programmes, the micro-hydro projects were typically financed through three streams: 30 per cent from villagers, 50 per cent through Participating Credit Institutions (PCIs), and 20 per cent from co-financing and occasional grants from provincial councils.

- The Energy Services Delivery (ESD) programme (1997-2002), in coordination with the Sri Lankan government, the World Bank, and Global Environment Facility (GEF), funded about US\$0.8 million for off-grid micro-hydro schemes, to be disbursed as loans administered by 6 PCIs. Projects were required to be at least 5 km from the existing grid to qualify.
- The Renewable Energy for Rural Economic Development (RERED) programme (2002-2011) was funded by the World Bank's International Development Agency (IDA) and GEF. As the follow-on to ESD,

Project Partners & Structure



WORLD BANK, GLOBAL ENVIRONMENT FACILITY (GEF) AND THE SRI LANKAN GOVERNMENT | Contributed initial funding for two long-term renewable energy programmes (ESD & RERED).



THE ELECTRICITY CONSUMER SOCIETIES (ECS) | Local community entities that owned and operated the micro-hydro facilities.



PARTICIPATING CREDIT INSTITUTIONS (PCIs) | Geographically distributed local credit institutions. Provided loans through ESD and RERED projects.



PROVINCIAL COUNCILS | Channelled direct subsidies to the village cooperatives and facilitated the subsidy approval process.



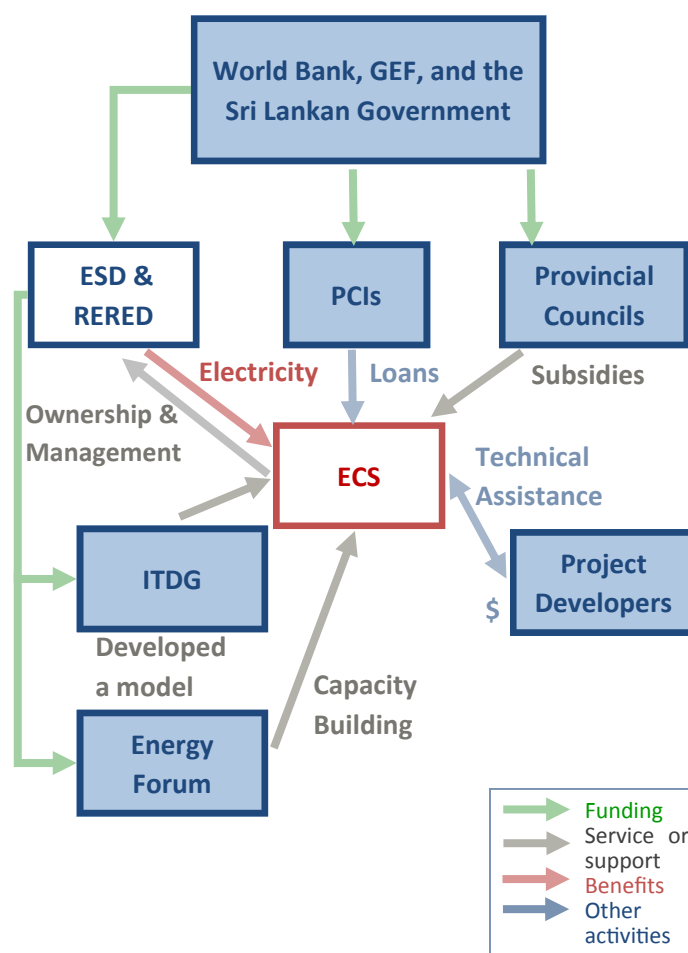
PROJECT DEVELOPERS | Typically contracted by the ECS to support project development and technical assistance.



ITDG | UK-based NGO that initially developed a community-driven micro-hydro model.



ENERGY FORUM | Sri Lankan NGO that supported community engagement and capacity building for project management.



RERED involved 10 PCIs who provided lending for eligible projects, and extended the programme through 2011.

Throughout the project process, Sri Lankan NGO Energy Forum conducted stakeholder meetings and feasibility tests, and hosted multiple community workshops to build capacity and raise awareness about micro-hydro power.

