



The Community Development Carbon Fund (CDCF)

Assessment of Community Benefits and Sustainable Development



THE WORLD BANK
1818 H St. NW
Washington, D.C. 20433

Author: Aditi Sen
Task Team Leader: Haddy Jatou Sey

www.carbonfinance.org

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Abbreviations

AEPC	Alternative Energy Promotion Center (Nepal)
AKRSP	Aga Khan Rural Support Program (Pakistan)
ASER	Agence Senegalaise d'Electrification Rurale (Senegal)
CBP	Community Benefit Plan
CDCF	Community Development Carbon Fund
CDD	Community Driven Development
CDM	Clean Development Mechanism
CFL	Compact Fluorescent Lamp
ER	Emission Reduction
ERPA	Emission Reduction Purchase Agreement
FMU	Fund Management Unit
GHGs	Greenhouse Gases
IBRD	International Bank for Reconstruction and Development
IDA	International Development Agency
O&M	Operation and Maintenance
MDGs	Millennium Development Goals
MHP	Micro Hydro Plant
SIF	Social Investment Fund (Moldova)
UNFCCC	United Nations Framework Convention on Climate Change

Annex A: List of CDCF Projects

S. No	Country /Project Name	Key Community Benefits
1	Argentina Olavarria Landfill Gas Recovery	Potable water and solar panel for hospital
2	Argentina Salta Landfill Gas Recovery	Upgrading work conditions for waste pickers
3	Bangladesh Grameen Shakti Solar Home Systems	198,978 HH connected to solar panels for electricity
4	Bangladesh IDCOL Solar Home Systems	226,700 HH connected to electricity and employment
5	Bolivia Wastewater Gas Capture	Sewage connections for 2000 HHs
6	Cambodia Kh- interconnection *	Lighting
7	China Gunaguran Hydropower Development	Construction and rehabilitation of local infrastructure
8	China Hubei Ecofarming Biogas	Biogas burners for household cooking
9	China Shandong Poultry Manure Biogas	Construction and rehabilitation of local infrastructure
10	Columbia Rio Frio Wastewater Treatment	Construction and rehabilitation of local infrastructure
11	Columbia Furatena Energy Efficiency and Rural Development	Income generation through increased agricultural productivity
12	Georgia Small Hydro Rehabilitation	Rehabilitation of local infrastructure
13	Guyana Skeldon Baggasse Cogeneration	Improved electricity to region and job creation
14	Honduras La Esperanza Hydroelectric	Improved electricity and employment
15	India FA G Brick Kiln	Accident and health insurance for workers
16	India Karnataka water *	Access to water connection
17	Kenya Olkaira Geothermal Expansion	Construction and rehabilitation of local infrastructure
18	Kenya Optimization of Kiambere Hydropower Station	Construction and rehabilitation of local infrastructure
19	Kenya Redevelopment of Tana Power Station	Construction and rehabilitation of local infrastructure
20	Nigeria Aba Cogeneration	Improved electricity access and construction of local infrastructure
21	Moldova Biomass Heating and Energy Conservation	Improved heating service
22	Nepal Biogas Support Program	Improved energy for cooking
23	Nepal Microhydro	Access to electricity at the household level
24	Pakistan Community Based Renewable Energy Development	Access to electricity at the household level
25	Peru – Santa Rosa Hydro	Construction and rehabilitation of local infrastructure
26	Philippines Laguna de Bay Watershed Community Carbon	Building institutional capacity
27	Philippines Ethanol Wastewater Management	Improving livelihood opportunities
28	Rwanda CFL *	Energy efficient lighting (installation of CFLs)
29	Senegal Lighting Energy Efficiency in Rural Electrification	Energy efficient lighting (installation of CFLs)
30	Thailand AEL livestock Waste Management	Construction of local infrastructure and employment creation
31	Uganda Kakir Sugar Works Cogeneration	Improved living standards for farmers and workers

* Projects where ERPA has yet to be signed

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Executive Summary

The Community Development Carbon Fund (CDCF) supports projects that measurably benefit poor communities and their local environment and generate verified Kyoto-compliant emission reductions under the Clean Development Mechanism (CDM). The key factor that distinguishes this Fund is the generation of community benefits by the projects it finances. This assessment focuses on the performance of the Fund's portfolio with respect to community benefits and its contribution to broader socio-economic and environmentally sustainable development. The assessment is based on a review of the entire CDCF portfolio, and it seeks to highlight outcomes, processes and lessons learned.

The CDCF portfolio currently has 19 projects with indirect benefits, 10 projects with direct or intrinsic benefits, and 2 projects which have both direct and indirect benefits. While many CDCF projects are still in early stages of implementation, key findings from the assessment are as follows:

- While the community benefits provided by CDCF projects often include a range of activities, the key community benefit outcomes in CDCF projects can be categorized as: (i) improved local infrastructure such as roads, health clinics etc; (ii) improved access to energy for heating and/or cooking; (iii) improved livelihood and employment opportunities; and (iv) improved access to electricity and/or energy efficient lighting.
- The level of community dialogue and participation in projects with direct benefits tends to be high when they are embedded in ongoing programs that are based on principles of community empowerment. In projects with indirect benefits which are required to prepare an additional Community Benefits Plan (CBP), the participatory process tends to be stronger when the consultation process involves a range of key stakeholders including local government administrations and is linked to broader local development priorities.
- Most of the projects are targeted towards communities that lack essential services such as electricity or basic health care and have relatively low per capita incomes (typically less than \$1025 per year). However there is a lot of heterogeneity and inequality within communities. In some CDCF projects such as the solar power projects in Bangladesh and the biogas project in Nepal, the poorest households are not able to access the technology as the upfront investment required is relatively high.
- Most projects demonstrate strong attention to Operation and Maintenance (O&M) of investments but the level of institutional sustainability varies considerably across the CDCF portfolio. Cost-effectiveness of CDCF projects also tends to vary and depends on the extent to which additional resources are leveraged for the CBP.

The assessment demonstrates that CDCF promotes a co-benefits approach to climate change by linking carbon finance to tangible poverty reduction and sustainable development outcomes. Many CDCF projects can be particularly appropriate for meeting the energy needs of poor and remote communities in developing countries. The assessment also highlights issues that need to be addressed in order to enhance effectiveness of CDCF projects. The major lessons that emerge from this assessment are: (i) effectiveness of CDCF projects is maximized when community benefits are intrinsic to the process of emission reductions; (ii) in the case of projects with extrinsic benefits, effectiveness is maximized when CBPs are integrated within a broader local development framework; (iii) the consultation process for designing CBPs needs to be more systematic in terms of budgeting, timing etc, (iv) the flow of funds for implementing community benefit plans needs to be more timely; (v) and the monitoring and evaluation of CBPs needs to be strengthened.

timely manner. However in many of the newer CDCF projects, this issue has been resolved by providing advance payment for the CBP.

The monitoring and evaluation of CBPs needs to be strengthened. Most projects reviewed did not have robust monitoring systems for CBPs. Reporting on CBPs was inconsistent, there was a lack of sufficient baseline data; and monitoring indicators were primarily output oriented and not sufficiently reflective of outcomes. One of the ways to address this would be to develop a simple and practical monitoring and evaluation tool that can be used by the project sponsors and beneficiary communities not only to track progress, but also to identify implementation successes and challenges.

The assessment demonstrates that by adopting a co-benefits approach to climate change, CDCF plays an important role in helping developing countries achieve tangible development benefits. It provides practical incentives for GHG mitigation by linking CDM with economic and social development priorities at the national and local levels. However, as with other CDM projects the overall effectiveness of CDCF projects should be judged in the context of emission reductions. In some CDCF projects²⁴ while the community benefit plans have been successfully implemented, the projects have not generated the expected ERs committed in the ERPA. Thus it is important to maintain a balanced approach that can enable CDCF projects to generate “development plus” carbon credits.

Given that carbon finance is a relatively new instrument, the CDCF experience has essentially been a learning by doing experience. Moving forward, there are specific recommendations that need to be taken into account if and when a new tranche of CDCF is developed.

- (i) Greater emphasis needs to be placed on identifying projects with intrinsic benefits. Currently there is a large unmet need for carbon finance projects that address core development priorities in poor countries. However the current CDCF portfolio has fewer projects with intrinsic benefits as compared to projects with extrinsic benefits.²⁵
- (ii) The design of CBPs in projects with extrinsic benefits needs to be improved. While many projects with extrinsic benefits result in significant improvements in community welfare, the CBPs need to be designed in a manner that maximizes scale and sustainability and minimizes transaction costs. There are two options for achieving this: (a) Ensure that additional resources and partnerships are leveraged for CBPs. The premium for additional CBPs should be seen as incremental and catalyze investments from local partners. (b) Establish a grant window to provide additional resources if the size of the CBP is very small. The grant window can also be used to support capacity building initiatives for participatory community development.
- (iii) The consultation process for the CBP should be scheduled after project registration. To avoid financial risk and the risk of unduly raising community expectations, detailed consultations should be carried out when the project is ready to be implemented, and provisions to develop a satisfactory CBP should be included in the ERPA.

²⁴ For example, VSBK India, La Esperanza Honduras and Olavarria Landfill Argentina

²⁵ This can be attributed to both practical constraints on the ground and regulatory constraints.

The assessment also indicates that there are certain aspects of implementation that can be strengthened in order to enhance the effectiveness of CDCF projects. The key lessons that emerge from this assessment are:

The effectiveness of CDCF projects is maximized when there is a strong synergy between local development goals and achieving emission reductions. Projects that have intrinsic benefits such as the Nepal Biogas Project or the Moldova Biomass Heating and Energy Conservation Project not only generate significant emission reductions but have a very high impact in terms of improving the material welfare of communities and contributing towards long term development priorities. The scope and magnitude of community impacts in projects that have direct benefits are significantly higher as compared to projects with indirect benefits. At the same time, the transaction costs for delivering community benefits are much lower in such projects.

In the case of projects with extrinsic benefits, effectiveness is maximized when CBPs are integrated within a broader strategic planning framework. Leveraging external partnerships and additional resources are critical to ensuring scale and sustainability. The assessment highlights that the transaction costs of implementing additional CBPs in stand alone CDCF projects can be fairly high especially if they are designed in an ad-hoc and isolated fashion. Furthermore, the resources available through carbon revenues alone are often not enough to address critical community development issues. Thus embedding CBPs within a supporting policy and institutional framework is important to ensuring scale and sustainability in the delivery of community benefits. For example, in projects such as China Guangrun Hydropower project, community benefit investments are prioritized within the context of the local poverty alleviation program and are financed partially through the revenues of the county. Similarly in Argentina Olavarria, the local government's financial and institutional support has been critical to the successful implementation of the CBP as well as to ensuring post construction O&M.

The consultation process for designing CBPs needs to be more systematic and streamlined. Given the fact that many project sponsors have limited experience with participatory planning, the consultation process in some projects has been somewhat unsystematic. The consultation process for CBPs needs to not only be inclusive, but also feasible and realistic. For example, in the Peru Santa Rosa Small Hydro project, even though the level of community participation in designing the CBP was high, the CBP was not designed in a systematic manner and was not linked to cost estimates or timelines. Furthermore, the project sponsor did not receive any assistance from CDCF in developing the CBP. Another key issue that needs to be addressed in this context is that of timing. While the consultation for CBPs often takes place well before the formulation of the ERPA, in most projects implementation of CBP activities does not begin until the project is registered which is often a time consuming process. For example, in Kenya and Nigeria, communities have been waiting for more than 2 years for project activities to begin. The consultation for CBPs raises community expectations, and the delay in implementation often causes resentment in the community.

The flow of funds for implementing community benefit plans needs to be timelier. A challenge associated with effective implementation of CBPs is the flow of funds. In some projects, sponsors receive CBP resources as and when they generate verified ERs, and thus the flow of funds is sporadic. This creates a bottleneck for implementing CBP activities in a

1. Introduction

The Community Development Carbon Fund (CDCF) was created in March 2003 to extend the benefits of carbon finance to poor communities in developing countries. These communities would otherwise find it difficult to attract carbon finance due to the higher transaction costs and risks involved in delivering carbon from small scale projects. The Fund supports projects that measurably benefit poor communities and their local environment and generate verified Kyoto-compliant emission reductions under the Clean Development Mechanism (CDM).

The single overarching factor which differentiates this Fund from the other World Bank carbon funds is the generation of community benefits by the projects it finances. CDCF projects are an opportunity for small communities in poorer countries to obtain clean water, improve health conditions, create jobs as much as it is an investment in clean technologies that help reduce greenhouse gas emissions and mitigate climate change. The CDCF also emphasizes community dialogue and participation to ensure that individuals, community leaders, existing community organizations and local government officials agree on the benefits to be provided and the counterpart contributions required for both investment and recurrent costs.

Recently donors requested the Fund Management Unit (FMU) to commission an independent review to assess the Fund's performance on community benefits and sustainable development. This assessment not only focuses on documenting outcomes and processes, but also seeks to highlight good practice experience and lessons learned.

1. 1 Key features of the Community Development Carbon Fund (CDCF) Projects

The Fund is a public/private initiative designed in cooperation with the International Emissions Trading Association and the United Nations Framework Convention on Climate Change (UNFCCC). The first tranche of the CDCF is capitalized at \$128.6 million with 9 governments and 16 corporations/organizations participating in it and is closed to further subscriptions. Parallel resources from donors are mobilized to support technical assistance, capacity building, and project preparation in CDCF countries. The CDCF supports projects that combine community development attributes with emission reductions to create "development plus carbon" credits.

The two key eligibility criteria for CDCF projects are:

The CDCF will give preference to small scale projects that are compatible with the definition of "small-scale CDM project activities" in accordance with decision UNFCCC 17/CP.7 (see <http://unfccc.int/cdm/ssc.htm>). This decision defines small projects as: a) renewable energy project activities with a maximum output capacity equivalent of up to 15 megawatts (or an appropriate equivalent); b) energy efficiency improvement project activities which reduce energy consumption, on the supply and/or demand side, by up to the equivalent of 15 gigawatthours per year; or, c) other project activities that both reduce anthropogenic emissions by sources and that directly emit less than 15 kilotonnes of carbon dioxide equivalent annually. Decision 17/CP.7 also creates a non-exclusive list of 14 small-scale project categories and specifies simplified baseline and monitoring methodologies for each category.

4. Conclusions and Lessons Learned

Each project must lead to improvements in the material welfare of the community or communities involved in it. Benefits typically arise from the project itself and are part and parcel of a CDCF project: village or neighborhood electrification, improved air quality or increased employment and income. In some cases, where there are limited benefits or no identifiable benefits integral to the project, an additional benefits package may be put together. Examples of the types of goods and services which may be provided as additional benefits include electricity for schools, health clinics, workshops, potable water, teaching or medical services.

In many ways, CDCF projects can be seen as promoting a co-benefits approach to carbon finance in developing countries. A co-benefits approach to climate change mitigation aims to meet the development needs of poorer countries, while simultaneously reducing greenhouse gas (GHG) emissions. Co-benefits describe parallel or ancillary benefits (non-climate change benefits) of climate mitigation policy and are typically co-located with emission reductions. However these benefits could be direct or indirect. Key categories of co-benefits include: (i) Environmental and health co-benefits - Studies demonstrate that the most common benefits are in environmental and health interactions. (ii) Economic co-benefits such as reduced electricity/fuel costs and increased income generating opportunities due to increased reliability of energy provision, and increased employment. (iii) Social co-benefits such as building social capital and networks, creating greater social cohesion especially amongst communities with different ethnic groups, and generating income generation activities that contributes to the social and economic well being of communities. (iv) Developmental benefits such as rural electrification, reduced energy poverty etc.¹

Climate Mitigation with Development Dividends: Role of Carbon Finance

The World Bank Group's Approach to Climate Action is founded on its core mission of supporting economic growth and poverty reduction in developing countries, and emphasizes climate action with development co-benefits. In Sub-Saharan Africa, the World Bank's response to climate change is designed to support its overall development and business plan for the continent. For example, Africa has the lowest electrification rate of all regions with only about a quarter of households having access to electricity; improving access to affordable energy is a top priority. By taking advantage of mitigation opportunities and new technologies in these areas, African countries can further development while providing clean energy access to their populations.²

Carbon finance has a huge potential to contribute to development in poor countries especially Africa. While China continues to dominate the CDM primary market with 84% of the market share in 2008, number of new countries entered the CDM pipeline in 2008 and early 2009. Most of these were in Sub-Saharan Africa, including Tanzania and Senegal. However there is recognition that there is a significant need to deepen access to carbon markets in poor countries, and that smaller projects and aggregation opportunities are often bypassed. International agreements beyond 2012 will have to maximize the potential of carbon trading for enhancing development effectiveness and facilitating low carbon growth in poorer developing countries.³

Over the last few years, there has been a growing recognition of the importance of linking climate finance to the poverty reduction and development agenda. Thus one of the most significant contributions of CDCF projects is demonstrating the viability of such an approach by fulfilling a dual objective of achieving reductions in greenhouse gas emissions while at the same time generating significant socio-economic and environmental benefits for local communities in poor countries.

While many projects are still in early stages of implementation, the assessment demonstrates that CDCF projects contribute towards socially and environmentally sustainable development in multiple ways.

- *CDCF projects that focus on developing renewable energy provide a valuable opportunity to address energy poverty in developing countries.* Energy is one of the most critical ingredients of poverty reduction and economic development. It is considered essential for meeting the millennium development goals (MDGs). However, worldwide, 1.6 billion people still do not have access to electricity²¹. This energy deficit significantly constrains opportunities for economic development. Increasingly there is recognition that renewable energy options such as micro hydro or solar can play a crucial role in this context. Many CDCF projects such as the micro hydro projects in Nepal and Pakistan can be particularly appropriate for meeting the energy needs of developing countries. In rural areas, particularly in remote locations, transmission and distribution of energy generated from fossil fuels can be difficult and expensive. Producing renewable energy locally can thus offer a viable alternative.
- *CDCF projects can provide a range of important co-benefits such as improved health, environmental and economic outcomes at the local and household level.* Many recent studies demonstrate that installing energy efficient cook stoves, as in the case of the Nepal Biogas Project, provides a significant return on investment both in terms of environmental benefits and health benefits²². According to the World Health Organization, the use of traditional cook-stoves results in indoor air pollution that causes 1.6 million premature deaths each year, largely among women and children. It is a death toll almost as great as that caused by dirty water and poor sanitation, and greater than that caused by malaria.²³ The time taken to collect wood also has an opportunity cost in terms of education, economic activity, and child care, especially when unsustainable practices make wood scarce.
- *CDCF projects provide local stakeholders including poor communities an opportunity to participate in decision-making processes.* The assessment highlights most CDCF projects are developed in collaboration with a range of local stakeholders such as government agencies, private enterprises, non governmental organizations and most importantly local communities themselves. The collaboration of local stakeholders is a key factor in the success and sustainability of these projects. Even in projects promoted by private companies, the social development dimension has contributed to strengthening corporate social responsibility and is seen as a valuable approach to developing an effective relationship with local communities.