Outcomes and Impacts

From 1997 to 2011, a series of successful public-private partnerships established by two long-term programmes added 2 megawatts of off-grid micro-hydro capacity, providing access to over 7,700 villagers in Sri Lanka. Apart from being able to enjoy basic electricity services, rural villagers also benefited from improved health because they no longer used kerosene. Additionally, these micro-hydro systems have improved the quality of life in rural Sri Lankan communities by enabling the villagers to engage in productive activities such as studying, and by delivering excess power to operate rice mills or establish battery charging centres. The formation of local cottage industries provided jobs for villagers in the making and selling of micro-hydropower equipment.

Lessons Learned

- **Scaling up the ECS addressed challenges of community-driven electricity generation.** A single ECS was often taken advantage of by private project developers as it lacked necessary skills for project management and governance. Establishing the Federation of Electricity Consumer Societies (FECS), an umbrella entity composed of multiple ECS groups, empowered the ECS groups to share expertise and networks while protecting the collective ownership.
- **Partnering with a geographically distributed network of financing institutions made the implementation of projects in rural areas more effective.** In this case, easily accessible loans were available for ECS groups to build decentralised off-grid micro-hydro systems because the programme selected credit institutions from a variety of areas.
- **Long-term energy infrastructure planning promoted private sector engagement because it reduced the short-term policy risks by establishing a clear direction.** This approach has resulted in the participation of over 10 financial institutions, which have provided lending services in support of the two long-term programmes for more than 15 years.



9. Building a Sustainable Biomass Business while Combatting Desertification in China

The Maowusu Biomass Thermoelectric Company (MBTC) has established a business in partnership with China's State Forestry Administration to combat soil erosion and to help reduce the desertification rate. The company has planted desert shrubs, which only survive through regular pruning, and uses the trimmings for biomass power generation. This partnership has yielded multiple benefits: climate adaptation by reducing soil erosion and desertification, job creation, energy production using locally grown biomass, the creation of an additional health supplement side business, and successful demonstration of adaptive and low carbon energy production methods.



Key Messages:

- This project addresses a wide range of issues with a single elegant solution.
- MBTC's business model makes replication at the necessary scale feasible. Desertification is a large-scale challenge but MBTC's model and intention to build 2,000 more biomass plants shows the potential for leveraging market-driven solutions.

Introduction

The Maowusu Desert, located between Yulin City in central China's Shaanxi Province and Ordos City in Inner Mongolia, is one of the four largest deserts in China. Deserts in China are spreading by 3,300 km² annually due to climate change, illegal logging, and unsustainable agricultural practices. Slowing this rate will require more active prevention of soil erosion and desertification. In 2008, Maowusu Biomass Thermoelectric Company (MBTC) began planting trees and shrubs in the Maowusu Desert, providing a feedstock for biomass power while simultaneously reducing the speed of desertification.

Project Activities

MBTC has turned an arid deserted region into vegetated land by successfully growing desert shrubs. This has not been without its challenges. Through trial and error, MBTC learned that a fundamental way to protect desert ecosystems is to perform pruning maintenance on the trees every three or four years to keep them alive. As a result of this maintenance, MBTC acquired large amounts

of trimmings, which became the key resource for biomass power generation.

Another challenge MBTC encountered was that biomass power generation was not cost-competitive compared with lower cost coal-fired power in China. To make up the cost difference and remain competitive, MBTC received subsidies from the State Forestry Administration and the National Development & Reform Commission. However, recognising that relying on subsidies was not a sustainable way of continuing the business, MBTC created an additional revenue stream by building a first-phase spirulina production facility. Spirulina is an algae-like substance that is used as a health supplement ingredient and animal feedstock. Spirulina can also be used as a concentrated food source in areas after disaster strikes due to its high nutrient density (spirulina is 65 per cent protein—the highest of any natural food—and is rich in beta-carotene, with concentrations ten times higher than carrots).