¹ Overseas Environmental Co-operation Unit Japan, 2008

² Development and Climate Change: A Strategic Framework for the World Bank Group, 2008

³ State and Trends of the Carbon Market, 2009; Carbon Markets for Development, Bali Breakfast 2008

²¹ World watch Institute, 2005

²² New York Times, 2009

²³ World Health Report, 2002

One of the key challenges is the high cost of the system. Given the level of poverty in many rural communities in Senegal, many households simply can not afford the costs. However some are able to pay for the costs through remittance from family abroad and those living in the capital city. The installation of CFLs is also expected to bring the costs down.

1.2 Scope and Methodology of the Assessment

The key objective of this assessment is to examine the performance of the CDCF portfolio with respect to the following.

1. Extent to which CDCF project measurably benefit poor communities and the local environment both at the level of immediate outputs and long-term outcomes.
2. Extent of community dialogue and participation in the design of community benefit plans, and in the implementation and monitoring of community benefits.
3. Extent of poverty targeting and social inclusion – the extent to which CDCF projects benefit the poor and vulnerable groups such as women, ethnic minorities etc.
4. Extent of sustainability and cost-effectiveness of community benefits
5. Lessons learned - which aspects of the project are working well and which aren't; what are some good practice principles that are emerging from the experience of CDCF projects; and what needs to be done to improve project design and implementation

In terms of methodology, the assessment used a combination of primary and secondary data and incorporates quantitative and qualitative information to the extent feasible. The two main components of the assessment are as follows.

- (i) Desk review – The desk review included the review of all 31 projects in the CDCF portfolio (the portfolio as of April 2009)⁴. The following documents were referenced as part of the document review: Emission Reduction Purchase Agreements (ERPAs), the Community Benefit Plans (CBPs), monitoring reports, and relevant studies and beneficiary surveys. The desk review included interviews with task managers, deal managers and other relevant staff in the Fund Management Unit (FMU).
- (ii) Field visits – A representative sample of 6 projects was chosen for field visits. As part of the field visit, the team visited different project sites, carried out key informant interviews with a range of stakeholders, and held focus group discussions with beneficiaries and community members. The field visits were documented as in-depth case studies.

There are some key caveats with respect to this assessment.

- Since many CDCF projects are still in early stages of implementation, the emphasis has been on assessing the effectiveness of the design and implementation processes associated with the delivery of community benefits.
- Another challenge has been collecting robust data on outcomes as only few of the projects reviewed had collected adequate outcome level information on community benefits.

Projects Reviewed

Desk Review	<ul style="list-style-type: none"> • 31 projects in the CDCF portfolio (See Annex A)
Field Visits	<ul style="list-style-type: none"> • Nepal Biogas • Nepal Micro-hydro • Peru Santa Rosa Small Hydro • Argentina Salta Landfill Gas Capture • Argentina Olavaria Landfill Gas Capture • Senegal Lighting Efficiency in Rural Electrification

⁴ As of June 1, 2009 there have been updates to the portfolio

2. The Fund's Performance on Community Benefits

2.1 Operational Structure of the Fund

The CDCF became operational in July 2003 and was instrumental in giving poorer countries the opportunity to develop small scale CDM projects. By virtue of the special advantage that the Parties to the UNFCCC have given small scale projects in the Marrakesh Accords of the Kyoto Protocol, such projects benefit from streamlined procedures and existing baseline methods pre-approved by the Executive Board (EB) of the CDM.

As of June 2009, the CDCF had signed 29 ERPAs for a total nominal value of US\$ 96.14 million and a potential value of US\$ 85.66 million (this reduced value takes into account a number of ERPA amendments under discussion). By 2010, it is expected that ERPAs for 6 new projects will be signed thereby fully committing the CDCF available capital of US\$99.56 million. The CDCF portfolio would have a risk adjusted ERPA value of US\$ 75.79 million with a un-delivery rate of about 25 %. Once the total available is fully committed, the Fund will still have an outstanding pipeline of 6 projects with a potential total ERPA value of about US\$ 27.9 million.

The total Emission Reduction (ER) volume corresponding to the CDCF portfolio amounts to 9,940,270 ERs. This includes the 29 projects with signed ERPAs with a total ER volume of 8,919,270 ERs, and the 6 new projects which would entail a contracted ER volume of 1,021,000 ERs. The risk adjusted values for ERs is expected to be about 6.6 million ERs.

As of June 9, 2009 the total value of monitored ERs amounts to 271,520 ERs, and the total value of issued CERs to 59,074 CERs.

Summary of the CDCF Portfolio

	No. of Projects	Potential ERPA Value (in USD million)	ER Volume
ERPA signed	29	85.66	8,919,270
ERPAs to be signed	6	13.75	1,029,000
Total CDCF portfolio	35	99.56	9,940,270
Risk adjusted (total committed)		75.79	6,580,955
Outstanding pipeline (Nb. Of projects)	6	27.86	2,142,890

2.2 Delivery of Community Benefits

All projects supported by the Fund benefit local communities either directly or indirectly. In case of direct benefits, the community benefits are integral to the project and the target community is readily identifiable. If there is no identifiable community integral to the project, the CDCF identifies and develops additional benefits in consultation with key stakeholders in the community. Such packages are financed by a price premium to cover the cost of the additional community benefits and an additional Community Benefits Plan (CPB) is prepared. This CBP is an integral part of the Emission Reduction Purchase Agreement (ERPA). Some projects have both direct and indirect benefits.

reduction on the pressure on fire wood used for lightning etc. One of its most significant impacts has been on improving the health conditions of both women and children in the households. Another major benefit is the significant reduction in the high cost of batteries, which has currently been reduced to zero. Access to electricity has prompted the village to have a primary school with high attendance and retention rates as children now have the opportunity to spend more time learning. Women also reported that access to lighting has increased their time for socialization and social networking in the evenings.

For over 60 years I have lived in this community without light, and we depended on the stars at night for light and sun in the day time. We could not do much to improve our economic activities and the lives of the children. But thanks to Allah we now have electricity and our children are in school, our health clinic is working and there is less illness in the village, our cattle are secure at night.

Chiekh Secka Chief of the Village

We used to have an old generator in the health clinic which was barely functioning, yet consuming gas at alarming high costs. Now with the solar power health has improved a lot, because I now have access to electricity 24 hrs a day, can receive patients anytime of the day or night, and can now sterilize equipment more efficiently. The savings we gained because we don't spend as much on gas is now used to buy health essentials for the community

Dr. Amadou Jaw

Have the beneficiaries themselves participated in identifying the community benefits, and subsequently monitoring the delivery of benefits?

ASER conducted a social mobilization and awareness campaign about solar energy, and the community members expressed interest in accessing the technology.

Does the project benefit the poor and the vulnerable?

Ndelle is a remote rural village located in the Fatick Region. It is 25 kilometers away from the road and is geographically isolated. It has a total population of 750 people and they live in extreme poverty. The per capita income is less than \$1.50 a day and they mostly depend on agricultural production for their livelihood. With the recent increase in drought, food insecurity and limited access to water have become major challenges in the community. The nearest water point is 4-5 kilometers away from the village, and often girl children are responsible for fetching water for domestic and productive work.

Are the benefits sustainable?

Sustainability of the projects appears to be high because the solar panels typically have a long life span. However the tariffs for solar power appear to be quite high for the poor communities. For example, a solar panel with 14 bulbs costs CFA 100,000 - this panel produces the highest quantity of energy and has the capacity to provide electricity for both domestic and productive activities. However other solar panels with 7 or 4 bulbs are available at a much lower price of CFA37, 000 and CFA 24,000 respectively.

What are the key implementation successes and challenges?

The success of this program is that it has enabled quite a significant number of rural communities to have access to electricity. As a result of this program, the percentage of rural households that have access to electricity has gone up from 6% to 20%. This has significantly impacted the well-being and living conditions of many rural households.

Are the benefits sustainable?

Sustainability of the projects appears to be high because of strong municipal support. The tariff for the water services is affordable for most residents (the residents now have to pay about 35 pesos every 2 months for the water) and water quality is checked once a month by a municipal engineer.

What are the key implementation successes and challenges?

The community development component is considered to be the most successful aspect of this project by the Municipality. The sustainability of the community benefits is enhanced by the fact that it is embedded within a larger municipal program. However it has to be noted that while the CBP has been fully implemented, the project has not generated the expected ERs committed in the ERPA.

3.6 Senegal Rural Area Energy Efficient Lighting Program

Project Description

The purpose of this project is to promote energy efficient lighting in newly electrified households and buildings located in the villages included in this concession for rural electrification. The project is being implemented by Agence Senegalaise d’Electrification Rurale (ASER) which is an autonomous public entity created in 1998 under Senegal’s electricity Reform Law 98-29, and it will coordinate and monitor the implementation of a nation-wide rural electrification plan¹⁹ which includes 12 geographical concessions covering the country’s entire territory. The selected concessionaire will install Compact Fluorescent Light bulbs (CFLs) instead of Incandescent Light Bulbs (ILBs) in newly electrified households and buildings. While the project is under implementation, activities under the CDM financed CFL component are yet to be started.²⁰

In Senegal, more than 50% of the 12 million country’s inhabitants live in rural areas. It is estimated that less than 9% of the villages in Senegal are electrified, and in these villages less than 30 % of the population have access to electricity. For their basic energy needs (such as cooking, lighting, and primary transformation of crops), these populations depend on fuel-wood for cooking, kerosene lamps and some small batteries for lighting. Human force, frequently from women, is the primary source of energy for domestic and productive tasks. Traditional fuels are of poor quality, and kerosene and batteries are expensive financially, damage people’s health and have a negative impact on the local and global environment.

The analysis included site visit to Ndelle community in Fatick Region where focus group discussions and semi-structured interviews were carried out with men and women from the community. Discussions were also held with the staff and patients in the health clinic. Key questions addressed were as follows.

To what extent does the project benefit local communities?

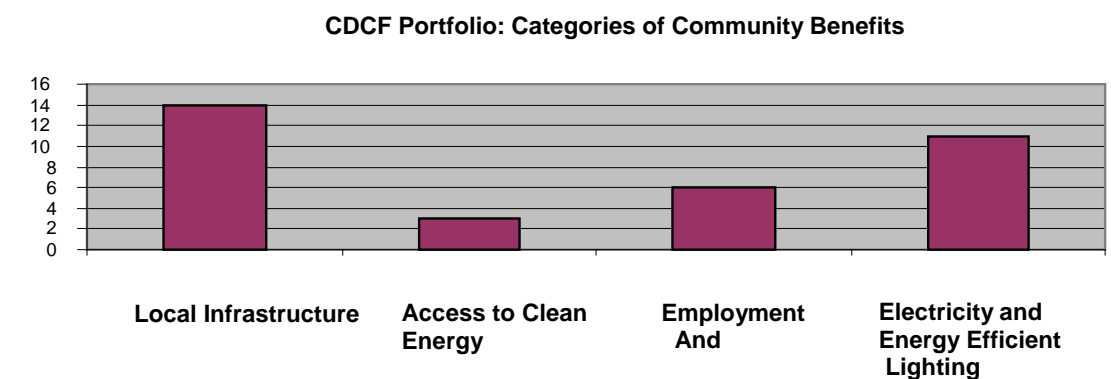
The project has intrinsic community benefits. Solar electrification is provided to rural households as well as to primary schools and local health clinics. Access to electricity results in a significant improvement in the living conditions in the communities through reduction in indoor pollution; increase in safety by reducing the incidence of theft and night aggressions;

¹⁹ PPER : Programme Prioritaire d’Electrification Rurale

²⁰ The analysis focuses on the broader rural electrification program because the CFL installation has yet to begin

The CDCF portfolio currently has 19 projects with indirect benefits, 10 projects with direct benefits, and 2 projects which provide both direct and indirect benefits. The price premium for additional CBPs typically ranges from 50 cents to 1 USD per ER, and the overall CBP budget ranges from approximately USD 40,000 to USD 1,145,000 depending on the volume of ERs generated and amount of co-financing leveraged. The average CBP budget is approximately 260,000 USD. As mentioned earlier, many projects are in early stages of implementation and currently only 11 projects have begun implementation of community benefits, and 4 projects have completed and delivered the community benefits identified in the ERPA.

While the community benefits provided by CDCF projects often include a range of activities, the key community benefit deliverables in CDCF projects can be categorized as follows: (i) improving local infrastructure; (ii) improving access to energy for heating and/or cooking; (iii) improving livelihood and employment opportunities; and (iv)improving access to electricity and/or energy efficient lighting.



The graph above captures the distribution of community benefits as per the number of projects. However in terms of number of beneficiaries, access to clean energy and access to electricity or energy efficient lighting are the dominant categories of community benefits as they are associated with projects with direct benefits.

Improving local infrastructure

There are a total of 14 projects in the CDCF portfolio that provide community benefits geared towards improving local infrastructure. This includes a range of activities such as construction of sewage facilities, potable water connections, construction and rehabilitation of local roads, renovations to local schools and health clinics, construction or rehabilitation of parks, community centers etc. The Olkarria, Kiambere and Tana projects in Kenya and the Aba Cogeneration project in Nigeria are some of the more ambitious projects in terms of scope of activities and available budget.⁵

Field visits highlighted that these improvements in local infrastructure have had significant welfare implications for the community. Some of the visible results are as follows:

⁵ All of these projects are yet to begin implementation as they are facing delays in implementation which may lead to a reduction of the emissions reductions volume and consequently of the CBP budget.

- In the China Guangrun Hydropower project, the CBP consists of 17 projects covering 9 villages in Yezheo Township, Jainshi County. This includes the construction of local roads, construction of drinking water facilities, and construction of a primary school and a health clinic, and an ethnic minorities' cultural preservation center. All project activities have been completed and are fully functional. The school has 7 classrooms and serves 156 students. The clinic provides free medical services to about 3,200 people (870 households). The clinic has three doctors to provide services for 10 to 12 hours during the day time.
- In the Argentina Olavarria Landfill Gas Capture project, the CBP has resulted in the provision of potable water connections to 160 households and installation of a solar panel in the local hospital. Access to potable water has significantly reduced the incidence of water borne disease among local residents.
- In the Peru Santa Rosa Small Hydro project, the CBP has resulted in the construction of a computer laboratory in the local school. The computer lab has benefited approximately 500 students. Not only do students of all grades use the computer lab, the computer lab also offers classes in the weekends and evenings for adults.

It is important to note that both in the China Guangrun Hydropower project and the Argentina Olavarria Landfill Gas Capture project, the project sponsor pre-financed the CBPs before ER revenues were available

Improving access to energy for cooking or heating

3 projects in the CDCF portfolio focus on the provision of cleaner energy for cooking and heating. This includes the Nepal Biogas project, the China Hubei Ecofarming Biogas Project and the Moldova Biomass Heating and Energy Conservation project – all of which have direct community benefits. The Nepal Biogas project has so far installed 19,396 biogas plants in the country. The Moldova Biomass Heating and Energy Conservation project has installed 200 boilers in schools, hospitals and kindergartens across 13 municipalities.

Studies as well as independent field visits confirm that these projects have had a significant welfare impact on target communities.

- In rural Nepal, fuel wood, biomass (agriculture residue, dung cake) and fossil fuels (such as kerosene and coal) are traditional sources of energy that are primarily used for cooking and heating purposes. The installation of biogas plant has overwhelmingly reduced the expenditure of the user households on fuel purchase. They have been able to save Rs. 1,395 per month which accounts to yearly saving of Rs. 16,749, thus helping them to improve economic wellbeing. Other impacts include:
 - A total of 89.4% of sampled household reported reduction of kitchen smoke after biogas use. This has led to an improvement in health outcomes especially for women.
 - Substantial amount of time has been saved by women in various activities like firewood collection/dung cake preparation, cooking food and cleaning utensils indicating that the technology has benefited the users.
 - After the installation of biogas plants, use of traditional farm yard manure (FYM) has completely stopped in the plains and substantially reduced in the

project aims to capture and destroy the landfill gases through flaring at Olavarria's sanitary landfill where the town's solid waste is disposed. An active collection system has been installed at the landfill, consisting of gas extraction wells, collection piping, mechanical blowers, landfill gas condensate and flare systems, as well as a monitoring and control system. The resulting reductions in landfill gas emissions, a total of 131,000 tons, will be sold to the CDCF.

A community benefits plan additional to the main project was prepared. The municipality of Olavarria contributed its own resources towards this plan. The objective of the plan was to improve the infrastructure in a rural community within the jurisdiction of the Municipality focusing on the installation of a water distribution network and solar water heating systems. All the CBP activities have been completed.

The analysis included site visit to Espigas where semi-structured interviews were carried out with the residents. Discussions were also held with the Municipality officials and representatives from the University of Olavarria who provided overall guidance for the project. Key questions addressed were as follows

To what extent does the project benefit local communities?

The project has indirect benefits geared towards improving local infrastructure in Espigas – a rural community 108 km from the city of Olavarria. The Community benefit plan has been fully implemented. 160 households have connections to potable water. Earlier the water was dirty and caused health problems, community members also save time and money as previously they had to buy drinking water from the city. A solar panel has also been installed in the local hospital which provides heating for the water. The hospital has 32 residents most of whom are elderly. Overall beneficiary satisfaction with the project was very high.

“Earlier the water would be brown and children would get a lot of stomach related diseases. Now water borne health problems have decreased significantly after we got drinking water in our village.”

Doctor at local health clinic in Espigas

Have the beneficiaries themselves participated in identifying the community benefits, and subsequently monitoring the delivery of benefits?

A series of consultations were carried out with local community leaders for designing the CBP and the provision of potable water in Espigas was found to be the most pressing need. However the CBP was essentially an extension of an ongoing program of the Municipality to install potable water connections. As a result the design of the CBP was not based on direct community participation.

Does the project benefit the poor and the vulnerable?

Espigas is a middle income rural community with 550 residents. The village has access to basic services such as electricity from the grid, a municipal public hospital, a kindergarten, an elementary school and a high school with 119 students. It has also has a special school for handicapped children. The main economic activities of the village are farming, dairying, and cattle ranching.

discharge. Given the fact that implementation has not begun; it is too early to say the extent to which the project benefits local communities.