Project Partners & Structure



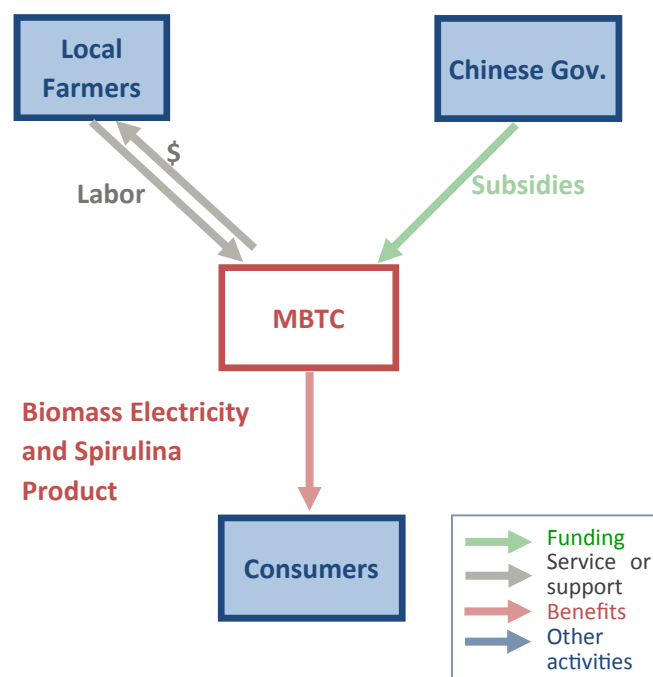
MAOWUSU BIOMASS THERMOELECTRIC COMPANY (MBTC) | Chinese biomass electric company that contracts local farmers to manage plants and uses the trimmings for power generation. Produces and sells an algae-like product, spirulina, which can be used as a health food supplement.



HERDERS AND FARMERS IN THE MAOWUSU DESERT REGION | Contracted to the MBTC, they plant shrubs in the desert, prune, and transport the trimmings to processing facilities.



CHINA'S STATE FORESTRY ADMINISTRATION AND THE NATIONAL DEVELOPMENT & REFORM COMMISSION | Provided MBTC with funding for research, engineering, and construction of the facilities. The government bodies also subsidised the electricity.



Since the beginning of its operation in November 2008, MBTC has invested an average of US\$7.9 million annually in regular shrub maintenance, and has developed an efficient operation process of planting, nursing, cutting, transporting and processing. The company has engaged 1,000 local farmers by contracting them to grow sand willows and has also hired 150 full-time workers at the site. With its successful business model, the company hopes to build as many as 2,000 similar power plants to turn more arid desert into vegetated fertile land.

Outcomes and Impacts

The Maowusu Biomass Thermoelectric Company has treated over 24,000 hectares (240 km²) in the Maowusu Desert since 2008 and has a goal of treating 10,000 hectares every year. Large shrub-like plants (sand willows) have helped hold down the soil, reducing the intensity of sandstorms and making the area more hospitable to wildlife.

By creating jobs for local herdsman and farmers, the company increased annual incomes by a total more than US\$11 million. In addition, MBTC has produced over 240 million kilowatt-hours of electricity at its 30 megawatt thermoelectric plant since 2008. The annual revenue from spirulina sales is expected to reach another US\$47.6 million (approximate), with a profit margin of 20 per cent in 2013.

Lessons Learned

- **Adding additional revenue streams can help businesses move on a path toward financial sustainability.** MBTC found value in its shrub and carbon waste products, creating further revenue generation opportunities and enabling the company to reduce its reliance on government subsidies.
- **Local knowledge can be essential for business operations.** MBTC faced challenges reliably growing the key input to their energy production, shrubs. Drawing from the knowledge of the local community enabled MBTC to find ways to sustainably grow and care for its plants. In return, MBTC created opportunities for a range of skill sets, thereby strengthening local economic resilience.

About MCG

Meister Consultants Group, Inc. (MCG) is an international consulting firm specialising in climate and disaster resilience, renewable energy, international dialogue, and corporate sustainability. Our services include strategy and policy development, market analysis, research programme planning and management, as well as new governance tools such as stakeholder and citizen participation, dialogue and mediation, multi-sectoral cooperation and the development and management of various multi-stakeholder initiatives.

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About CDKN

The Climate and Development Knowledge Network (CDKN) aims to help decision-makers in developing countries design and deliver climate compatible development. We do this by providing demand-led research and technical assistance, and channelling the best available knowledge on climate change and development to support policy processes at the country level.



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