Have the beneficiaries themselves participated in identifying the community benefits, and subsequently monitoring the delivery of benefits?

A series of consultations were carried out with the local community for designing the community benefit plan (CBP) and the CBP broadly responded to the needs of the beneficiaries. However the site visit highlighted that the level of community participation was not very high. Most people were not aware of the specifics of the CBP. Furthermore, the consultation process for the CBP was not deep enough and therefore did not address the core issues of structural poverty and livelihood insecurity that affected the beneficiaries.

Does the project benefit the poor and the vulnerable?

The project is geared towards the poorest and the most vulnerable as defined by the Bank.

There are currently 141 full time workers and 300 part time workers in the landfill site and most of the workers are women. They primarily collect plastic, paper and metal. Most of the workers live in the barrios adjacent to the landfill site – and while all the barrios have access to a health center, primary school, electricity, drinking water and transportation, there is a high level of structural poverty, conflict and gender violence in these communities. A key issue is the low price of waste which has fallen significantly due to the global economic downturn.



Group discussions with waste pickers in Salta

“The money we make from waste picking is not enough to support our families. We work 13-14 hours a day and then only earn 500 or 600 pesos a month”
Waste picker at Salta Landfill

What are the key implementation successes and challenges?

One of the main challenges in this project has been that the CBP was designed in a stand alone manner, and no attempt was made to leverage additional resources and/or partnerships. As a result the CBP resulted in a very narrow set of activities that did not address the key challenges facing the community. However at the meeting with the Municipality during the field visit, the Deputy Mayor expressed an interest in expanding the social dimension of the project. The Municipality expressed a willingness to invest their own money for the CBP activities. The municipality would like to explore the possibility of using the CDCF community benefit resources for setting up a micro-enterprise / micro-credit program in the community in order to enhance income generating opportunities for the community.

3.5 Argentina Olavarria – Landfill Gas Capture Project

Project Description

The town of Olavarria with a population of about 100,000 is located in the province of Buenos Aires, 350 kilometers southwest of the capital city Buenos Aires in Argentina. This

hilly areas, and the use of organic residues for composting has increased from 4.6% to 86.2% after installation of biogas plants.⁶

- 96% of biogas users also installed latrines which have improved overall sanitation.
- In Moldova, the quality of community infrastructure had deteriorated severely in the last ten years to the extent that some of it was largely dysfunctional. Most public building such as schools and hospitals were supplied with heat from inefficient and outdated boilers. Through the Moldova Biomass Heating and Energy Conservation project, energy efficient coal and gas boilers were installed in communities.⁷ This resulted in increasing the heating period in building and increasing of the heating level comfort. The heating period in winter was increased from 2100 hours to 3300 hours. Greater thermal comfort has improved attendance in schools. Other impacts include:
 - The installation of energy efficient boilers also reduced respiratory diseases and improved local air quality due to a reduction in noxious fumes and GHG gases from inefficient boilers. In the beneficiary survey, school children mentioned that the snow around school was white whereas before the project it was black due to the soot.
 - The new boilers decreased consumption and expenditure on fossil fuels such as coal and gas - For coal the expenditure level was reduced: from 44,8 USD/Gcal⁸ to 20,8 USD/Gcal and for gas from 22,3 USD /Gcal to 20 USD/Gcal.⁹

Improving employment and livelihood opportunities

6 projects in the CDCF portfolio focus on employment creation and livelihood security as the primary community benefits. For example, the CDCF projects in Columbia¹⁰ and Guyana which focus on emission reductions in the sugar sector will provide a range of direct and indirect livelihood related benefits. In both countries, the sugar sector employs a significant percentage of the rural labor force and the projects will result in benefits such as increased income of small family-owned farms through increases in land productivity; job creation in the sugar industry; training for local farmers, etc. In CDCF projects such as the India FAL-G Brick and Argentina Salta Landfill Gas Capture the emphasis has been on improving the quality of working conditions for the informal laborers who typically work in these industries. In addition to projects which focus primarily on employment creation, almost all CDCF projects have some impact on employment creation at the local level as the construction and operation and maintenance of CDCF projects often entails the hiring of community residents.

Some of the visible results are as follows:

- The India FAL-G project provides stable year round work and health and accident insurance to brick workers. Interactions with entrepreneurs indicated that Fal-G units

⁶ Nepal Biogas Users Survey, 2008

⁷ In Moldova the project was not able to install any biomass boilers as envisaged because there was a lack of awareness about the technology, the upfront investment costs were higher as compared to other technologies, and communities were reluctant to adopt what was considered by them to be a “backward” technology. The project therefore focused on its energy efficiency component.

⁸ Gcal is a unit for measuring heat energy

⁹ Aide Memoire, 2008

¹⁰ There is a likelihood that the projects in Columbia may be terminated, in which case they would not have generated any ERs.

typically operate for about 250 to 300 days in a year, which is substantially more than the clay brick industry. (Though systematic tracking was not done by the project sponsor.) The project has also provided health and accident coverage of Rs 100,000 (2000 USD) per worker for a total of 338 workers. 13 HIV/AIDS awareness workshops for workers were also organized.

- In the Moldova Biomass Heating and Energy Conservation project, approximately 100 new jobs were created in district heating enterprise operations.

Improving access to electricity and energy efficient lighting

11 projects in the CDCF portfolio focus on the provision of electricity or energy efficient lighting as one of the primary community benefits. Typically, these projects provide intrinsic or direct community benefits. This includes projects such as Nepal Micro Hydro, Pakistan Renewable Energy, and Bangladesh Grameen and Bangladesh IDCOL which cumulatively aim to provide electricity to 249,881 households. There are also some projects that include electricity provision as part of the additional community benefit plan such as Nigeria Aba which seeks to provide electricity to approximately 5000 households in the community.

The CDCF portfolio also includes energy efficient lighting programs such as the Rural Area Energy Efficient Lighting Program in Senegal that will provide affordable access to power for Senegal’s rural communities—the equivalent of about 365,000 rural households within five years. The energy efficient lighting programs focus on the installation of compact fluorescent lamps (CFL) instead of incandescent light bulbs. These energy efficient light bulbs can work up to five or six times longer than a conventional light bulb and result in savings for households on their power bills because these new bulbs use much less electricity than an ordinary light bulb.

Some of the visible results are as follows:

- 55 households in Santa Anita and 450 people in San Fernando in Honduras have received access to electricity through the Honduras La Esperanza project.
- 31 micro-hydro plants have already been commissioned in the Pakistan Community Managed Renewable Energy Project and 41 plants have been commissioned in Nepal. The provision of electricity not only replaces the use of fossil fuels such as kerosene and diesel which are traditionally used in rural areas for lighting, but also has downstream impacts such as reduction in expenditures on kerosene and improvement in economic activity.
- Some of the measurable impact indicators from the Microhydro Project in Nepal are¹¹:
 - On average, kerosene consumption has reduced significantly (82.4%) which accounts to monthly saving of 3.32 lits/HH/month. Similarly reduction in candle by 75.7%, dry cell by 61.5% and fuel wood by 8.6% are observed.
 - Access to electricity has spurred economic activity. One of the most noticeable impacts has been in agro-processing which previously relied on mechanical power. Electricity has decreased the processing cost - farmers are saving Rs. 0.66 in rice huller, Rs. 0.31 in grinder and Rs. 0.67 in oil expeller after installation of the micro-hydro plant.
 - Reduction in indoor pollution – respiratory diseases and eye infections. A total of 88% of sampled household reported reduction of smoke in house after micro hydro installation

¹¹ Nepal Microhydro Users Survey, 2008

Are the benefits sustainable?

Sustainability of the project appears to be high because of the high level of community ownership. The project sponsor has also committed funds towards ensuring the operation and maintenance of the computer lab.

What are the key implementation successes and challenges?

One of the main challenges in this project has been that the CBP was designed in a manner that was not very systematic. Even though community participation was high, the CBP was not anchored in realistic cost estimates and timelines. There was also a discrepancy between the CBP in the ERPA and the activities identified in the act that was signed between the project sponsor and the community. Another challenge has been that the flow of funds is not timely and is causing a considerable delay in the implementation of CBP activities. This situation has also contributed towards creating some frustration among community members whose expectations had been raised during the consultation and planning process. The most successful aspect of the project has been the strong relationship between the project sponsor and the community. While this was the project sponsor’s first experience with community development, the company is committed to corporate social responsibility. They have now hired a full time social mobilization expert to manage community development initiatives in their other projects.

“Through this project I have learned the importance of having good relations with the community. Some other companies in this area are now following our example, and trying to give back to the community.”

Guillermo Cox, Director GCZ Ingenrios

3.4 Argentina Salta: Landfill Gas Capture Project

Project Description

The main objective of the project activity is to reduce greenhouse gas (GHG) emissions from the sanitary landfill of the city of Salta, Argentina. The project activity involves the capture of the landfill gas generated at Salta’s municipal landfill and the destruction by flaring of the methane contained in the landfill gas. The project will displace 210,900 tons of carbon dioxide equivalent (tCO₂e) into the atmosphere over 21 years, starting in 2008. The project will be administered by the Municipality of Salta to improve landfill operation and overall waste management for the city.

A community benefits plan additional to the main project was prepared. The objective of the plan is to improve the infrastructure and working conditions for waste pickers who are involved in separating, classifying, storing, and recycling inorganic components of municipal waste before it is taken to the landfill. The project was registered in March 2009, and implementation of CBP activities is yet to begin.

The analysis included site visit to Salta where semi-structured interviews were carried out with waste pickers. Discussions were also held with the project sponsor i.e. the Municipality of Salta. Key questions addressed were as follows.

To what extent does the project benefit local communities?

The project has indirect benefits geared towards improving livelihood opportunities and working conditions of waste pickers at the Salta landfill. Key deliverables include shelter for worker; paper compactor room; multiuse room and kitchen; toilets; and yard for waste

has hired a teacher for the computer lab. The computer lab also offers classes in the weekend and evenings for adults. The beneficiaries expressed a high level of satisfaction with the project.

“Enrollment in the school has increased because of the computer lab. Many parents are bringing their children to this school because other schools don’t have computers. Before we had this computer lab, many people didn’t even know what a computer was – this is the only place that has computers in this community. Now we need internet. “

President of the Parent Teacher Association – La Merced.



Students at the Computer Lab in La Merced

The community members were eager to begin implementation of the other CBP activities. A major concern for them was the lack of adequate classroom space in the school - currently students from different grades are forced to share classrooms. However the project sponsor highlighted the fact that the flow of funds for CBP was not timely, and this was creating a considerable delay in implementing the other CBP activities.

Have the beneficiaries themselves participated in identifying the community benefits, and subsequently monitoring the delivery of benefits?

The site visit highlighted that the level of community participation was quite high. The consultation process for the CBP resulted in activities that closely reflected the community’s priorities. A meeting was held with various representatives of La Merced, in order to decide on the components comprising the community benefits plan. A representative of the Peruvian DNA was present at the meeting. The community subsequently signed an agreement/act with the Project Sponsor which not only outlines the commitments of the project sponsor but also of the community. For instance, the community took on responsibility for establishing parks and building the school fence. The community was also very active in the construction of the computer lab, and members of the PTA contributed labor towards it.

Does the project benefit the poor and the vulnerable?

La Merced is a community in the Santa Rosa Irrigation valley where most residents are agricultural workers with limited formal education and low income levels. The community has access to basic services such as electricity, water and health services, and is not a community that is defined as “poor” in the context of Peru. However the benefits identified in the CBP are geared towards the vulnerable. For example, the orphanage that receives free electricity hosts children who have been abandoned due to poverty or come from abusive homes. Similarly, the local government school lacks the infrastructure conducive to effective learning such as adequate classroom space.

- There is a greater use of electrical appliances such as television and radio.
- Focus group discussions with beneficiaries of the micro hydro project highlighted that one of the most significant impacts of access to electricity for lighting has been that students are now able to study in the evenings which has improved learning outcomes.

It is important to note that the 4 key categories of community benefits described above do not capture all the activities that are included in the CBPs. Some projects focus on developing social programs such as HIV/AIDS programs for at risk youth, or activities such as institutional strengthening and capacity building as in the case of the Philippines Laguna deBay project.

2.3 Community Dialogue and Participation

While the specific requirements for community participation and consultation depends on the type of community benefit, all CDCF projects involve the communities in identifying the benefits and establishing partnerships with representative community organizations or local government entities.

Community participation in CDCF projects which have direct benefits

The level of community dialogue and participation is very high in projects that are embedded in ongoing programs that are themselves based on principles of community empowerment. This includes projects such as the Moldova Biomass Heating and Energy Conservation project, the Nepal Micro-hydro project and the Pakistan Renewable Energy project. In these projects, communities are expected to participate intensively in all stages of the project – they are involved in planning and prioritizing sub-project investments, contributing towards the costs of the investment, supervising the construction, and operating and maintaining the sub-project. Thus these programs give community groups substantial control over planning and investment decisions.

Good Practice Example: Pakistan Community Based Renewable Energy Development

In Pakistan, the program builds on the previous successes achieved by the Aga Khan Rural Support Program, (AKRSP) in micro-hydro development. Individual project development is done through a three-part dialogue process with the local communities for project identification, mobilization and implementation. In the First Dialogue, communities are briefed about the nature of the hydropower project, the intended outcomes and mutual obligations between AKRSP and the communities. It is the policy of AKRSP that at least 75 percent of the member households of the community must show their support for the project before qualifying for technical and financial assistance. Once there is initial agreement, technical staff of AKRSP work with the community representatives to assess the available water resources, survey potential sites and prepare cost estimates as part of the full feasibility study. Survey results and cost estimates are presented to the full meeting of the Village Organization (VOs) as the Second Dialogue, and detailed terms of partnership are discussed, and agreement reached. Following this a general meeting of the beneficiary community will be called upon in the village premises to initiate the project (Third Dialogue). Once the micro-hydro plant is constructed, the community in charge of the installed unit collects revenues to service debt and cover operations and maintenance costs by selling electricity to participating households.¹³

¹³ ERPA, Pakistan Community Based Renewable Energy Development

In the case of CDCF projects such as Nepal Biogas, Bangladesh Solar IDCOL and Bangladesh Solar Grameen, there is no active community mobilization as these programs operate on commercial market oriented principles. However due to the demand driven nature of these projects, households have complete control over decision making. Extensive social mobilization campaigns and information about the use of biogas plants and solar plants are conducted by the entrepreneurs working with the community to promote the use of biogas and/or solar power. Furthermore, capacity building and training programs are delivered to end users to maximize the use of the plant and to operate and maintain it.

Community participation in CDCF projects with indirect benefits

In projects with indirect benefits which are required to prepare an additional CBP, the participatory process tends to be stronger when the consultation process involves a range of key stakeholders including local governments. For example in the China Guangrun Hydro Project, the project sponsor i.e. the Guangrun Power Company and the local county played a key role in the process and provided significant financial resources towards the CBP. The CBP was designed and implemented by the Yezhou Township Government and Jianshi County Religious Affairs Bureau, and the criteria and processes applied under the local government’s poverty alleviation program were applied to the prioritization of CBP investments. Similarly, the consultation process for the Wastewater Treatment project in Rio Frio Columbia was based on a close partnership with the neighboring Municipality of Giron. The CBP was designed to complement the Municipality’s investments towards rehabilitating city infrastructure after it had been damaged in floods in 2005.

Good practice example: Thailand Livestock Waste Management

The target community was identified through a combination of income and non-income based poverty criteria. The Moo 10 in Koh Chan District of Chonburi province was identified as the community to receive support under the CBP as it fell below the poverty threshold of 10,000 baht per year, and lacked many essential economic infrastructure and social services that existed in other communities such as schools, health center, and convenient access to markets. Rapid social assessment in Moo 10 also revealed the declining trends in villagers’ household agricultural earnings. During the consultation process, numerous meetings were held with relevant government officials and with villagers. A town hall meeting where local government officials and villagers participated was also held to relay information about this project and discuss community’s priorities. To ensure the quality of participation and inclusiveness of the consultation process, the focus groups meetings were held with various social groups, particularly targeting marginalized groups such as women, youth, and elders. Meetings were also held with the poorest households in the community. The recommended activities to be supported under the CBP focused on the following: (i) installing lighting on roads and small pathways for safety of traveling at night; (ii) improving access to safe drinking water; (iii) provision of scholarship for poor students; (iv) provision of mosquito spraying; (v) providing working capital for community cooperative shop; and (vi) capacity building and projects piloting for sufficiency economy practices. The final CBP not only reflected community priorities but is linked to cost estimates and timelines.¹⁴

In some projects, however, the consultation process for designing the CBP appears to be somewhat shallow and ad-hoc. For example, in the Argentina Salta Landfill Gas Capture project, field visits highlighted that the target community i.e. the landfill workers did not

¹⁴ Consultation report

agriculture and the majority of the residents belong to the disadvantaged caste groups such as Tamang and Gurung. In both communities all households including the poorest were benefiting from the project.

Are the benefits sustainable?

Sustainability of the projects appears to be high because of the high level of community ownership. A community committee is responsible for the management of the MHPs – establishing tariffs, collecting fees etc. Both the MHPs had operators who were paid from the revenue collected through user fees. The operators were responsible for running the plants and minor repairs.

What are the key implementation successes and challenges?

The remoteness of the communities makes this a challenging program to implement but both the communities and the program staff have a very high level of commitment towards this program. The program also demonstrates the importance of having a strong enabling environment. The government of Nepal has a nation wide program for promoting renewable energy with offices at the district level, and the success of the program is partly due to the supporting institutional environment.

3.3 Peru Santa Rosa Small Hydro Project

Project Description

The 4.1 MW Santa Rosa Hydroelectric Project, which uses the existing irrigation infrastructure as its source of water flow, is a milestone for Peru as it is the first small-scale CDM project to be developed in that country. The project is a bundle of small run-of-river hydropower plants located in the Santa Rosa Irrigation area of Sayán District. The project will help the national grid reduce the use of thermal plants and will displace expensive heavy fuel-diesel, coal, and gas-fired generation. The CDCF will purchase 88,000 tCO₂e from the project with an option to purchase an additional 62,000 tons.

The project sponsor is a private company GCZ Ingenieros. The Santa Rosa Irrigation canal is more than 35 km long and passes through various towns and villages in its run (e.g., Sayán, Andahuasi and La Merced), where communities are agriculturally dependent. A community benefits plan additional to the main project was prepared at the initiative of the CDCF. Representatives from the village of La Merced were consulted in determining what would be the most desirable community benefits. Two small hydro plants (1.1 MW and 1.7 MW) have been constructed in Santa Rosa. The hydro plants are full functioning and generating ERs, and the CBP has been partially completed

The analysis included site visit to La Merced where semi-structured interviews were carried out with community members including the Parents Teacher Association at the local school. Discussions were also held with the project sponsor. Key questions addressed were as follows.

To what extent does the project benefit local communities?

The project has indirect community benefits which focuses primarily on upgrading the infrastructure at the local school in La Merced. So far the project sponsor has implemented two of the activities identified in the CBP - free electricity to the local orphanage, and provision of a computer lab with 14 computers and furniture for the local school. The school has a population of 500 students. Students of all grades use the computer lab and the school

To what extent does the project benefit local communities?

The project has intrinsic benefits and the welfare impact on local communities is very apparent. Off grid power generated through the MHPs provide large number of rural households with electricity for lighting, milling and other needs. In Lukla, 200 households were provided electricity connections and in Tistung 160 households were provided electricity connections through the MHPs. The primary benefit has been access to household lighting - all households in the above communities have been electrified and use the electricity for lighting purposes. Some households had installed radios and televisions. Other benefits include reduction of expenditure on kerosene, diesel and batteries, and enhancement of income generating opportunities. With more reliable supply of energy, small businesses such as milling units, tailoring shops, and bakeries have expanded. The level of overall beneficiary satisfaction was very high, and most people interviewed stated that electricity had made a dramatic difference to their lives.

“I previously used a petro-max (kerosene lamp) for lighting purposes but now I have electricity for lighting. I have 3 bulbs, a TV and also use an electric sewing machine now. My productivity has doubled using the machine and my work hours have extended due to the availability of good light.”

Owner of tailoring shop in Lukla

“One of the biggest differences I notice after getting electricity in our village is that children can now study in the evening and do their homework. Because we have electricity, we can also run adult education classes in the primary school at night.”

School teacher in Tistung.”

Have the beneficiaries themselves participated in identifying the community benefits, and subsequently monitoring the delivery of benefits?

The level of community participation in this project is very high as the entire process is a bottom up and demand driven one. The community was involved in decision-making in all phases – planning, construction and operation and maintenance. Extent of community mobilization tends to be higher in REDP plants as compared to ESAP plants as a result of REDP’s implementation modalities. The REDP community mobilization process ensures the participation of one female and one male from each household in all activities such as planning, implementation, capacity building, organization development and decision making. Key stakeholders of the program are the community, elected bodies such as Districts Development committees (DDD) and, Village Development Committees (VDCs.). In both the communities visited, the members from the community initiated the idea of installing MHPs. They collected community contributions according to the income level and capacity of different households – households that were unable to contribute financially contributed through voluntary labor. Communities were also responsible for setting tariffs and operation and maintenance. In addition, the communities provide feedback on the benefits through an annual household survey.

Does the project benefit the poor and the vulnerable?

The micro-hydro sites are located in remote and rural communities that do not have access to basic infrastructure services such as electricity, roads etc. However some districts and villages are economically better off. In Lukla which is the entry point to treks to Mt Everest the main occupation is tourism, and average household income is high. However Tistung by comparison is among the poorest villages in Nepal where most people rely on subsistence

have a high level of awareness regarding the CBP. The activities included in the CBP while relevant were not addressing the core issues of structural poverty that underpinned the problems in the community. Furthermore, no attempt was made to leverage additional resources and partnerships for the CBP.¹⁵ Similarly, in the Honduras La Esperanza Hydro project, supervision missions revealed that while the implementation of the CBP was successful to some extent, the plan was implemented in ad hoc bases without any systematic consultation process which resulted in misperceptions about the project in some communities surrounding the project site.

Community participation in monitoring and evaluating of benefits

While in most CDCF projects this aspect is too early to assess, the extent to which communities themselves participate in monitoring and evaluating the delivery of benefits appears to be limited especially in projects with indirect benefits. While all CDCF projects are required to have progress reports for CBPs, in many of the projects, there are no systematic monitoring and evaluation (M&E) mechanisms in place which provide an opportunity for communities to participate in monitoring the delivery of the benefits.

2.4 Poverty Targeting and Social Inclusion

Currently 50% of the projects are targeted toward CDCF priority countries. These are defined as (i) World Bank's International Development Association (IDA) list of countries; (ii) countries commonly referred to as "IDA blend" with a population of less than 75 million; or (iii) countries designated as Least Developed Countries (LDCs) by the United Nations. Of this almost half the projects are located in Africa. However the extent of poverty targeting within CDCF projects varies and often depends on the measures used to define poverty. The World Bank defines absolute poverty as anyone living on less than \$1.25/day in the countries eligible for support by IDA and less than \$2/day in countries supported by International Bank for Reconstruction and Development (IBRD).¹⁶ Other proxy measures such as consumption of calories and access to basic services such as health care, education, and clean drinking water are commonly used to estimate poverty. Since household level poverty data is not available, the extent to which CDCF projects are successful in reaching the poor as defined by the World Bank is difficult to assess. However if proxy measures such as access to basic services or average per capita income are considered, most CDCF projects visibly benefit poor communities.

Most of the projects are targeted towards communities that lack essential services such as electricity or basic health care and where the per capita income is below the relative poverty line. In some of the projects reviewed as in the case of Moldova, Peru and Argentina the target communities have access to basic services but quality of social services available is usually very poor. In some projects such as the Argentina Salta Landfill project and India FAL G project, the CBP is explicitly geared towards groups that face high levels of structural poverty such as waste pickers and brick workers. Only one project – Argentina Olavarria –

¹⁵ However during the field visit, the CDCF team had very productive discussions with the municipality. The Municipality expressed a strong interest in expanding the social dimension of the project. They were willing to invest their own money for the committed CBP activities. The municipality also expressed an interest in exploring the possibility of using the CDCF community benefit resources for setting up a micro-enterprise / micro-credit program in the community

¹⁶<http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTPOVERTY/EXTPA/0,,contentMDK:20153855~menuPK:435040~pagePK:148956~piPK:216618~theSitePK:430367,00.html>

benefits a community that, with an average per capita income of around \$1500/year is above the Bank definition of relative poverty.

Poverty profile of Umuojima Ogbu – the targeted beneficiary community for the Nigeria Aba Cogeneration Project

Umuojima Ogbu is a community of 5000 individuals, consisting primarily of farmers and some small traders. Average income in the village is 3-4,000 Naira a month – less than \$1 a day. The community currently has no health center or dispensary, and has an old, poorly equipped government school. There is a high incidence of malaria, typhoid and dysentery in the village.¹⁷

Furthermore, the assessment highlights that while most projects are geared towards poor communities, there is a lot of heterogeneity and inequality within communities. In some instance, the poorest households within a community are excluded from the benefits of the project. For example, in some CDCF projects such as the solar power projects in Bangladesh and the biogas project in Nepal, the poorest households are not able to access the technology as the upfront investment required is relatively high.

The extent to which CDCF projects promoted the inclusion of vulnerable groups in decision making processes and the sharing of community benefits is difficult to assess. A vulnerable group is defined as a population that has some specific characteristics that make it at higher risk of falling into poverty than others living in areas targeted by a project. Vulnerable groups include the elderly, mentally and physically disabled people, at-risk children and youth, HIV/AIDS- affected households, ethnic minorities and, in some societies, women. Most CDCF projects do not have explicit mechanisms to include marginalized groups in decision-making processes, and there is very little disaggregated data available to evaluate the extent to which vulnerable group have benefited. However in some of the more recent CDCF projects that are being prepared this issue is being addressed. For example the CBP for China Aksu biogas project which is in the outstanding pipeline specifically targets vulnerable groups. 100% of the CBP for this project will exclusively benefit the indigenous people living in the identified community

2.5 Sustainability and Cost-effectiveness of Community Benefits

The assessment highlights that sustainability of community benefits is primarily dependent on two factors: technical sustainability of investments and sustainability at the institutional level.

Technical sustainability involves effective operation and maintenance (O&M). Both projects with direct benefits and those with indirect benefits demonstrated strong attention to O&M. For instance, in the Nepal Biogas Project, even after 4-5 years of operation very few users reported any technical problems with their systems. Similarly, in the Argentina Olavarria Landfill Project where the potable water connections were installed about two years ago, no major technical problems have been reported. Most CDCF projects have also made efforts

¹⁷ ERPA, Nigeria Aba Cogeneration Project

geographically isolated with very limited access to social services such as health, education, water and sanitation. Their source of economic livelihood is primarily agriculture. However, poverty targeting remains a challenge. The very poor and socially marginalized households can not install biogas plants as only households that own some land and have cattle to generate animal manure qualify. According to the private companies, people with adequate cash in hand or those who have collateral to take a loan have been observed installing biogas plant. Thus it is the relatively better off among the poor who have access to this technology, and the majority of biogas users are from upper caste groups Brahmin and Chhetri (67.4%). AEPC is making a concerted effort to address this situation by promoting micro-credit programs so that the poorest can afford the technology.

Are the benefits sustainable?

Sustainability of the projects appears to be high because of high level of after sales serviced provided by the biogas company. Most of the biogas plants installed in phase 1 (4 years ago) are still functioning well with only minor repair problems.

What are the key implementation successes and challenges?

While the program faces challenges in scaling up market size and reaching the poorest of the poor, the biogas program has been one of the longest running development initiatives in Nepal. Biogas plants provide a range of health, environmental and economic co-benefits, and the fact that the government has a nation wide program for biogas provides these projects with a strong enabling environment.

3.2 Nepal Micro Hydro Program

Project Description

The project involves hydropower technology to produce electricity (renewable energy) for supply to households and other electrical end-use enterprises. This project focuses on the development and installation of micro-hydro power plants (MHPs) of different capacities with a cumulative capacity up to 15MW, which is being promoted by the Alternative Energy Promotion Centre (AEPC) under the Ministry of Environment, Science and Technology (MOEST) of Government of Nepal (GoN). The implementation of these micro-hydro plants is being done through two of AEPC's programs namely; Rural Energy Development Program (REDP) and Minigrid Support Program (MGSP) of Energy Sector Assistance Program (ESAP).

Access to basic infrastructure services such as roads and electricity is very limited in Nepal especially in remote and rural communities. Only 10 percent of households are connected to the power grid. Use of the generated electricity through the MHPs will replace fossil fuels such as kerosene and diesel which are traditionally used in rural areas of Nepal for lighting and agro-processing needs. It is estimated that the project activity will lead to the reduction of 272,951 tCO₂eq in the first crediting period of 7 years from July 2009 to June 2016. The total number of households that will benefit from this project is estimated to be 14,861. The project is yet to be registered but the details of all the MHPs including their location and capacities are known, and several MHPs have already been commissioned and are fully functioning.

The analysis included site visits to Lukla (Chaurikharka) where a 100 KW plant has been commissioned and is fully functioning, and Liti Adhamara (Tistung) where a 19.2 KW plant has been commissioned and is fully functioning.

To what extent does the project benefit local communities?

The project has intrinsic community benefits. Biogas plants provide households with cleaner and energy efficient option for cooking which results in reduced indoor pollution, enhanced agricultural productivity, reduced consumption and therefore expenditure on firewood, improved sanitation, and time saving for women. One of its most significant impacts has been on improving the health conditions of both women and children in the households by reducing respiratory illness, eye infections, coughs, fire related incidences, and other diseases associated with using traditional cook stoves that operate with fuel wood. All beneficiaries expressed a very high of level of satisfaction with the outcomes of biogas installation and the construction of attached latrines, though some reported that gas production was low in winter.

“Our family decided to install a biogas plant because firewood was not available easily, and it was also more convenient. The main benefit is that there is no smoke in the kitchen now, and it is much healthier for us. It also takes less time to cook and clean utensils. We still collect firewood but earlier we needed 30kgs/day but now we need only 5kgs/day.”

Owner of Biogas Plant in Gorkha



Comparison between an energy efficient biogas stove and traditional firewood stove.

Have the beneficiaries themselves participated in identifying the community benefits, and subsequently monitoring the delivery of benefits?

Since the installation of biogas is a market driven process, community participation is not very relevant in this model. The project relies on social mobilization campaigns that are carried out by the private companies and NGOs to raise awareness about the benefits of biogas plants. The field staff of the private companies play a major role in this process as information dissemination is primarily through direct marketing by the service provider. Often word of mouth is instrumental in motivating people to install biogas plants. All the beneficiaries receive training on the use of the biogas plant, and have easy access to the company for any kind of after sales service. The project also has a rigorous monitoring system that includes a household survey and elicits direct feedback from the consumers.

Does the project benefit the poor and the vulnerable?

The socio economic and poverty profile of the targeted beneficiaries communities has been categorized as “poor” based on income and caloric intake. These communities are also

to ensure that there are adequate financial resources to support O&M, and cost reflective tariffs have been set up for provision of services such as water and electricity.

Good Practice for Ensuring Sustainability - Nepal Micro Hydro Project, Nepal

A community based committee is the key body at the village level for the operation and management of the micro hydro project (MHP). The committee is either elected or formed through consensus. All MHPs have an operator whose salary is paid from the revenue generated from the sale of electricity. The operator receives training and is required to maintain a logbook. The operator is responsible not just for running the plant but also for maintenance and occasional repair. The MHP management committee is in charge of the management of funds generated from the sale of electricity. The tariffs are established based on consultations with village members. The tariffs applied to households varies as per consumption – flat rate is common in small to medium size plants while metering system is common in large size plants. One key factor for the project’s sustainability is the high level of commitment of the community and the staff towards the project. Despite the remoteness of the areas visited, staff walk several miles to visit installations and provide technical assistance. The community is equally dedicated.¹⁸

Sustainability at the institutional level is more varied across the CDCF portfolio and strongly depends on the enabling environment and the extent to which additional partnerships and resources are leveraged. Projects where community benefits are delivered through broader ongoing programs have strong enabling environments which promote sustainability. For example, the Nepal Micro Hydro Project is implemented through two ongoing programs - Rural Energy Development Program (REDP) and Minigrid Support Program (MGSP) of Energy Sector Assistance Program (ESAP). Similarly, the Moldova Biomass Heating and Energy Conservation project is implemented through two World Bank financed programs – the Moldova Social Investment Fund (SIF) and the Energy II Project. Projects that are co-financed by local administrations as in the case of China or Argentina are also more likely to be sustainable as they are able to integrate the CBPs within a comprehensive local development framework. Finally, the capacity of the project sponsor and the level of community commitment are also strong determinants of sustainability. For example, in Peru, the project sponsor committed his own funds towards the operation and maintenance of the computer lab that had been financed.

Cost-effectiveness of community benefits

Anecdotal evidence suggests that the cost effectiveness of CDCF projects is also maximized when additional resources and partnerships can be leveraged. One of the strongest examples of such an approach is the Moldova Biomass Heating and Energy Conservation Project. The SIF II project covers capital cost for a new heating systems and energy efficiency improvements which is complemented by a beneficiary community contribution. Carbon payments are used by local authorities to pay for the maintenance of the installed boilers and for the purchase of fuel. The project also yields monetized efficiency gains by decreasing the cost of heat production.

In contrast, in projects where the CBP is financed entirely through the CDCF premium, the cost-benefit ratio is relatively low. In the Argentina Salta Landfill Gas Capture Project where the total value of the CBP is USD 60000, the benefits from CBP activities are likely to be limited as they do not address the key social needs in the community. In the Peru Santa Rosa

¹⁸ Information collected during field visits

Small Hydro Project, while the CBP (which amounts to USD 88,000) provides significant benefits to the local community, the associated transaction costs are very high. During the field visit, the project sponsor highlighted the fact that after paying for the feasibility studies, verification costs, taxes etc, he had very little funds left for actually implementing CBP activities. One of the factors underpinning this is the ratio of the CBP premium to the price of the CER. In the Santa Rosa project, the project sponsor receives \$4 per ER as carbon payment and \$1 per ER as the CBP premium.

A related issue that needs to be considered in this context is economies of scale. Transaction costs are exacerbated in the case of extrinsic CBPs which have small budgets such as the Philippines Laguna de Bay project (USD 40,614), Argentina Salta Landfill Gas Capture project etc. The transaction costs are often quite significant not just for the project sponsor, but also for the FMU as the cost of preparing and supervising the CBP is very high in comparison to the actual budget of the CBP.

3. Case Studies

The case studies were selected to ensure representation in terms of type of benefits and project sponsoring entities. The following table provides summary description of the projects discussed in the case studies.

Project	Type of Community Benefit	Type of Project Sponsor
Nepal Biogas Program	Direct Benefits – Improved access to energy	Autonomous Government Agency
Nepal Micro Hydro Program	Direct Benefits – Improved access to electricity	Autonomous Government Agency
Peru Santa Rosa Small Hydro Project	Indirect Benefits – Improved local infrastructure	Private Company
Argentina Salta Landfill Gas Capture Project	Indirect Benefits – Improved employment and livelihood opportunities	Municipality
Argentina Olavarria Landfill Gas Capture Project	Indirect Benefits – Improved local infrastructure	Municipality
Senegal Rural Area Energy Efficient Lighting Program	Direct Benefits – Access to energy efficient lighting	Autonomous Government Agency

3.1 Nepal Biogas Program

Project Description

The project aims to develop biogas use as a commercially viable, market-oriented industry in Nepal. Between 2004 and 2009 the project will install 162,000 quality-controlled, small-sized biogas plants in the Plain, Hill, and Mountain regions of Nepal. The estimated useful life of a biogas plant is 20 years and its rate of successful operation has been 97 percent. Approximately 19,000 biogas systems have been installed so far.

The CDM project is part of an ongoing nation wide program – the Biogas Support Program that is funded by international donors such as the Netherlands Development Organization (SNV/N), and coordinated by the Alternative Energy Promotion Center (AEPIC). The provision of subsidies has been a key element in making these biogas plants accessible to poor households. Revenue from the CDCF will reduce the dependency on large government and external donor subsidies and will help expand the biogas installation to more remote and poorer areas of Nepal. These biogas plants displace traditional fuel sources for cooking-fuel wood, kerosene, and agricultural waste and introduce the proper treatment of animal and human wastes as well as produce a high-quality organic fertilizer. Each biogas plant can reduce 4.6 tCO₂e annually.

The analysis included site visits in Gorkha and Dhading districts where interviews were held with several households that had installed biogas plants, private service providers that supplied biogas systems, and program implementers. Key questions addressed were as follows: