



Community Development Carbon Fund Retrospective

Insights and lessons from 15 years of carbon finance benefiting communities



May 2017

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Acknowledgements

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Acronyms

°C
Degrees Celsius

CBP
Community Benefit Plan

CDCF
Community Development
Carbon Fund

CDM
Clean Development
Mechanism

CER
Certified Emission Reduction

CFL
Compact Fluorescence Lamp

CFU
Carbon Finance Unit of the
World Bank

Ci-Dev
Carbon Initiative for
Development

CO₂
Carbon dioxide

CSR
Corporate social
responsibility

DOE
Designated Operational
Entity (Auditor)

ERPA
Emission Reductions
Purchase Agreement

ETS
Emission Trading System

EU
European Union

EU ETS
European Union Emission
Trading System

GHG
Greenhouse gas

GWh
Gigawatt hour

HHK
Hybrid Hoffman Kiln

IDA
International Development
Assistance of the World Bank
Group

ITMO
Internationally Transferred
Mitigation Outcomes

KenGen
Kenya Electricity Generating
Company

LED
Light-emitting diodes

LDC
Least Developed Country

MRV
Monitoring, Reporting and
Verification

MtCO₂e
Megaton of Carbon Dioxide
Equivalent

NDC
Nationally determined
contribution

NGO
Non-governmental
organization

PDD
Project Design Document

PoA
Program of Activities

SDG
Sustainable Development
Goal

SD
Sustainable Development

SD report
Sustainable Development
co-Benefits description report
of the Clean Development
Mechanism

tCO₂
Ton of carbon dioxide

tCO₂e
Ton of Carbon Dioxide
Equivalent

UN
United Nations

UNEP
United Nations Environmental
Program

UNFCCC
United Nations Framework
Convention on Climate
Change

UNICEF
United Nations International
Children's Emergency Fund

Executive Summary

The Sustainable Development Goals (SDGs), adopted in 2015, aim to end all forms of poverty. They recognize that ending poverty must go hand-in-hand with tackling climate change.¹ This dual objective is at the core of the Community Development Carbon Fund (CDCF). The CDCF was created in 2002 to support projects and programs in developing countries that reduce greenhouse gas emissions and provide tangible local livelihood co-benefits. By offering the developers of these activities a price premium for the emission reductions issued as Certified Emission Reductions (CERs) under the Clean Development Mechanism (CDM), the CDCF promotes CDM activities that combine community development and climate action, especially in poor regions of the world. In doing so, the CDCF aims to contribute to a more equitable regional distribution of carbon finance in communities that may otherwise find it difficult to attract financing because of higher transaction costs and risks involved in achieving emission reductions from small-scale or remote projects.

As the first fund to focus on combining carbon finance with community co-benefits, the CDCF has played a pioneering role in demonstrating the viability of this type of fund. To date the CDCF has funded 36² registered CDM activities, 25 of which went on to collectively reduce emissions by over 4 million tons of carbon dioxide equivalent (MtCO₂e).³ These 25 projects have created community co-benefits aligned with the SDGs for approximately 17.5 million people.

1 Source: United Nations, *The Sustainable Development Agenda*, accessed April 24, 2017, <http://www.un.org/sustainabledevelopment/development-agenda/#>

2 Projects and Program of Activities where CDCF has actively supported their development through either emission reduction purchases, funding for validations/verifications or assistance with the Project Design Documents etc.

3 Based upon total issued CERs by these activities as of 01 March 2017. Source: UNEP DTU Partnership, *UNEP DTU CDM/JI Pipeline Analysis and Database*, accessed April 24, 2017, <http://www.cdmpipeline.org/>

On the 15th anniversary of the CDCF, this report reviews the key achievements of the CDCF and the main lessons learned. The implementation of the Paris Agreement, adopted by the Parties to the United Nations Framework Convention on Climate Change (UNFCCC) in 2015, is essential for the achievement of the SDGs. The CDCF insights are particularly timely as discussions are currently taking place on how to operationalize the Paris Agreement, including through the design of new carbon market mechanisms.



The Fund has successfully opened the door for carbon financed development projects in many of the countries and communities most in need of investment.

Sandrine Boukerche,
World Bank carbon finance specialist

This report finds the following general features and trends:

Key achievements of the CDCF:

- ▶ **Reducing emissions**
 - ▶ CDCF assisted CDM activities have reduced 4.1 MtCO₂e of GHG emissions in the form of issued CERs to date.
- ▶ **Linking carbon finance with community co-benefits**
 - ▶ CDCF assisted CDM activities provide a wide range of community co-benefits that are highly likely to be strongly contributing to the achievement of many SDGs.
 - ▶ Key community co-benefits of the CDCF assisted projects and programs are: improved access to clean energy, improved local infrastructure and services, improved livelihoods and health; and improved energy efficiency.

- ▶ **Bringing carbon finance to priority countries⁴**
 - ▶ 13 CDCF assisted CDM activities were in Least Developed Countries (LDCs) and have successfully issued over 2.1 MtCO₂e of CERs.
 - ▶ 12 CDCF assisted CDM activities were in World Bank priority countries with over 3.1 MtCO₂e of CERs successfully issued.
 - ▶ **Generating global public tools for climate action**
 - ▶ The CDCF contributed to the development of CDM methodologies in several ways:
 - ▶ CDCF supported submissions of new methodologies via the project entity.
 - ▶ CDCF was the main funding source for the development of new methodologies.
 - ▶ CDCF supported submissions for changes to methodologies that resulted in new revised methodologies being published.
 - ▶ CDCF contributed to the development of methodologies led by other entities.
 - ▶ In the above sense, the CDCF has developed, funded or contributed to the approved version of 20 CDM methodologies, 16 of which are for small-scale activities.
 - ▶ The CDCF's innovations and contributions in the form of developing methodologies and the Program of Activities (PoA) approach have allowed an increased uptake in small-scale and micro-scale activities, especially in LDCs which were initially unable to access the CDM.
 - ▶ **Raising climate change and community benefit awareness**
 - ▶ The CDCF's registered CDM projects and programs successfully demonstrated the viability of combining emission reductions with community co-benefits.
 - ▶ Learning from the CDCF's experience, at least four project entities have gone on to develop additional CDM activities, non-CDM projects or development initiatives themselves without receiving CDCF assistance.
- Main challenges encountered by the CDCF:**
- ▶ **Dealing with the evolving CDM rules**
 - ▶ The initial lack of clarity and openness in the CDM regulatory framework was followed by a period with more dialogue with the regulator but also characterized by an increased rigidity of the CDM regulations. For example at the start there was a lack of suitable methodologies for small-scale activities, and the validation and verification process did not take into account the situation of the host countries and the local beneficiaries, especially in LDCs.
 - ▶ **Working in LDCs and remote locations**
 - ▶ Inherent challenges exist in trying to establish projects in LDCs including shifting stability and the lack of supporting infrastructure and institutions.
 - ▶ Transaction costs and risks can be high for originating, training, monitoring and verifying small-scale community projects, especially within LDCs or remote rural regions.
 - ▶ Short time frames to deliver emission reductions, and pilot new markets, new approaches and new methodologies is challenging in LDCs.

4 Priority Countries are countries designated as least developed countries (LDCs) by the United Nations. And countries considered to be World Bank priority countries-eligible for World Bank International Development Association (IDA) loans, or designated as "IDA blend" with a population of less than 75 million. Some countries fall into both categories. Source: UNFCCC, *LDC Country Information*, accessed March 4, 2017, http://unfccc.int/cooperation_and_support/lcd/items/3097.php. Source: World Bank, *Borrowing Countries*, n.d., accessed May 4, 2017, <http://ida.worldbank.org/about/borrowing-countries>

- ▶ **Accurately forecasting timelines and emission reduction volumes**
 - ▶ Partly due to the uncertainties caused by the regulatory and investment environment, accurate forecasting timelines and final emission reduction volumes on a project level was complex. This made it difficult to plan the timing and magnitude of carbon finance that a project would benefit from. This in turn affected the viability of projects.
 - ▶ **Monitoring cost-effectively emission reduction and community co-benefits**
 - ▶ The design and implementation costs of the monitoring system for community co-benefits can be high. It is also difficult and costly to systematically monitor co-benefits with complex qualitative indicators such as gender equality.
- On the path towards the operationalization of the Paris Agreement, the lessons learned from the CDCF experience can inform the discussions on further interlinking of sustainable development co-benefits with GHG emission reductions, notably through the design of future carbon initiatives:
- ▶ **Build in capacity building and technical assistance:** For first of a kind portfolios, future instruments should set aside resources for capacity building and technical assistance. This is important to launch the projects and mitigate emission reduction delivery risks.
 - ▶ **Keep it simple:** Establishing fewer and more flexible conditions on objectives and funding conditions would allow instruments like the CDCF to react quicker to changing market conditions.
 - ▶ **Assess the demand:** The current conditions in the international carbon market mean that there will be challenges in finding demand for emission reductions, even when linked to strong community co-benefits.
 - ▶ **Factor in technology evolution:** As technology and business models are evolving rapidly, the development of new emission reduction methodologies need to be designed with sufficient flexibility to allow for these technology changes, e.g. the replacement of traditional light bulbs with Compact Fluorescent Lamps (CFLs) and now light-emitting diodes (LEDs).
 - ▶ **Provide long term visibility:** Purchase time frames for emission reductions are important. Longer time frames provide more room to mitigate delivery risk and transaction costs.
 - ▶ **Engage with buyers to reflect the full value of emission reduction and co-benefits:** More work and communication with donors, especially from the private sector, is needed to understand the full value of an emission reduction project with community co-benefits.
- This report uses empirical evidence to identify the achievements and describe the experiences of the CDCF; the results presented therefore constitute only a limited share of the various contributions that the CDCF has made to the carbon finance sector. A comprehensive evaluation of the CDCF is needed to fully map these outcomes.

1. Introduction

Over 800 million people still live in extreme poverty, and the average global temperature is expected to increase by 2.3 – 4.9 degrees Celsius (°C) by the end of the century.⁵ The Community Development Carbon Fund (CDCF) set out to address both challenges by pioneering carbon finance for small-scale greenhouse gas (GHG) emission reduction projects that also benefit communities in poor regions. The CDCF was launched in 2002 at a time when carbon finance and the concept of putting a price on carbon was only just starting to be put into practice.

Throughout the last 15 years, the carbon finance and development landscapes have undergone significant changes. Three periods can be distinguished: (i) 2002-2008, before the start of the first commitment period of the Kyoto Protocol under the United Nations Framework Convention on Climate Change (UNFCCC); (ii) 2008-2012, which corresponds to the first commitment period of the Kyoto Protocol and saw the growth of the Clean Development Mechanism (CDM) of the Kyoto Protocol; during this period, there was also a rapid expansion of regional and national carbon pricing, largely because of the implementation of the European Union Emissions Trading System (EU ETS); and (iii) from 2013 to the present day, which has been defined by the decline in the mechanisms under the Kyoto Protocol including the CDM, the emergence of new, national and

subnational, carbon pricing instruments in both developed and developing economies, and the transition to the Paris Agreement framework.⁶

The Kyoto Protocol differentiated between countries that had an emission reduction commitment (Annex I Parties) and those that did not (non-Annex I Parties). This architecture is at the core of the CDM. The CDM allows countries with an emission reduction commitment to meet their targets using carbon credits generated from GHG emission reduction projects in countries without such a commitment. In a departure from this model, the Paris Agreement, adopted in 2015, encourages all countries to make individual, voluntary commitments to contribute to the global UNFCCC goal to keep the global average temperature increase to well below 2°C. This marked the beginning of a new era in the cooperative effort to limit climate change.⁷

Article 6 of the Paris Agreement sets into motion the design of a new mechanism to combine GHG emission reductions with climate co-benefits and new cooperative approaches to emission reductions. The new mechanisms being developed under the Paris Agreement should help to achieve the scale of emission reductions needed to keep global temperature rises below 2°C. They will also need to contribute to the implementation of the Sustainable Development Goals (SDGs) adopted in 2015.

5 Source: United Nations. Goal 1: *End poverty in all its forms everywhere*, accessed March 24, 2017, <http://www.un.org/sustainabledevelopment/poverty>. Source: Climate Action Tracker, *Effect of current pledges and policies on global temperature*, accessed March 24, 2017, <http://climateactiontracker.org/global.html>.

6 Source: World Bank. *State and Trends of Carbon Pricing 2015*, September 2015.

7 Source: World Bank, Ecofys, Vivid Economics, *State and Trends of Carbon Pricing 2016*, October 2016.

On the 15th anniversary of the CDCF, this report reviews the key achievements of the CDCF and the main lessons learned. The CDCF insights are particularly timely as discussions are currently taking place on how to move away from the top-down Kyoto Protocol approach and operationalize the Paris Agreement, including through the design of new carbon market mechanisms that would apply a more bottom up approach.

This report is a fact based retrospective overview of the diverse contributions of CDCF projects in enhancing community livelihoods in poor regions with carbon finance. Data was obtained through a combination of reviews of existing CDCF-related literature, project databases and interviews with internal and external stakeholders.

The CDCF benefitted communities beyond those directly affected and the wider carbon market. Such contributions are alluded to in the report but they are often difficult to assess quantitatively. As such, this report is not able to present all the impacts and influences the CDCF has had. Furthermore, it is recognized that climate action is about cooperation and many achievements were only possible due to the collaboration between CDCF and its various stakeholders.

Chapter 2 of this report provides background on the CDCF and international carbon market mechanisms under the UNFCCC, including the CDM and potential new mechanisms under Article 6 of the Paris Agreement. Chapter 3 covers the key achievements of the CDCF in the context of linking carbon finance with development co-benefits, the promotion of carbon finance activities in the poorest regions and countries in the world, and the contribution of the CDCF to support small-scale CDM projects. Chapter 4 concludes with an overview of the key lessons learned by the CDCF over the last 15 years and highlights how these insights may be applicable in the post-Paris Agreement world.

2. CDCF – Combining carbon finance with development co-benefits

2.1. The Community Development Carbon Fund

The CDCF was announced at the World Summit on Sustainable Development in Johannesburg in September 2002 as a pioneering fund to combine climate action with development co-benefits. The fund was officially launched by the World Bank Group in association with the International Emission Trading Association and the UN Climate Change Secretariat in July 2003.⁸ The CDCF is housed within the Climate Change Group (formerly known as the Carbon Finance Unit) of the World Bank Group and was designed to run for 17 years.

The CDCF is a public-private partnership with currently 24 entities both private and public investing in the CDCF to purchase emission reductions from CDM projects that support communities in Least Developed Countries (LDCs) and poor areas around the world.⁹ The founding principle of the CDCF is to contribute to achieving emission reductions while simultaneously improving the well-being of local communities. The CDCF was established as a trust fund and has been administered by the World Bank which acts as a Trustee and purchases emission reductions on behalf of the Fund Participants.

The CDCF was established with three main objectives: (i) **Delivering emission reductions with community co-benefits.**¹⁰ The CDCF aims to purchase and facilitate the generation of

GHG emission reductions from small-scale CDM projects which reduce poverty and improve the well-being of local communities through sustainable development co-benefits. (ii) **Working with priority countries.** The CDCF targets countries designated as Least Developed Countries (LDCs) by the United Nations and those eligible for World Bank International Development Association (IDA) loans.¹¹ It helps to build local capacity to implement emission reducing projects and access carbon finance in regions that would otherwise be largely excluded. (iii) **Focusing on small-scale projects.** The CDCF contributes to the development of new methodologies and approaches for small CDM projects to expand the geographical reach of CDM projects. The key achievements of the CDCF for each of the three objectives are presented in Chapter 3, and the lessons learned in Chapter 4.

The CDCF supports projects in two main ways: by purchasing the emission reductions generated by projects and by providing technical assistance and capacity building for the development of projects. For each of the projects within the CDCF portfolio the World Bank—as Trustee of the CDCF—enters into an Emission Reduction Purchase Agreement (ERPA) with the project entity that sells the emission reductions to the CDCF. The ERPA is a legal contract between the buyer and seller of the emission reductions and specifies the commercial terms agreed, such as the contracted emission reduction volumes, the unit fixed price per tCO₂e, the purchase term and the Community Benefit Plan (CBP).

⁸ Funds for operation secured. Source: Jason Smith et al., *The Community Development Carbon Fund - A Retrospective Analysis*, 2010.

⁹ For a full list of the CDCF participants please see Annex I. Source: World Bank, *CDCF Annual Progress Report FY2015 and business plan and budget FY2016*, 2015.

¹⁰ Source: World Bank, *CDCF making an impact: carbon finance delivers benefits for the poor*, 2013.

¹¹ For more information on the International Development Association, see <http://ida.worldbank.org/about/what-ida>. Source: Ibid.

Fixed prices can help to make the project bankable and protect the project entity that sells the emission reductions to the CDCF against the risk of prices going down in the market and buyers against the risk of prices going up in the future. Offering a price premium for developers of CDCF projects for emission reductions issued as CERs under the CDM and the use of up-front payments are other means the CDCF applies to support projects that combine GHG emission reductions with sustainability co-benefits.

CDCF supports the development of CDM small-scale methodologies and rules. These methodologies and tools can help small-scale project developers to generate CERs and receive carbon finance. It is also generally recognized that the provision of technical assistance and capacity building—core components of the design of each CDCF project—can significantly contribute to reducing GHG emissions in the communities in a sustainable and meaningful way. The CDCF Technical Assistance Trust Fund, also referred to as CDCFplus—is the technical assistance arm of the CDCF to support capacity building of the CDCF projects. CDCFplus was established by

contributions from the Government of Italy and the United Nations Environmental Program (UNEP) in 2005. Activities include enhancing knowledge sharing of carbon finance, GHG accounting, monitoring, reporting and verification (MRV) training, and knowledge diffusion on climate action and mitigation technologies through technical assistance in the local communities.

2.2. International carbon market mechanisms under the UNFCCC

2.2.1. Under the Kyoto Protocol: the CDM

The CDM underpins the CDCF. As the CDM represents an internationally recognized standard on GHG emission reduction accounting, CDCF directly assists projects with strong community co-benefits to register and issue CERs under the CDM. These CERs are purchased by the CDCF on behalf of participants who can then utilize the CERs to meet their own emission reductions targets, or resell them in the secondary market. Through the success of its projects the CDCF also aims to create demonstrations of pathways that similar projects could replicate, thus catalyzing the development of projects with strong community co-benefits, especially in poor regions of the world.



CDCF was aimed to pioneer linking carbon finance to sustainable development community benefits and thereby improving the lives of poor communities.

Sandrine Boukerche,
World Bank carbon finance specialist



CDCF is a unique fund with a strong promotion of co-benefits. With this carbon fund we have demonstrated that it is possible to achieve emission reductions at the community level and at the same time to provide additional benefits, such as improvement of access to health, education, and infrastructure.

Teresa Solana Mendez de Vigo,
Carbon finance expert at the Government of Spain

The mechanism grew from something that was barely operational with no registered projects in 2002 to having 7,761 projects registered by March 2017.

These projects have issued nearly 1.8 billion tCO₂e of emission reductions.¹² The number of approved CDM baseline and monitoring methodologies have now reached 209, of which 95 are for small-scaled projects. There were no registered CDM activities (PDDs or PoAs) in LDCs in 2002. Now there are over 200.¹³

The CDM is a flexibility mechanism of the Kyoto Protocol to the UNFCCC. It intends to help reduce global GHG emissions in the most economically efficient manner. The CDM allows developed countries with emission reduction targets under the Kyoto Protocol (Annex I countries) to use CERs generated from GHG emission reduction projects in developing countries without emission reduction (non-Annex I countries) targets to meet a part of those targets. Project entities—organizations that own the emission reduction projects in developing countries, in return, receive investments in clean technology and

revenues from the sale of these CERs once they are generated and delivered.¹⁴ The first CDM project was registered in November 2004 but the CDM only gained momentum after the coming into force of the Kyoto protocol the following year with the first CERs issued in October 2005. The first CDCF assisted project was registered on 19 August 2005 and was also the first CDCF project

to issue CERs on 20 October 2005.¹⁵

As a simplified overview of the CDM project cycle, developing country projects seeking to participate in the CDM must first be approved by their host countries and then become 'registered' CDM projects by going through a multistep process to demonstrate their eligibility with the CDM rules set under the UNFCCC. The process involves auditing of the project (formally known as validation) by a third party auditor and potentially a review of all the application documents by the UNFCCC. After registration projects must carry out appropriate monitoring and recording of the relevant data needed to calculate and prove the amount of

12 Source: UNFCCC, *CDM Insights - Issuances*, accessed March 1, 2017, <http://cdm.unfccc.int/Statistics/Public/CDMinsights/Index.html#iss>.

13 For ease of reference this report refers to CDM projects as PDDs and programs as PoA. Collectively these are referred to as 'CDM activities'.

14 For more information on the UNFCCC CDM, see: <https://cdm.unfccc.int/>.

15 Source: UNFCCC, *La Esperanza Hydroelectric Project*, accessed April 24, 2017, <http://cdm.unfccc.int/Projects/DB/DNV-CUK1098894708.4/view>.

GHG emission reductions generated. This data is audited again (in a process formally known as verification) by a third party before the project can apply for the issuance of the equivalent amount of CERs from the UNFCCC. Should these CERs be then sold to an entity within an Annex I country, the Annex I country must first approve the participation of the purchasing entity before it is able to receive CERs from the project. One CER is equivalent to one ton of carbon dioxide equivalent (tCO₂e).

2.2.2. Under the Paris Agreement

The Paris Agreement will provide the overall regulatory framework for the operation of future instruments that seek to combine emission reductions with community co-benefits. Article 6 of the Paris Agreement, which covers potential transfers of mitigation outcomes (such as the purchase and use of carbon offsets from community focused projects), will be of particular relevance. Article 6 recognizes that Parties can voluntarily cooperate in the implementation of their Nationally Determined Contributions (NDCs) to allow for higher ambition.¹⁶ Articles 6.2–6.3 of the Paris Agreement cover cooperative approaches where Parties could opt to meet their NDCs by using internationally transferred mitigation outcomes (ITMOs). Article 6.4 establishes

a mechanism for countries to contribute to GHG emissions mitigation and sustainable development.¹⁷ It is important to note that, unlike the Kyoto Protocol and its CDM, Article 6 of the Paris Agreement applies to all Parties to the Agreement, without any differentiation.

Parties under the UNFCCC are currently working on operationalizing Article 6. Views diverge on several topics including governance, modalities to ensure environmental integrity and sustainable development, accounting in the context of NDC implementation, and the relationship between the new approaches and mechanism and existing mechanisms such as the CDM. This is particularly true for Article 6.4, which covers the establishment of a new emission reduction mechanism. Some Parties advocate for the Article 6.4 mechanism to be similar to the CDM and for the CDM to be integrated with the new mechanism. Other Parties highlight the need for significant departures from the Kyoto Protocol approach, as NDCs will affect, among others, baseline approaches, crediting periods, accounting rules, and the role of the host country in the new mechanism.¹⁸ However, one point that is undisputed and enshrined within the Paris Agreement text itself is that the new mechanism must ensure participating activities contribute to sustainable development.¹⁹

16 NDCs are contributions toward climate action declared by the nations who have ratified the Paris Agreement, see http://unfccc.int/focus/ndc_registry/items/9433.php.

17 Source: World Bank, Ecofys, Vivid Economics, *State and Trends of Carbon Pricing 2016*, October 2016.

18 Source: UNFCCC, *Submissions and Statements at SBSTA 47*, 2017, <http://www4.unfccc.int/submissions/SitePages/sessions.aspx?showOnlyCurrentCalls=1&populateData=1&expected-submissionfrom=Parties&focalBodies=SBSTA>.

19 Source: UNFCCC, *Paris Agreement Article 6.4, 21st Conference of the Parties*, 2015.

3. Fifteen years of carbon finance and innovation

3.1. Pioneering emission reductions with development co-benefits

Improving the material welfare and social well-being of beneficiary communities is one of the founding mandates of the CDCF. The key differentiator of the CDCF from other carbon funds is the commitment of the CDCF to promote “development plus carbon credits” or “carbon credits with a human face”.²⁰ With this dual focus, the CDCF has been pioneering in its very nature.

The project types targeted by the CDCF are among the most challenging ones to implement. Such projects can have considerable development co-benefits to the local communities but they face potential significant barriers to leverage the carbon market, which was nascent at the start of the CDCF.

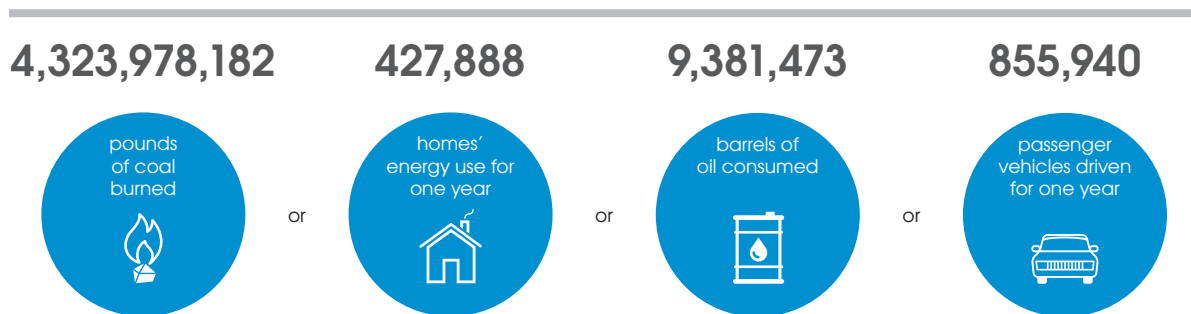
3.1.1. Reducing greenhouse gas emissions

The CDCF directly supported the **registration of 36 CDM projects** (consisting of 32 PDDs and four PoAs) located in 17 countries across five different continents.²¹ CDCF assisted projects are CDM projects that have received direct financial or technical assistance from the CDCF up to their eventual registration with the CDM. To date, 26²² of these - consisting of 24 registered PDDs and 2 POAs - have successfully issued over four million CERs, of which about 3.2 million from PDDs and 0.8 million from PoAs.²³

Table 1, Figure 1 and Figure 2 provide an overview of the key characteristics of these projects.

As Figure 1 below shows, the CERs issued by the CDCF assisted CDM projects are the equivalent of preventing the consumption of over nine million barrels of oil or the combustion of over four billion pounds of coal.

Figure 1 / The volume of emission reductions achieved by CDCF is comparable to avoiding emissions from²⁴



20 Source: World Bank, *CDCF making an impact: carbon finance delivers benefits for the poor*, 2013.









































































21 Source: CDCF (internal document), *Portfolio database since inception*, 2017.

22 These 26 projects all have signed ERPA's for their CERs and active community benefit plans in place.

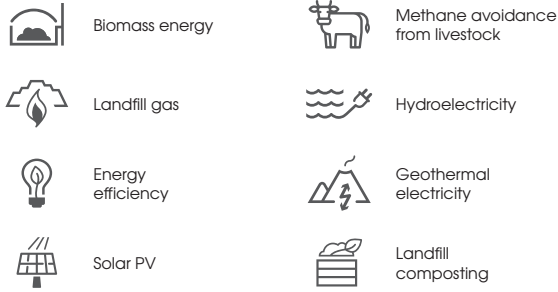
23 Source: UNFCCC: *CDM, Issuance of CERs*, accessed March 1, 2017, <https://cdm.unfccc.int/Issuance/index.html>.

24 Comparisons are based on the USE EPA GHG equivalency calculator, see: <https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator>. Cars and homes energy consumption are based upon those in the USA.

Table 1 / CDCF assisted registered CDM projects and PoAs²⁵

Project name	Location	Project type	CERs issued (tCO ₂ e)	Project name	Location	Project type	CERs issued (tCO ₂ e)
Olavarría Landfill Gas Recovery Project	 Argentina		0	Redevelopment of Tana Hydro Power Station Project	 Kenya		19,000
Salta Landfill Gas Capture Project	 Argentina		0	Biomass Heating in Rural Communities (Project Design Document No. 1)	 Moldova		43,000
Improving Kiln Efficiency in the Brick Making Industry in Bangladesh (Bundle-2)	 Bangladesh		18,000	Biomass Heating in Rural Communities (Project Design Document No. 2)	 Moldova		37,000
Improving Kiln Efficiency of the Brick Making Industry in Bangladesh	 Bangladesh		103,000	Energy Conservation and Greenhouse Gases Emissions Reduction	 Moldova		44,000
Installation of Solar Home Systems in Bangladesh	 Bangladesh		811,633	Biogas Support Program - Nepal (BSP-Nepal) Activity-1	 Nepal		328,000
Animal Manure Management System (AMMS) GHG Mitigation Project, Shandong Minhe Livestock Co. Ltd., Penglai, Shandong Province, P.R. of China	 China		420,000	Biogas Support Program - Nepal (BSP-Nepal) Activity-2	 Nepal		311,000
Guangrun Hydropower Project in Hubei Province, P.R. China	 China		149,000	Biogas Support Program - Nepal Activity-3	 Nepal		231,000
Hubei Eco-Farming Biogas Project Phase I	 China		334,000	Biogas Support Program - Nepal Activity-4	 Nepal		234,000
Guyana Skeldon Bagasse Cogeneration Project	 Guyana		0	Micro hydro Promotion	 Nepal		93,000
La Esperanza Hydroelectric Project	 Honduras		245,000	Community-Based Renewable Energy Development in the Northern Areas and Chitral (NAC), Pakistan	 Pakistan		28,000
Bundled Street Lighting Energy Efficiency Projects implemented by AEL in India	 India		0	Santa Rosa	 Peru		42,000
FaL-G Brick and Blocks Project No.1	 India		106,000	Laguna de Bay Community Waste Management Project: Avoidance of methane production from biomass decay through composting -1	 Philippines		0
FaL-G Brick and Blocks Project No.2.	 India		16,000	Electrogaz Compact Fluorescent Lamp (CFL) distribution project	 Rwanda		23,000
FaL-G Brick and Blocks Project No.3.	 India		49,000	Promotion of Energy Efficient lighting using Compact Fluorescent Light Bulbs in rural areas	 Senegal		0
FaL-G Brick and Blocks Project No. 4.	 India		0	AEP Livestock Waste Management Project	 Thailand		0
Vertical Shaft Brick Kiln Cluster Project	 India		0	Municipal Waste Compost Program	 Uganda		16,549
Olkaria II Geothermal Expansion Project	 Kenya		303,000	Mperewe Landfill Gas Project	 Uganda		0
Optimization of Kiambere Hydro Power Project	 Kenya		47,000	Electricity Distribution Loss Reduction Program	 Yemen Rep.		0
				Total			4,052,000

25 Sources: CDCF (internal document), *Portfolio database since inception*, 2017;



Note (Table 1): The emission reduction figures presented in the report are the number of CERs issued as of 1 May 2017. This volume does not necessarily reflect volumes transacted to the CDCF under ERPA. Source: CDCF. Portfolio database since inception, 2017. Internal CDCF document. The issued CERs represent the emission reductions in tons of carbon dioxide equivalent that are formally recognized by the UNFCCC. In addition to CERs some projects such as the Fal-G Brick and Blocks Project No. 4 also generated emission reductions which were verified under voluntary offset standards. While these emission reductions are not recognized by the UNFCCC, they nonetheless undergo an auditing process following a similar standard. The projects are presented in alphabetical order of the host country names.

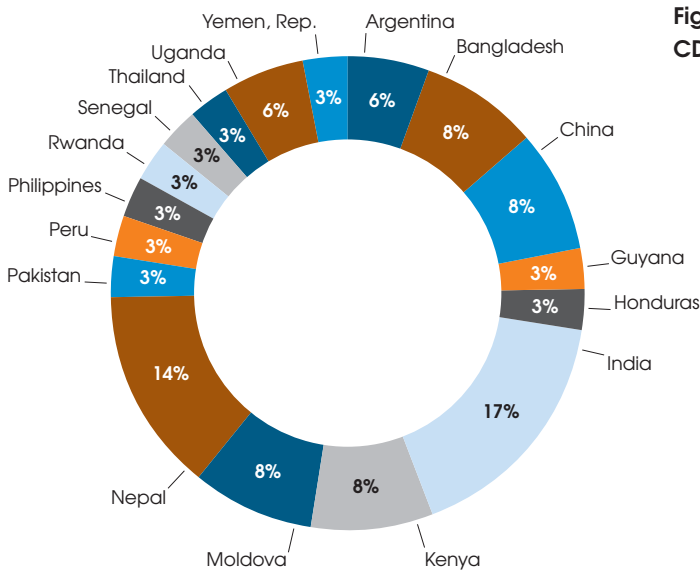


Figure 2 / Number of registered CDCF assisted CDM PDDs and PoAs by country²⁶

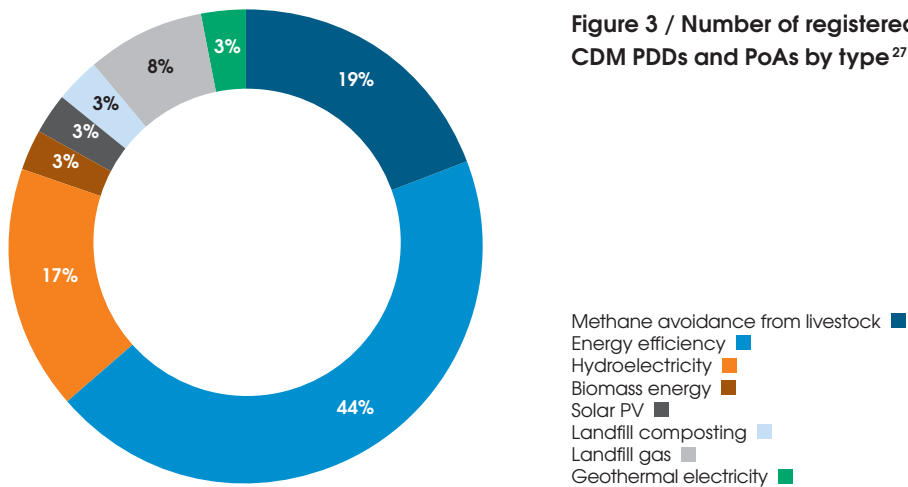
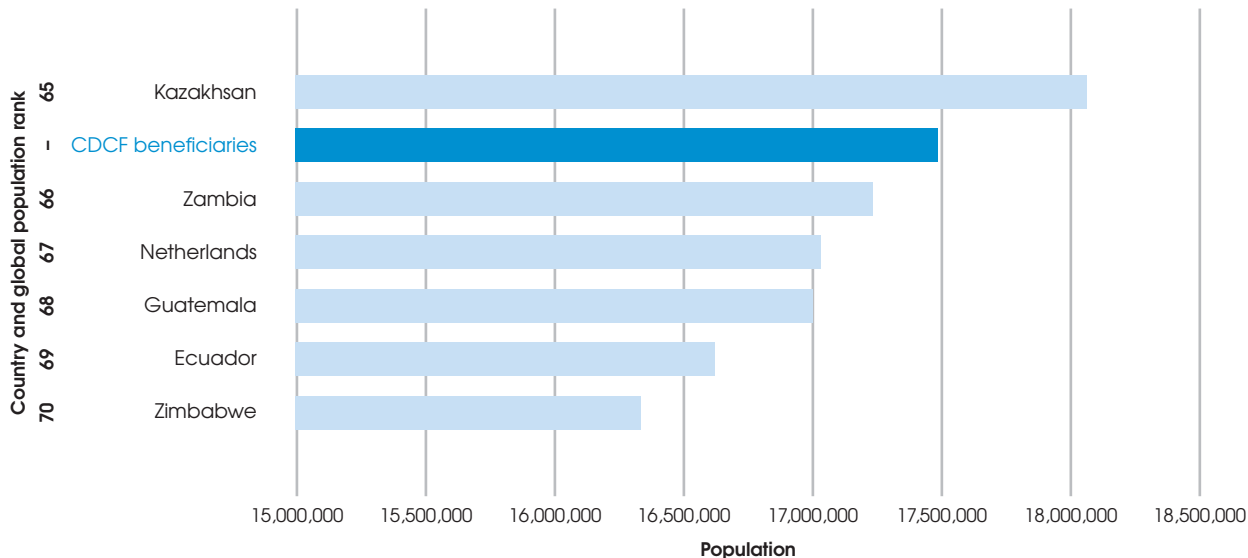


Figure 3 / Number of registered CDCF assisted CDM PDDs and PoAs by type²⁷

²⁶ Sources: CDCF (internal document), *Portfolio database since inception, 2017.*

²⁷ Ibid.

Figure 4 / Number of beneficiaries of CDCF supported projects²⁸

3.1.2. Bringing tangible co-benefits to local communities

As of March 2017, CDCF assisted projects have contributed to the sustainable development of numerous communities across the world, **benefiting an estimated 17.5 million people.**²⁹

All projects facilitated by the CDCF must provide measurable direct or indirect co-benefits to the local community living in the vicinity of the projects. There are four main types of co-benefits: (1) **Improved livelihoods**, due to increased health quality, e.g. through the reduction of air pollution and accidents of the local community, improved working conditions and new employment opportunities.³⁰ Table 2 shows that the CDCF portfolio projects improved livelihoods of approximately 46,000 people. (2) **Access to clean energy** for rural households and communities, including improved access to clean, more reliable, safe, and cheap energy for cooking, heating, and lighting as a result of the implementation of

a CDCF project. Approximately 15 million people benefitted from implementing these measures.

(3) **New and/or improved local infrastructure** (construction and rehabilitation) through the implementation of CDCF Community Benefit Plans (CDP), including maintenance and construction of roads, local health clinics and schools. Around 200,000 people benefitted from improvements in local infrastructure. (4) **Improved access to energy efficiency measures and services**, which helped to reduce the communities' energy consumption. Approximately 1.2 million people benefitted from measures that fall under this category.

Co-benefits are direct or indirect. **Direct co-benefits** are brought by the project itself. They include for example access to cheaper, safer and more reliable energy and electricity for community through the installation of run-of-river hydropower, household solar systems, and household biogas digesters. In case the projects have no or negligible direct co-benefits for the local communities, a

²⁸ Source: Worldometers, *Current World Population*, Accessed March 1, 2017, <http://www.worldometers.info/world-population/>.

²⁹ Estimate based upon beneficiary data from community benefit plans. Source: CDCF (internal document), *Community Benefits, Annual Meeting, June 1, 2016*.

³⁰ Source: CDCF (internal document), *Community Benefits, Annual Meeting, June 1, 2016*. Source: World Bank, *CDCF making an impact: carbon finance delivers benefits for the poor*, 2013.



From all carbon funds the government of Spain participated in, CDCF was *the* carbon fund to receive emission reductions with additional value and co-benefits for communities.





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CBP is set up. In this case, additional activities with benefits for the community are designed and implemented in consultation with the local community. Examples of these activities include building new classrooms, providing access to drinking water, setting up health clinics, offering medical services and providing training for new livelihood skills for poor local communities. Co-benefits derived from these activities are referred to as **indirect co-benefits**. CDM projects with indirect co-benefits include large projects such as geothermal plants, landfills, and large

livestock waste management. Annex II provides an overview of the CDCF portfolio projects and their main contribution to the local communities (direct and indirect co-benefits).³¹

The CDCF co-benefits are summarized in Table 2 and are illustrated by the three case-studies presented in Chapter 3.

Table 2 / Key community benefits and number of beneficiaries³²

Key community benefit	Number of beneficiaries
Improved livelihoods, including living and working conditions and more employment opportunities.	 460,000
Access to clean energy for poor rural households and communities.	 15,500,000
Construction and rehabilitation of local infrastructure, including roads, clinics and schools	 201,000
Access to energy efficiency measures and services	 1,264,000

Note: The figures provided in the table above are estimates as community co-benefits are often interlinked and can extend beyond the local communities directly impacted by the project.

31 Source: World Bank, *Community Development Carbon Fund*, n.d., accessed April 24, 2017, <https://wbcarbonfinance.org/docs/CarbonFundweb.pdf>.

32 Sources: CDCF (internal document), *Portfolio database since inception, 2017*; World Bank, *CDCF making an impact: carbon finance delivers benefits for the poor*, 2013.

The positive impacts on beneficiary communities often go beyond quick and immediate co-benefits; they also bring about lasting changes to the communities and contribute to the achievement of SDGs. Table 3, Table 4, and Table 5 below map the key community co-benefits of the three projects presented in the case-studies against the SDGs to which they most likely contribute.³³ Annex II presents this mapping for the other projects that issued CERs.

Table 3 / Improving Kiln Efficiency in the Brick Making Industry in Bangladesh (Bundle-1,2): community co-benefit overview³⁴

Key community co-benefits	UN SDGs contributed towards
Promotion of cleaner brickmaking technology	Affordable and clean energy
Reduction of air pollution	Good health and well-being
Provision of basic sanitation and washing facilities for men and women on each plant	Good health and well-being, gender equality, clean water and sanitation
Provision of on-site first aid and health clinic to provide primary health care (health clinic built, biweekly doctor's visits are ensured)	Good health and well-being
Construction of multipurpose centers at each plant, separate eating rooms, construction of dormitories for non-local workers	Gender equality
Provision of safety gear and appropriate clothing	Decent work and economic growth
Creation of new permanent employment for men and women	Decent work and economic growth

Table 4 / Rwanda Electrogaz Compact Fluorescent Lamp (CFL) distribution project: community co-benefits overview³⁵

Community co-benefits	SDGs contributed towards
Affordable and reliable energy to poor families in Rwanda	Affordable and clean energy; sustainable cities and communities
Job creation and increases in businesses	Decent work and economic growth
Connection of households that were not yet connected to the grid and distribution of three to four CFLs with their new electricity meter.	Affordable and clean energy

Table 5 / Biogas Support Program - Nepal (BSP-Nepal) Activity-1, 2, 3, 4: community co-benefits overview³⁶

Key community co-benefits	UN SDGs contributed towards
Air quality improvements (reducing fly ash and suspended particulate matter)	Good health and well-being
Improvement of soil quality by adding soil nutrients	Zero hunger
Protection of forests	Life on land
Creation of job opportunities and business opportunities, improvement of working conditions	Decent work and economic growth
Improvement of health & safety, e.g. reduction of number of accidents	Good health and well-being
Women empowerment	Gender equality
Increased affordability and reliability of energy	Affordable and clean energy

The new mechanism proposed in Article 6.4 of the Paris Agreement, which will provide the regulatory framework for any future instrument similar to the CDCF, strongly emphasizes the need to combine mitigation and sustainable development. Mapping the community co-benefits of the CDCF assisted projects to the 17 UN SDGs (for a complete overview see Annex II) reveal that the CDCF has very likely made contributions that cover a variety of SDGs, as shown in Figure 5. The line marks the number of projects that includes activities which likely contribute to the specific SDG.

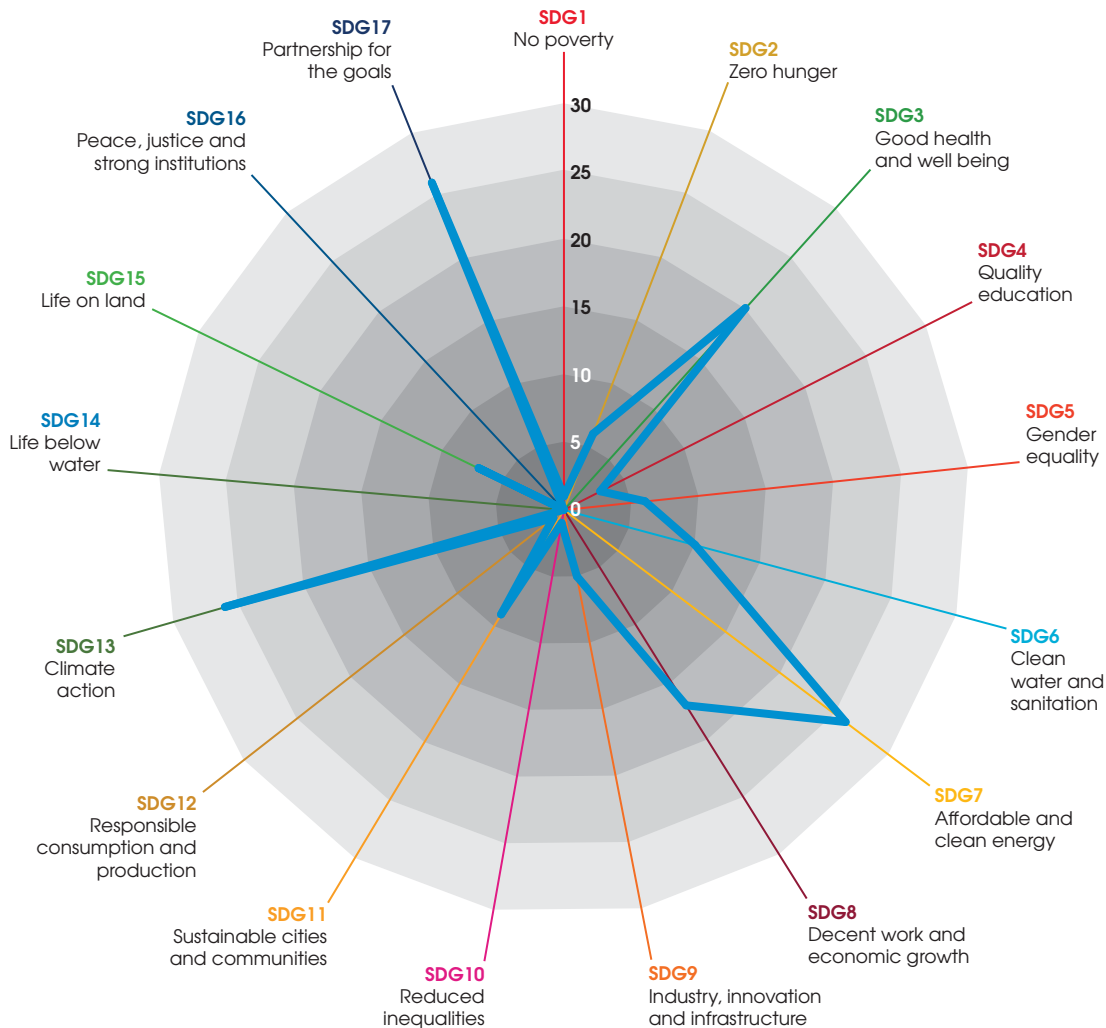
33 The analysis is based on the data on co-benefits presented in project documents. The specific sources are indicated in the footnotes for each table.

34 Source: World Bank, *Implementation completion and results report on a proposed purchase agreement of emission reductions from the community development carbon fund for the Bangladesh brick kiln efficiency project*, 2014.

35 Source: World Bank, *Raising Awareness of Energy Efficient Light Bulbs Pays off in Rwanda*, November 6, 2014, <http://www.worldbank.org/en/news/feature/2014/11/06/raising-awareness-energy-efficient-light-bulbs-pays-off-rwanda>.

36 Note that the Sustainable Development Report for the project *Biogas Support Program - Nepal (BSP-Nepal) Activity-2* does not indicate any impact on gender equality. Source: UNFCCC, *CDM Sustainable development co-benefits description reports 2017*, accessed April 24, 2017, <http://cdm.unfccc.int/Statistics/Public/CDMinsights/index.html#iss>.

Figure 5 / Strongest contributions towards sustainable development co-benefits mapped to most comparable SDGs by CDCF portfolio projects³⁷



Note: This figure is based on the analysis of the data on co-benefits that is presented in available information including CDCF project implementation completion reports, CDM sustainable development co-benefits description reports for the projects and CDM validation reports. Annex II of the report provides more detail on how the project benefits are mapped to UN SDGs. It is important to note though that this is a simple illustrative analysis of which UN SDGs CDCF projects are most likely contributing strongly to. It focuses on the most visible and well documented benefits and does not map exhaustively all of the benefits (and therefore the contributions to UN SDGs) for the CDCF projects. Therefore, a zero rating in the figure does not necessarily imply that CDCF projects have not contributed to this SDG, this is especially the case for benefits that are complex to monitor quantitatively such as gender equality. For example, as part of the Olkaria II Geothermal Expansion Project Kenya, three new nurseries and three new school classrooms were built (see Figure 6), which potentially benefit 450 children a year. While it is very likely that this also means improved education opportunities for local girls given the lack of immediately available information, the main contribution is considered to be contributing to SDG 4 only for this analysis.

As illustrated in Figure 5, CDCF projects contribute most substantially, but not exclusively, to the following SDGs:

- **SDG 3: Good health and well-being.** For example, some CDCF projects helped to reduce indoor air pollution and thereby reduced the occurrence of respiratory diseases, especially for women who were previously exposed to strong indoor pollution while cooking. Project examples include the

Biogas Support Program Nepal and the China Hubei Household Eco-farming Biogas Project. 88 percent of sampled beneficiary households in Nepal reported reductions in in-home smoke after the implementation of the project.³⁸ Other co-benefits include new washing facilities and separate toilets for men and women, and new employment opportunities, e.g. through the project to improve kiln efficiency in the brick making industry in Bangladesh.

³⁷ Based upon the strongest co-benefits as stated in project CDP completion reports, UNFCCC Sustainable Development Tool reports or project CDM validation reports.

³⁸ Source: World Bank, *CDCF making an impact: carbon finance delivers benefits for the poor*, 2013.

- ▶ **SDG 13: Climate Action, SDG 7 Affordable and clean energy and SDG 11: Sustainable cities and communities.** Improved access to clean energy and electricity is a core benefit of CDCF projects and strongly contributes to the three aforementioned SDGs. Projects such as the Nepal Micro Hydro, Pakistan Community-based Hydro Power, and Bangladesh Solar Homes Systems provide direct electricity access to communities. Other projects, such as Rwanda Compact Fluorescent Lamp (CFL) Energy Efficiency, include energy efficient lighting.
- ▶ **SDG 17: Partnership for goals.** The CDCF by nature brings together multiple stakeholders from both the private and public sectors to collaborate and deliver community co-benefits which contribute to sustainable development. For example, each project requires various stakeholders to cooperate to design, implement and monitor the project. Also, capacity building and technical assistance activities foster collaboration towards sustainable development.

The CDCF shared its experience with combining co-benefits and emission reductions by contributing to the development of the CDM Sustainable Development (SD) tool, presented in Box 1.³⁹

Box 1 / The CDM Sustainable Development (SD) tool.

The CDM SD tool provides a means for project developers to showcase the sustainable development co-benefits of their projects and PoAs and helps them to achieve a price premium for their CERs. Through the tool, project developers can provide information about co-benefits of the projects. The tool then creates a sustainable development co-benefits report that is published by UNFCCC. To date, 48 CDM projects and PoAs have used the tool to generate SD reports.

Figure 6 / Old classroom (left) and new classroom (right) built as part of the CBP of the Olkaria II Geothermal Expansion Project in Kenya⁴⁰

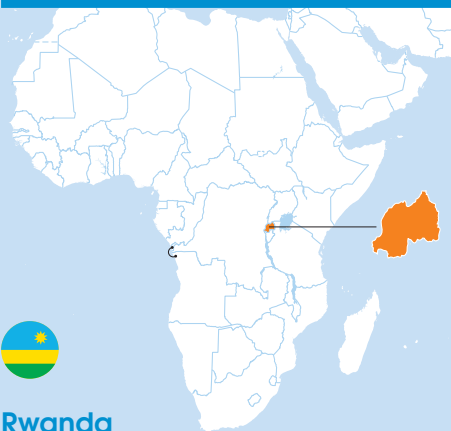


³⁹ Source: World Bank, *CDM Input - Voluntary Tool on Sustainable Development Co-benefits*, 2012.

⁴⁰ Source: CDCF. Community Benefits. Source: CDCF (Internal document), *Community Benefits. Annual Meeting*, June 1, 2015.

Case study 1

Rwanda Electrogaz Compact Fluorescent Lamp (CFL) distribution project



Rwanda

- ▶ Population: 12.1 Million⁴¹
- ▶ 63.2 percent of the population lives below the national poverty line⁴²

Children in newly grid-connected households can do their homework at night.⁴⁵



The Rwanda Electrogaz Compact Fluorescent Lamp (CFL) distribution project is the first CDM project to be registered in Rwanda. Under the CDM project, the Rwanda Energy Group – the national public electricity utility, formerly called Electrogaz – conducted an ambitious countrywide distribution of 800,000 high-quality CFLs, commonly known as “Energy Savers,” that are up to 75 percent more efficient than incandescent bulbs. In April 2015, the project issued 23,491 carbon credits, marking the first time a project in Rwanda issued certified emission reductions.

The project helps to expand the use of high-efficient lighting technology in Rwanda’s residential sector by distributing CFLs. The project supports communities by providing high quality and low price CFLs which enables households to reduce their electricity consumption. In total, over one million people benefitted from the project.⁴³

The project also enables the poorest families in Rwanda to afford access to electricity on a more sustainable basis and proposes a competitive alternative to traditional fuel, e.g. kerosene lamps and small batteries that have negative environmental and health impacts for the community. Some villages are becoming small commercial centers, open late into the night. For newly connected households, children can now continue to do their homework at night. CFLs are also used outside, and can be left on all night, for safety and visibility on the rugged terrain.⁴⁴

Another benefit is that the high adoption rate of CFLs and new energy-saving behavior by customers has helped end-users to save 64 GWh per year, valued at \$14.5 million - savings that help Rwanda to further expand access to electricity.



CFLs can be used inside or outside, and can be left on all night which increases safety and visibility for the households and communities.⁴⁶

41 Source: Worldometers, *Rwanda Population*, Accessed April 24, 2017, <http://www.worldometers.info/world-population/rwanda-population/>.

42 Source: African Health Observatory, *MDG Goal 1: Eradicate extreme poverty and hunger - Other MDGs*, n.d., accessed April, 24, 2017, http://www.aho.afro.who.int/profiles_information/index.php/Rwanda:MDG_Goal_1:_Eradicate_extreme_poverty_and_hunger_-_Other_MDGs

43 Source: The World Bank, *Raising Awareness of Energy Efficient Light Bulbs Pays off in Rwanda*, 2014, accessed April 24, 2017, <http://www.worldbank.org/en/news/feature/2014/11/06/raising-awareness-energy-efficient-light-bulbs-pays-off-rwanda>

44 Source: CDCF (internal document), *Community Benefits. Annual Meeting*, June 1, 2015.

45 Source: CDCF. *Community Benefits. Annual Meeting*, June 1, 2015. 2015. CDCF internal communication.

46 Ibid.

3.2. Contributing to sustainable development in poor countries and regions

The priority countries for the CDCF are those most in need of development assistance.⁴⁷ These include the countries designated as LDCs by the UN and countries listed in the World Bank's list of countries eligible for IDA loans.⁴⁸ These countries are also the ones least represented under the CDM. LDCs tend to exhibit low or dispersed emission profiles, which means that CDM projects located within LDCs will by nature often result in lower emission reductions, and therefore generate fewer CERs and hence carbon revenue compared to equivalent projects in other countries.⁴⁹ To address this, similar activities need to be grouped or the geographical scale of the project needs to be expanded to generate a substantial volume of emission reductions to making transaction costs worthwhile. In addition, the rules of the CDM, especially before the introduction of PoAs and of streamlined procedures, were complex and favored large single facility projects over those that involved numerous small emitters such as



One of the key achievements of the CDCF was to achieve emission reductions in the poorest countries and communities in the world. CDCF has proven that every country can contribute to reducing emissions.

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households. Finally, another challenge faced by the CDM in LDCs was the lack of local technical capacity or knowledge of climate action and carbon mitigation technology.

3.2.1. Pioneering carbon finance for communities in poor regions

A founding mandate of the CDCF was to invest a minimum of 25 percent of the fund resources into eligible projects located in LDCs and other poor developing countries. To date the CDCF has significantly surpassed this target with 74 percent of its capital invested in assisting community focused projects such countries.⁵⁰

Over the last 15 years, the CDCF has successfully registered **13 CDM projects located in six LDCs. Of these ten projects went on to issue just under 2.2 MtCO₂e of CERs⁵¹** as shown in Figure 7.

These registrations were supported by active

capacity building through CDCFplus—the technical assistance arm of the CDCF. CDCFplus activities helped to disseminate knowledge on mitigation technologies, and enhance capacity to monitor and verify emission reductions.⁵² Through these efforts, the CDCF has enabled climate change mitigation in households in some of the

poorest countries and regions in the world. Of the 17.5 million beneficiaries of CDCF portfolio projects, approximately **16 million were from communities in LDCs.**⁵³

47 Source: World Bank, *CDCF 2004 Annual report*, 2005.

48 Source: World Bank, *CDCF making an impact: carbon finance delivers benefits for the poor*, 2013.

49 Source: World Bank, *10 Years of Experience in Carbon Finance: Insights from working with the Kyoto mechanisms*, 2010.

50 Source: World Bank, *CDCF annual progress report June 2016*, 2016.

51 Source: UNEP DTU Partnership, *UNEP DTU CDM/JI Pipeline Analysis and Database*, accessed April 24, 2017, <http://www.cdmpipeline.org/>

52 Source: Interviews with the CDCF team and external stakeholders.

53 CDCF (internal document), *Community Benefits. Annual Meeting*, June 1, 2016, 2016.

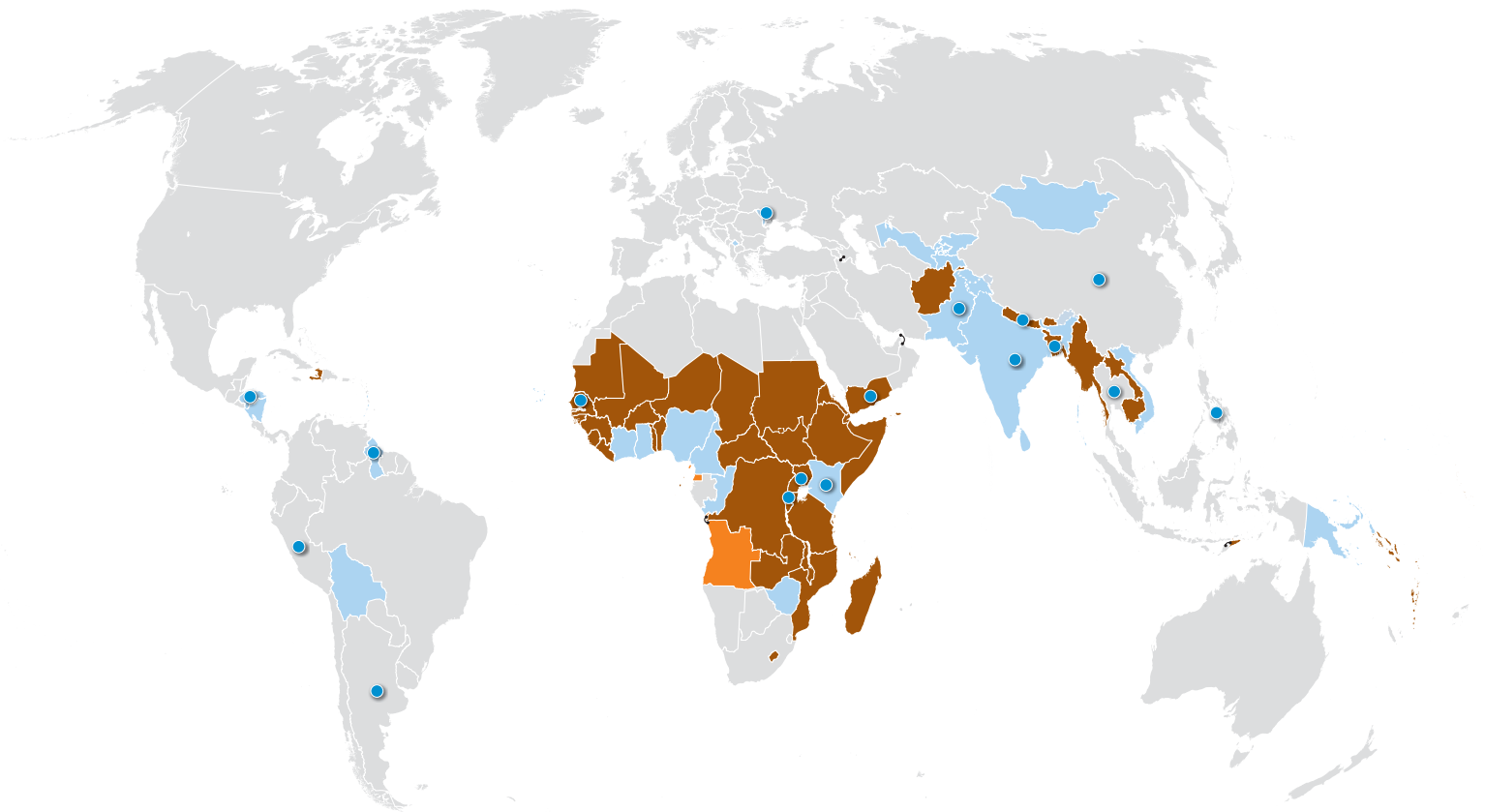


Figure 7 / Geographic coverage of CDCF projects by country⁵⁴

Note: The LDCs are highlighted in orange, World Bank Priority countries in light blue, countries which are both a LDC and a World Bank Priority country are in brown and the CDCF projects shown as blue dots.

The CDCF achieved a series of important firsts for various CDM activities in LDCs including:⁵⁵

- ▶ **The first CER generated from a CDM PDD in a LDC**, by the Biogas Support Program - Nepal (BSP-Nepal) Activity-1 (CDM No: 0136).⁵⁶ Along with its sister PDD, Biogas Support Program - Nepal (BSP-Nepal) Activity-2 (CDM No: 0139), the two PDDs were also the first CDM PDDs to be registered in Nepal and the first CDM projects registered in the world that explicitly aim to bring additional co-benefits to communities in LDCs.
- ▶ **The first PoA registered in Africa (April 2010) and in Uganda**. The Uganda Municipal Waste Composting PDD (CDM No: 2956) was the first PoA registered in Africa and first PoA registered in Uganda.
- ▶ **The first CDM PDD registered and first CERs issued for a PDD in Rwanda**. The Rwanda Electrogaz Compact Fluorescent Lamp (CFL) PDD (CDM No: 3404) was also the first CFL PDD on the African continent.
- ▶ **The first PoA to begin the CDM validation process and the first solar home system PoA worldwide**. The Installation of Solar Home Systems in Bangladesh PoA (CDM No: 2765) was also the first renewable energy PoA in Bangladesh.
- ▶ **The first and only CDM activity to date in the Republic of Yemen**. The Yemen Electricity Distribution Loss Reduction Program PoA (CDM No: 9557) was also the first PoA on the Arabian Peninsula and the first POA in the transmission and distribution sector that reduces transmission and distribution losses worldwide.

54 Source: UNFCCC, *LDC Country Information*, accessed March 4, 2017, http://unfccc.int/cooperation_and_support/lcd/items/3097.php; World Bank, *Borrowing Countries*, n.d., accessed May 4, 2017, <http://ida.worldbank.org/about/borrowing-countries>.

55 Source: UNEP DTU Partnership, *UNEP DTU CDM/JI Pipeline Analysis and Database*, accessed April 24, 2017, <http://www.cdmpipeline.org/>

56 By start of crediting period date.

In addition to LDCs, priority countries of the CDCF include those countries eligible for IDA loans by the world bank.⁵⁷ These are often regions of high poverty which are only marginally better off than the LDCs. An example of such a region is Kenya, which is not classified as an LDC, but is eligible for World Bank IDA loans. 46 percent of Kenya's 38.3 million people are living below the poverty line and 74 children out every 1,000 will not live to see their fifth birthday.⁵⁸ The Kenya Olkaria II Geothermal project (CDM No: 3773) resulted in the first CER issuance in Kenya. Another example of a CDCF project in Kenya is the rehabilitation of the Tana hydro power station, which involved the upgrade and replacement of broken and ageing equipment. The Tana project has issued 19,000 tCO₂e of emission reductions in Kenya since its registration in October 2011 by displacing fossil fuel-based electricity generation in the Kenyan grid.⁵⁹ In addition, like all CDCF projects, the Tana project also has a range of community co-benefits. One of the most important is the improved access to clean drinking water, where CDCF established a CBP requiring that clean drinking water be made accessible to the local community living near the plant.⁶⁰

Families in the remote tribes have difficult access to water and have to walk tens of kilometers to find water. The CBP of Tana, Olkaria II and Kiambere each include a component on access to water. The construction of water pipes, installation of water tanks or construction of a small community earth dam have a big impact on the local families as well as the broader region since people from other communities could also get their water during severe droughts.

Xiaoyu Chang,

World Bank carbon finance specialist

All three of the CDCF projects located in Kenya provide indirect benefits to local poor communities, designed under a CBP and funded by a price premium on carbon credits. One of the most important needs identified by the communities is access to drinking water.

3.2.2. Providing capacity building and technical assistance

LDCs and many developing countries lack capacity and technological training to develop and implement CDM projects. The CDCF has addressed this issue by knowledge sharing on carbon finance, GHG accounting, MRV, climate action and mitigation technology.

57 For an overview of countries eligible for the World Bank International Development Association loans, see <http://ida.worldbank.org/about/borrowing-countries>.

58 Source: UNICEF, *Kenya at a glance*, accessed April 4, 2017, https://www.unicef.org/kenya/overview_4616.html.

59 Source: UNFCCC, *Redevelopment of Tana Hydro Power Station Project, Project Design Document*, 2014.

60 Source: World Bank, *Kenya: Optimization of Kiambere Power Station Project*, n.d., accessed April 24, 2017, <https://wbcarbonfinance.org/Router.cfm?Page=Projport&ProjID=35854>.

Such capacity building is primarily delivered by CDCFplus in several ways.⁶¹ Firstly, CDCFplus identifies local intermediaries and trains them to prepare and implement small-scale carbon projects. Such intermediaries include commercial banks, savings and loan associations, cooperatives, development NGOs, and in-country utilities providers. These suppliers can work on both individual and bundled projects and ideally serve as points of contact for additional regional initiatives.

CDCFplus also responds to specific requests from project developers for technical assistance to bring the project to the CDM validation stage. This can include partial funding for project origination and design such as social and environmental due diligence, feasibility studies, market analysis, or project business plan; carbon asset creation or PDD preparation; and community co-benefits identification and selection.⁶²

CDCFplus identifies community co-benefits and ensure that local beneficiary communities and other stakeholders are fully informed and consulted from the onset of the CBP activities from

the design phase through to the implementation phase and that their concerns and interests are reflected in the final project. Finally, CDCFplus seeks to provide technical assistance to the governments of LDCs and developing countries with poor regions to improve understanding of how carbon finance works and how to allow their countries to better participate in the carbon market. This includes helping negotiators in the international climate negotiations⁶³ and organizing events at international climate gatherings (see Box 2).

The impacts and results of these capacity building activities are not easily quantified. However, from a qualitative perspective **the CDCFplus' capacity building activities have been highlighted by stakeholders**

as being one of the most important and useful outputs of the CDCF.⁶⁴ Stakeholder specifically highlighted the CDCF's technical assistance to both communities and policy maker stakeholders on MRV for climate mitigation as one of the most important examples of the CDCF's capacity building activities.



Over the last 15 years, we realized that capacity building at all levels – from the project level to the country level – is crucial for delivering a successful CDCF project.

Teresa Solana Mendez de Vigo,
Carbon finance expert from the Government of Spain

61 Source: World Bank, What is CDCFplus?, n.d., accessed April 24, 2017, <https://wbcarbonfinance.org/Router.cfm?Page=CDCF&FID=9709&ItemID=9709&ft=Plus>

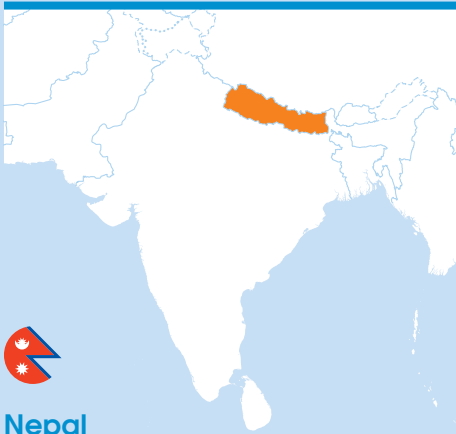
62 Source: World Bank, *CDCF making an impact: carbon finance delivers benefits for the poor*, 2013. Source: Interviews with CDCF participants.

63 Ibid.

64 Based on interviews with CDCF participants.

Case study 2

Biogas Support Program - Nepal (BSP Nepal)



Nepal

- ▶ Population: 29.1 Million⁶⁵
- ▶ 25.2 percent of the population lives below the national poverty line⁶⁶

The Biogas Support Program - Nepal (BSP Nepal) activities 1,2,3 and 4 are four registered PDDs within the CDCF portfolio that achieved approximately 170,000 emission reductions annually.⁶⁷ The projects provided around 60,000 rural Nepalese households access to clean, free, and safer cooking fuel through the installation of small biogas plants.⁶⁸ The projects are part of a nationwide program, funded by international donors and coordinated by the Alternative Energy Promotion Center of Nepal and supported by the Biogas Sector Partnership Nepal.

The projects supported the installation and operation of biogas plants in the backyard of rural families, where animal and human waste is manually churned in a digester. This provides economic benefits due to free, long-term and sustainable supply of biogas for cooking and sustainable fertilizer for the families involved. The use of the slurry from the biogas digester as fertilizer

60,000 rural households in Nepal benefitted from free, continuous biogas for cooking⁶⁹



65 Source: Worldometers, *Nepal Population*, Accessed April 24, 2017, <http://www.worldometers.info/world-population/nepal-population/>.

66 Source: Asian Development Bank, *Poverty in Bangladesh*, n.d., accessed April 24, 2017, <https://www.adb.org/countries/bangladesh/poverty>.

67 Source: UNFCCC, *CDM Sustainable Development co-Benefits Description Report*, accessed April 4, 2017, <http://cdmcobenefits.unfccc.int/Pages/SD-Reports.aspx>.

68 Source: World Bank, *CDCF making an impact: carbon finance delivers benefits for the poor*, 2013.

69 Source: CDCF (internal document), *Community Benefits, Annual Meeting, June 1, 2016*, 2015. Source: World Bank, *CDCF making an Impact: carbon finance delivers benefits for the poor*, 2013.

Nepalese women churning animal waste in biodigester⁷¹

also helped increase the communities agricultural output.⁷⁰ The projects moreover contributed to the conservation of forests by substituting biogas for non-renewable woody biomass as remote rural households no longer need to forage wood and biomass from delicate local forests.

The reduction of indoor smoke, fumes, and heat through improved cooking methods increased the health of family members. Sanitary conditions also improved in the households in cases where the latrine was connected to the biogas digester. The time and energy saving generated by reducing the need to collect firewood and making dung cakes was a significant benefit especially for women.

Capacity building was integral to the projects. The projects relied heavily on social mobilization campaigns by NGOs and private companies that



enhanced the knowledge about biogas plants. In addition, every beneficiary households received training on the use of biogas plants and received access to services from the company after the purchase.

Nepalese women exposed to indoor pollution because of traditional firewood stove (left) and Nepalese women cooking with cleaner and safer biogas at home⁷²



70 Source: UNFCCC, *CDM Sustainable development co-benefits description report 2017*, accessed April 20, 2017, <http://cdmcobenefits.unfccc.int/Pages/SD-Reports.aspx>.

71 Source: CDCF (internal document), *Community Benefits, Annual Meeting, June 1, 2015*. Source: World Bank, *CDCF making an Impact: carbon finance delivers benefits for the poor*, 2013.

72 Ibid.



CDCF is a unique fund which strongly promotes co-benefits. CDCF pioneered capacity building in the local communities in terms of operating new technologies, understanding the key factors for making the project a success and monitoring the emission reductions. The communities were the real leaders of the CDCF projects.

Teresa Solana Mendez de Vigo,
Carbon finance expert from the Government of Spain

The review of the CDCF records also points to numerous community and stakeholder (including donors and local governments) capacity building events.⁷³ One interviewed stakeholder emphasized that the various technical assistance opportunities they had with the CDCF is something they utilize in climate negotiations

and when considering new climate actions. Knowledge sharing therefore helps increase the impacts of the immediate outputs of the CDCF projects themselves. Another stakeholder indicated that one of the primary reasons he wanted to be a part of the CDCF was to learn about carbon finance and the carbon market.

Box 2 / Examples of the CDCF's capacity building and technical assistance events focusing specifically on LDCs

- ▶ At Carbon Expo 2016 the CDCF co-organized a side event called "Carbon Co-Benefits – Pushing the Envelope".⁷⁴
- ▶ In 2015, the CDCF co-organized two related events to help maximize knowledge on development co-benefits of CDM projects at the Africa Carbon Forum. One event focused on the CDM SD tool called "Add value to your CERs: the CDM Sustainable Development Co-benefits tool" and another workshop took place on "Accelerating Innovation for Promoting Energy Access".⁷⁵
- ▶ Similarly, CDCFplus supported the first phase of the World Bank work program on CDM reforms focusing on the needs to low-income countries. A study on "CDM Reform – Improving the efficiency and outreach of the Clean Development Mechanism through standardization" was published in May 2012. The study was presented at the UNFCCC Bonn negotiations and during the Carbon Expo 2012.⁷⁶
- ▶ In 2009, CDCF produced and held workshops on the "Carbon Finance Toolkit: Ensuring Benefits for Communities". The Carbon Finance Tool aimed to provide a practical guide to project developers, local communities and World Bank staff on how to stream line carbon finance components and achieve participatory community development in the design of their projects. In particular, it provided specific guidance on each of the main project types supported by the CDCF, such as hydroelectricity, biomass energy and landfill gas.
- ▶ CDCF participated in the first global carbon trade fair, Carbon Expo in Cologne from 9 to 11 June 2004.⁷⁷

73 Source: World Bank, *CDCF Annual Progress Report FY2015 and business plan and budget FY2016*, 2016. Source: World Bank, *CDCF Annual Progress Report FY2015 and business plan and budget FY2016*, 2015. Source: World Bank, *CDCF annual progress report Fiscal Year 2012*, 2012. Source: World Bank, *Report to the Participants on Progress in Implementation Fiscal Year 2004*, 2004.

74 Source: World Bank, *CDCF Annual Progress Report FY2015 and business plan and budget FY2016*, 2016.

75 Source: World Bank, *CDCF Annual Progress Report FY2015 and business plan and budget FY2016*, 2015.

76 Source: World Bank, *CDCF annual progress report Fiscal Year 2012*, 2013.

77 Source: World Bank, *Report to the Participants on Progress in Implementation Fiscal Year 2004*, 2004.

Many people now working on climate negotiations, CDM reforms, private sector corporate social responsibility (CSR) reporting and other World Bank funds have taken part in CDCF capacity building or operation related activities. They can apply the experiences and knowledge they have gained, including knowledge of the unique challenges and potential solutions faced by community projects in LDCs, to the design of future carbon market mechanisms.

3.2.3. Promoting replication through learning by doing

Through participation in the CDCF, local public and private entities build their capacity on carbon finance, which they can leverage to carry out similar activities without the support of the CDCF.

For example, starting in 2007 Eco Carbon Pvt. Ltd in India developed in collaboration with the CDCF four PDDs for the India-FaL-G Brick and Blocks Projects (CDM No: 707, 4585, 4831, 5348). In 2014 Eco Carbon Pvt. Ltd went on to develop two additional FaL-G PDDs on its own (CDM No: 10062, 10191), drawing on the experience gained through the development of the additionality arguments and GHG monitoring plans for the previous four PDDs.⁷⁸

The FaL-G technology is also expanding into new countries. In 2014, Eco Carbon announced at the Africa Carbon Forum that it would provide the FaL-G technology for free to the African continent. In 2015, Eco Carbon entered into sub-agreements with project units in Bangladesh. In 2016, it offered technical support to Nepal to produce bricks and help rebuild the country following the April and May 2015 earthquakes.

Similarly, the Alternative Energy Promotion Centre in Nepal, building on its experience with the CDCF in developing and managing the Nepal Micro hydro Promotion and Nepal Biogas Support Program, went on to develop three PoAs on its

own: the Nepal Biogas Support Program-PoA (CDM No: 9572); PoA for Promotion of the Improved Water Mills (IWM) in Nepal (CDM No: 9889) and Promotion of the Improved Cooking Stove (ICS) – Nepal (CDM No: 9902).

Finally, the Kenya Electricity Generating Company Ltd (KenGen) worked with the CDCF to develop and register the Olkaria II Geothermal Expansion Project (CDM No: 3773) and later developed the Olkaria I Units 4&5 Geothermal Project (CDM No: 8643) and the Olkaria IV Geothermal Project (CDM No: 8646) without CDCF support.⁷⁹

CDCF project developers also benefitted from learning by doing in relation to local community engagement. Interviews with the CDCF team highlighted that some private sector project developers who learned about community engagement and co-benefits generation replicated the project business model for other operations or setting up their own NGO.

For example, KenGen's CSR arm was set up in 2006, at the time of the ERPA signature between KenGen and the CDCF for the design and implementation of the Community Benefit Plans. Since then the CSR team has grown to include local community champions and in December 2014 "The KenGen Foundation" was incorporated, committed to continue local community activities beyond the CDCF.

Additionally, the Municipality of Salta in Argentina, as part of the CDCF community benefit plan, formalized the community of waste pickers that were informally working on the municipal land fill site to separate and sell recyclable materials. The formalization of the cooperative as a legally recognized entity was important to allow recycling as a legal activity. It established a formal communication channel and relationship between the municipality and one of the most vulnerable groups, which continues beyond the CDCF ERPA. In addition, other local mayors visited the Salta landfill site recognized as exemplary.

78 Source: UNFCCC, *India-FaL-G Brick and Blocks Project No.5 (10062) and India-FaL-G Brick and Blocks Project No.6 (100191)*, accessed March 1, 2017, <https://cdm.unfccc.int/Projects/DB/DNV-CUK1414745423.53/view> and <https://cdm.unfccc.int/Projects/DB/SGS-UKL1443018464.49/view>

79 Source: UNFCCC, *CDM Insights - Issuances*, accessed March 1, 2017, <http://cdm.unfccc.int/Statistics/Public/CDMinsights/index.html#iss>.

3.3. Working with communities to extend the reach of small-scale projects

Promoting small-scale projects and creating the enabling conditions for their expansion is a key objective and a key achievement of the CDCF. The number of registered small-scale CDM PDDs and PoAs and their geographical distribution are largely influenced by CDM rules and supply and demand dynamics on the carbon market.⁸⁰

In terms of rules, the CDCF played an important role in helping to create the enabling conditions for the growth of small-scale activities, through notably the development of small-scale methodologies and the rules for PoAs. These tools were used by many small-scale projects beyond CDCF to generate CERs and receive carbon finance.

3.3.1. Trailblazing new small-scale methodologies

Small-scale CDM projects are climate change mitigation projects below a certain threshold as described below for each of the three types of small-scale CDM projects:⁸¹

- ▶ Type I: renewable energy project activities with a maximum output capacity of 15 megawatts (MW) (or an appropriate equivalent);
- ▶ Type II: project activities relating to improvements in energy efficiency which reduce energy consumption, on the supply and/or demand side, by up to 60 gigawatt hours (GWh) per year (or an appropriate equivalent);
- ▶ Type III: other project activities that result in annual emission reductions of less than or equal to 60 kilotons of carbon dioxide equivalent (ktCO₂e).

80 The EU decision restricting the eligibility of CERs in Phase III of the European Union Emission Trading System (EU ETS) to CERs from projects located within a LDC, or from projects registered before 31 December 2012 was likely the major influence behind the drastic increase in registered small-scale CDM projects in 2011 and 2012, despite the decreasing demand for CERs.

81 Source: UNFCCC, *CDM FAQs*, accessed March 1, 2017, <https://cdm.unfccc.int/faq/index.html>.

Mitigation projects at the community level, especially those involving isolated communities, are mostly small-scale projects.⁸² Small-scale projects are crucial for both global and community level climate action, as the anthropogenic GHG emission

activities are often individually small in scale but repeated across large populations. For example, a single community of a hundred households using solid fuels such as firewood for cooking may not collectively generate a large volume of emissions. However, when taking into account that approximately 700 million people in Sub-Saharan Africa alone are dependent on solid fuels, the impacts from these small-scale activities are significant.⁸³

Out of the 36 projects that received direct CDCF assistance, 30 are small-scale PDDs or PoAs.⁸⁴ The contribution of the CDCF to implement small-scale projects goes beyond just the projects that received direct CDCF assistance. Small-scale projects require specific methodologies to help guide their project design and implementation. When the CDCF was established, the environment for carbon finance was still in its infancy and there was a lack of appropriate methodologies especially for such projects. Methodology development could cost over US\$100,000 and the process to have the methodology approved could take up to

82 Source: CDM Rulebook. What are small-scale projects? n.d. Accessed April 24, 2017, <http://www.cdmlrulebook.org/152.html>

83 Source: World Bank, *Africa Clean Cooking Energy Solutions Initiative*, 2012.

84 Source: UNEP DTU Partnership, *UNEP DTU CDM/JI Pipeline Analysis and Database*, accessed April 24, 2017, <http://www.cdmpipeline.org/>

CDCF helped to bring climate change mitigation to the household level in a way that has not been seen before. CDCF projects helped to increase the awareness of climate change to very remote communities, for example in Nepal and Rwanda.

Sandrine Boukerche,
World Bank carbon finance specialist

two years.⁸⁵ This high cost and high risk combination meant that private sector investors were reluctant to develop new methodologies: for small-scale or disparate projects.

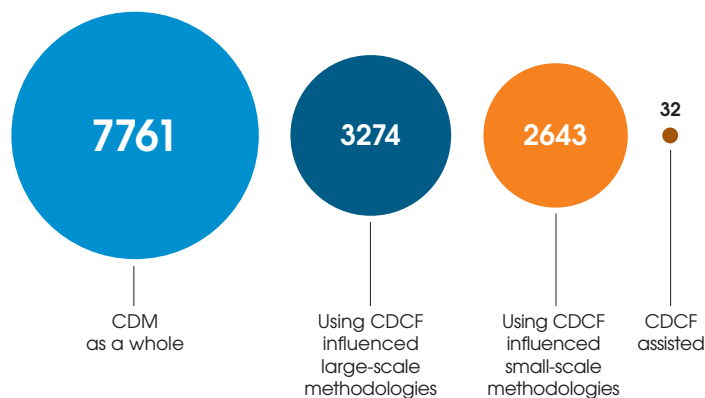
The promotion of small-scale projects, especially through methodology development, is a key goal for the CDCF and the CDCF has been instrumental in developing and solidifying various methodologies for use in the CDM framework. Due to their complexity, methodologies are often produced in collaboration with a number of stakeholders and it is difficult to establish the contribution of each stakeholder to the development of methodologies. Furthermore, methodologies evolve over time in line with new data sources and monitoring equipment, new mitigation technologies, new business models, regulatory changes and efficiencies in approaches. In some cases, the methodologies are merged into consolidated methodologies.⁸⁶ To reflect this situation and the diversity of CDCF's contribution to the development of methodologies, CDCF's inputs were broken down into four categories:

- ▶ CDCF supported the submission of new methodologies via the project entity
- ▶ CDCF was the main funding source for the development of new methodologies, even if this was with other collaborators
- ▶ CDCF supported submissions for changes to methodologies that resulted in revised methodologies being published
- ▶ CDCF contributed to the development of the methodology but was not the main author

85 Source: World Bank, *Ten years of experience in carbon finance: Insights from working with carbon markets for development and global greenhouse gas mitigation*, 2009.

86 Consolidated large-scale methodologies are a mix of other previously approved methodologies, that each funded a specific project. For example ACM0002 (the most used methodology in the CDM) was based on elements of new methodologies: NM0001-rev, prepared by Econergy International Corporation; NM0012-rev by Ecoscurities Ltd; NM0023 by Prototype Carbon Fund; NM0024-rev by Prototype Carbon Fund; NM0030-rev by Haidergarh Chini Mills, a unit of Balrampur Chini Mills Limited; NM0036 by Mitsubishi Securities; NM0043 by Econergy International Corporation; NM0055 by URS Corporation and Amoseas Indonesia Inc.

Figure 8 / Registered CDM PDDs using CDCF influenced methodologies⁸⁷



Using the above approach and examining the CDM methodologies database and the CDCF methodology development records, this study finds that the CDCF has helped to develop 20 CDM methodologies. Of the 20 methodologies 16 were small-scale.

As of 31 March 2017, 3,126 registered PDDs and 240 registered PoAs apply small-scale methodologies.⁸⁸ Out of those, **2,643 PDDs and 122 PoAs apply one of the 16 small-scale methodologies that were developed through contributions from the CDCF.**⁸⁹ In other words, the impacts and influences of the CDCF can be observed in around 67 percent of all registered small-scale projects and 51 percent of all PoAs within the CDM. These projects have issued nearly 86 millions tCO₂e of emission reductions.⁹⁰ When taking large-scale methodologies into account, this number increases to 6,086 projects, as shown in Table 6.

87 Source: UNEP DTU Partnership, *UNEP DTU CDM/JI Pipeline Analysis and Database*, 24 April, 2017, <http://www.cdmpipeline.org/>

88 Source: UNEP DTU Partnership, *UNEP DTU CDM/JI Pipeline Analysis and Database*, accessed April 24, 2017, <http://www.cdmpipeline.org/>

89 Project registered using AMS-II.D, AMS I.C, AMS I.D, AMS II.E, AMS III.B, AMS III.E, AMS III.F, AMS III.R, AMS II.H, AMS II.I, AMS II.J, AMS III.Z, AMS III.AJ, AMS I.L, AMS III.BB, AMS III.BL, ACM0002, ACM0016, AM0010, AM0020. Source: UNEP DTU Partnership, *UNEP DTU CDM/JI Pipeline Analysis and Database*, Accessed April 24, 2017 from <http://www.cdmpipeline.org/>. Source: UNFCCC, *CDM Insights - Issuances*, accessed March 1, 2017, <http://cdm.unfccc.int/Statistics/Public/CDMinsights/index.html#iss>. Source: UNFCCC, *CDM Methodologies*, accessed April 24, 2017, <https://cdm.unfccc.int/Projects/DB/SGS-UKL1443018464.49/view>. Source: CDCF (internal documents), *Methodologies list and contributions*, 2017.

90 Project registered using AMS-II.D, AMS I.C, AMS I.D, AMS II.E, AMS III.B, AMS III.E, AMS III.F, AMS III.R, AMS II.H, AMS II.I, AMS II.J, AMS III.Z, AMS III.AJ, AMS I.L, AMS III.BB, AMS III.BL. Source: UNEP DTU Partnership, *UNEP DTU CDM/JI Pipeline Analysis and Database*, accessed April 24, 2017, <http://www.cdmpipeline.org/>

Box 3 / AMS-I.L Baseline methodology for electrification of rural communities⁹²

The development of AMS-I.L was jointly funded by CDCFplus and the UK Department for International Development. AMS-I.L aims to address both development and climate issues related to electricity access in rural communities of developing countries and switching to lower carbon intensive fuel sources. In LDCs worldwide, average rural electrification rates are on average only around 12 percent, and many of the countries are at less than 5 percent. However, before the development of AMS-I.L, the lack of an appropriate methodology for grid electricity displacing household fuel consumption meant that the CDM had almost no impact on rural electrification. Some of the main reasons for this include the difficulty of monitoring a large number of small-scale activities (e.g. electricity consumption by an individual rural household), the uncertainty of emissions reductions due to inflexible CDM rules that did not account for the local context in LDCs, and the use of very low historical energy use for setting baseline emissions.

To overcome these challenges, AMS-I.L introduced a series of innovative approaches. The main approach was the simplified additionality test, where projects in LDCs were automatically considered to be additional. Any project seeking CDM Executive Board approval must prove additionality—the project must prove that any emissions that will take place as a result of the project activities would not have occurred in the business as usual case. However, simply proving a project-specific emissions baseline can be financially onerous. This approach of simplified additionality for LDCs significantly reduces the financial and time costs. It has since evolved and can be seen in many CDM related rules. The methodology also builds in pioneering approaches in its treatment of fuel use and the implementation of the concept of suppressed demand in the baseline.

The methodology was submitted in August 2011 and approved in March 2012. To date the methodology is used by at least four PoAs in Africa and India, which are expected to collectively reduce emissions by more than 170 ktCO₂e by 2020.

Table 6 / Registered CDM projects using CDCF influenced methodologies⁹¹

Methodology developed, funded or contributed towards by the CDCF	Number of projects registered using methodology	Number of PoAs registered using methodology	Number of Projects and PoAs registered using methodology
ACM0002	3,264	46	3,310
ACM0016	9	1	10
AM0010	1	-	1
AM0020	-	-	-
AMS I C	263	20	283
AMS I D	2,103	51	2,154
AMS I.L	-	4	4
AMS-II.D	57	4	61
AMS II E	20	1	21
AMS.II.H	3	-	3
AMS II I	-	-	-
AMS II J	37	20	57
AMS III AJ	-	-	-
AMS III B	20	1	21
AMS III.BB	-	1	1
AMS III.BL	-	-	-
AMS III E	41	-	41
AMS III R	34	8	42
AMS-III.F	55	10	65
AMS-III.Z	10	2	12
Total	5,917	169	6,086

91 Some projects use more than one methodology so numbers attributed to the exact methodology may differ but total numbers remain unchanged. Source: CDCF (internal document), *Methodologies Submissions*, n.d.

92 Pöyry Management Consulting. *Justification document for proposed new baseline methodology for electrification of rural communities*. Final report, August 2011. Vantaa, Zürich: Pöyry.

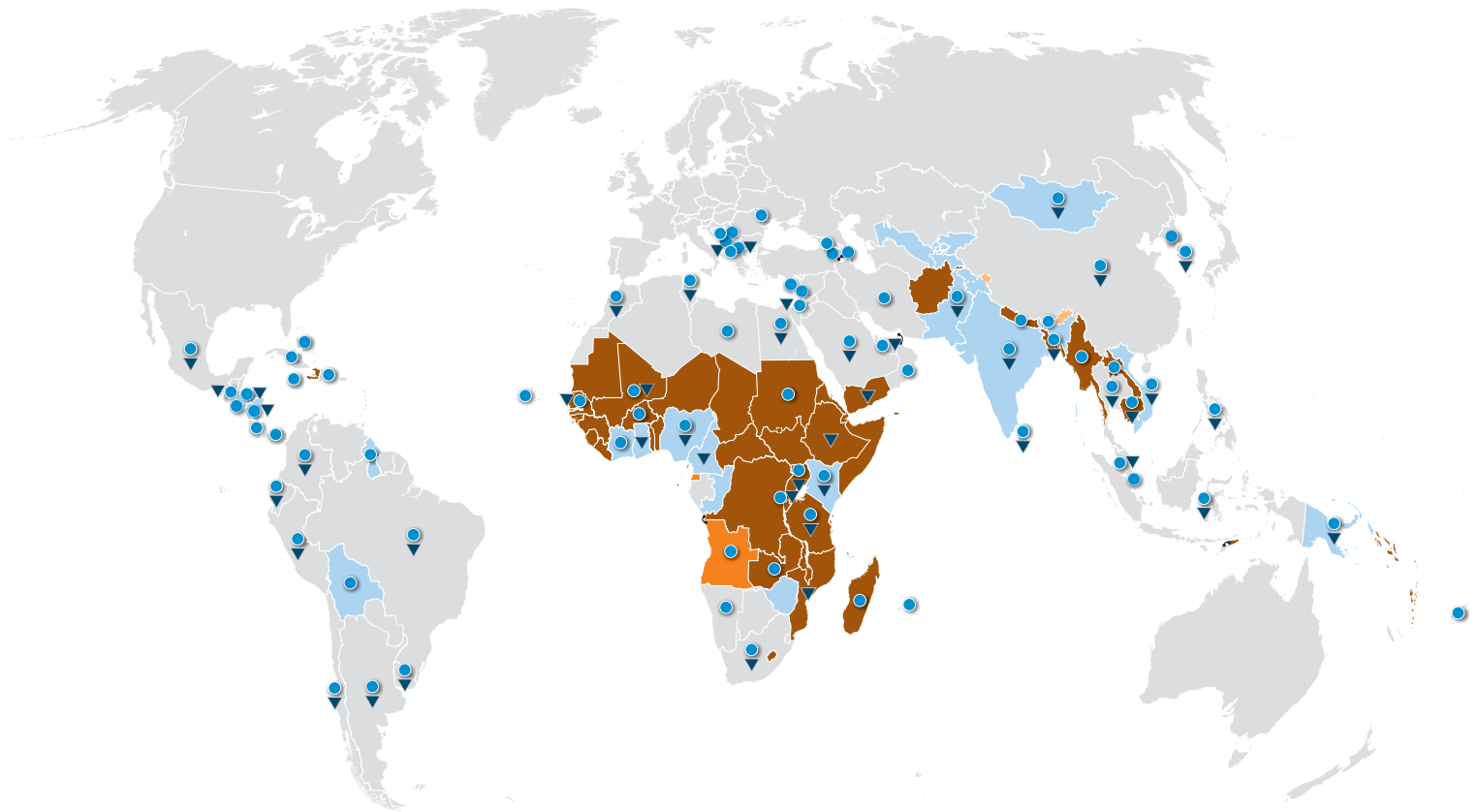


Figure 9 / PDDs and PoAs registered using CDM methodologies with CDCF contributions⁹³

▼ PoAs
● PDDs

While methodology development is a multi-stakeholder process, for many methodologies that were specifically designed to target common project types found in communities of poor countries, **CDCF was the initiator and main driving force for their development**. This includes for example AMS-I.L. which covers the electrification of rural communities using renewable energy (see Box 3), AMS-III.R. which applies to methane recovery in agricultural activities at the household

level, and AMS II.J. on demand side activities for efficient lighting technologies such as CFL lightbulb distribution to communities.

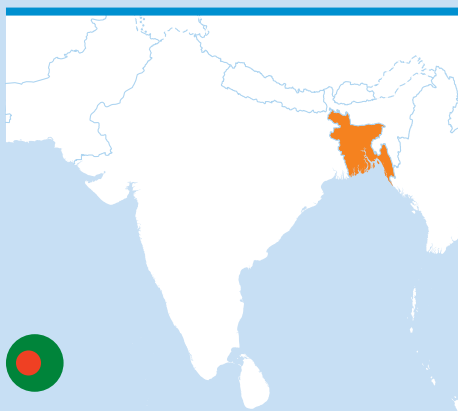
The 36 small-scale PDDs and PoAs with direct CDCF assistance are spread over 17 countries covering five continents. However, PDDs and PoAs using methodologies that were developed, funded or received inputs from CDCF now span across 84 countries, six continents and 19 LDCs.⁹⁴

⁹³ Source: UNFCCC, *LDC Country Information*, accessed March 4, 2017, http://unfccc.int/cooperation_and_support/lcd/items/3097.php; World Bank, *Borrowing Countries*, n.d., accessed May 4, 2017, <http://ida.worldbank.org/about/borrowing-countries>; UNEP DTU Partnership, *UNEP DTU CDM/JI Pipeline Analysis and Database*, accessed April 24, 2017, <http://www.cdmpipeline.org/>

⁹⁴ Source: UNFCCC, *CDM Insights - Issuances*, accessed March 1, 2017, <http://cdm.unfccc.int/Statistics/Public/CDMinsights/index.html#iss>.

Case study 3

Improving Kiln Efficiency of the Brick Making Industry in Bangladesh



Bangladesh⁹⁵

- ▶ Population: 164 Million
- ▶ 31.5 percent of the population lives below the national poverty line

The Improving Kiln Efficiency of the Brick Making Industry in Bangladesh projects are two registered PDDs in the CDCF portfolio that focus on improving the working conditions and livelihood opportunities for brick workers. To date, the projects have benefitted 640 brick workers in Bangladesh. Seasonal brick workers represent some of the most vulnerable and poor groups in developing countries where rapid urbanization increases the demand for bricks. Through improving energy efficiency in the brick making process, the projects are expected to cut emissions each year by around 75,000 tCO₂e.⁹⁶

The projects introduced a new Hybrid Hoffman Kiln (HHK) technology for cleaner and more efficient kilns to operate all year-round. HHKs use only half the amount of coal compared to fixed chimney kilns and store coal particles inside the brick, which prevents them from becoming air-borne fly ash. Community consultations showed that the project provided stable long-term employment as compared to the seasonal employment in the traditional brick sector.⁹⁷



The projects provided various co-benefits, particularly for women (e.g. less labor intensive and back-breaking work due to mechanization)⁹⁸

95 Source: Worldometers, *Bangladesh Population*, Accessed April 24, 2017, <http://www.worldometers.info/world-population/bangladesh-population/>. Source: Asian Development Bank, *Poverty in Bangladesh*, n.d., accessed April 24, 2017, <https://www.adb.org/countries/bangladesh/poverty>

96 Source: World Bank, *Modern Brick Kilns Yield Development Benefits in Bangladesh*, 2016, <http://www.worldbank.org/en/news/feature/2016/07/20/modern-brick-kilns-yield-development-benefits-in-bangladesh>.

97 Source: World Bank, *Modern Brick Kilns Yield Development Benefits in Bangladesh*, 2016, <http://www.worldbank.org/en/news/feature/2016/07/20/modern-brick-kilns-yield-development-benefits-in-bangladesh>.

98 Source: CDCF (Internal document), *Community Benefits, Annual Meeting*, June 1, 2016.

The projects have a significant positive impact on the lives of brick workers by providing them with a regular and higher income which enabled them to have a permanent family home. In addition, the projects also enhanced gender equality as the female brick workers received the same salary as their male counterpart.

Revenue from the carbon credits provide additional money for the kiln owners with some earmarked for social benefits of workers. The additional revenue pays for twice-a-month doctor visits for the brick workers as well as improved facilities such as new bathrooms and toilets for men and women on-site, safety gear including gloves, boots, masks and helmets and a dining area. The projects also helped to build a health clinic which enabled the provision of first aid on the site.⁹⁹

“

This project is a model for the kind of development needed to achieve World Bank Group goals of ending severe poverty, increasing shared prosperity and transforming economies and societies to a low-carbon future.¹⁰⁰

Sandrine Boukerche,
World Bank carbon finance specialist

Female brick worker. The project improved the health and safety standards on-site¹⁰¹



“

Now, I know that I have a job throughout the year and how much money I would bring home at the end of the month. The jobs in these kilns are not only far less tiring but also more stable and earning a higher income than before, similar to men.

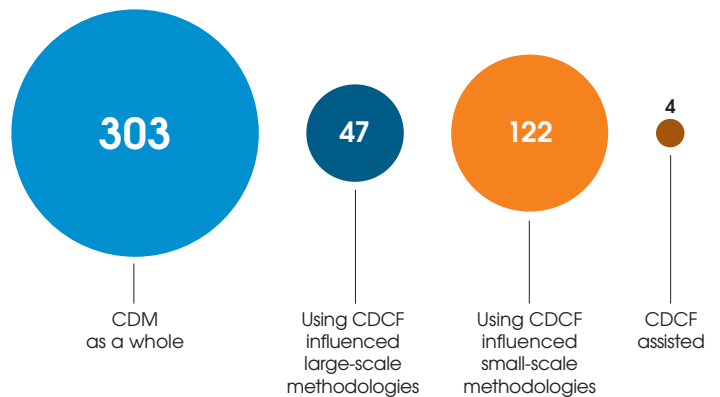
Brick kiln worker in Bangladesh who worked as seasonal worker in traditional kilns before the project

⁹⁹ Source: World Bank, *Modern Brick Kilns Yield Development Benefits in Bangladesh*, 2016, <http://www.worldbank.org/en/news/feature/2016/07/20/modern-brick-kilns-yield-development-benefits-in-bangladesh>.

¹⁰⁰ Source: Ibid.

¹⁰¹ Source: CDCF (Internal document), *Community Benefits, Annual Meeting, June 1, 2016*, 2016.

Figure 10 / Registered CDM PoAs using CDCF influenced methodologies¹⁰²



3.3.2. Helping to pioneer innovations in programmatic approaches

In addition to the methodologies, arguably one of the most important contributions by the CDCF that enabled the expansion of small-scale community CDM activities was the establishment of the programmatic concept and rules, which enabled the development of PoAs.

In targeting the development of community level projects in poor regions, CDCF recognized quickly that even with the additional small-scale methodologies, there remained challenges for these projects to participate in the CDM and gain access to carbon finance. This was primarily due to the sole project-based approach, which required standalone projects to individually go through the CDM validation, registration, verification and issuance processes. This approach favored single facility, large projects with simple MRV requirements. Even with simplified eligibility and MRV rules, the high compliance costs and small emission reductions associated with community level projects were a significant barrier to their development.

The CDCF tried to address this through the bundling approach where multiple projects with similar characteristics starting at around the same time were treated as a single CDM project, thus

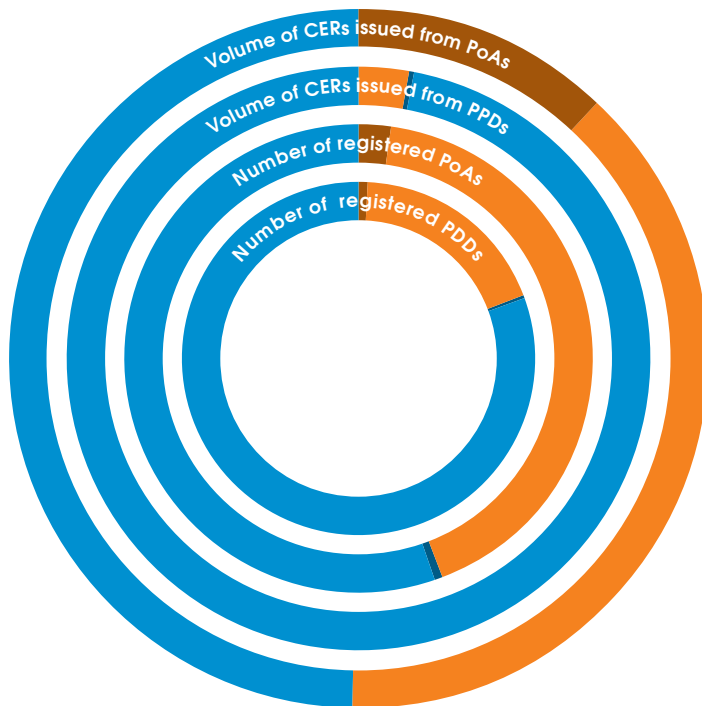
reducing transaction costs. While this approach did benefit many projects, it did not go far enough to cover the situations where the mitigation activities were truly upon a micro-scale, nor did it allow the option of adding in new mitigation activities after the CDM registration as the project grew organically. Rather, a programmatic approach was needed. Throughout the last 15 years, the CDCF has been a strong proponent for PoAs; from as early as 2005, CDCFplus commissioned research on how programmatic approaches could be established under the CDM.¹⁰³ The CDCF was one of the most active contributors to feedback on the rules of the PoA and actively provided input since 2006. Among its inputs that were later adopted was the key point on how PoAs should not only be allowed for activities implementing formal policy, but rather it should be open to all CDM eligible mitigation activities.¹⁰⁴ The **very first PoA to start validation in 2007** (and be given a PoA identification number) was the CDCF assisted program - Installation of Solar Home Systems in Bangladesh, (ID: PoA0002, CDM No: 2765).

¹⁰² Source: UNEP DTU Partnership, *UNEP DTU PoA Pipeline Analysis and Database*, accessed April 24, 2017 from <http://www.cdmpipeline.org/>

¹⁰³ Source: Christiana Figueres, *Econergy International Corp. Margaree Consultants Inc.*, 2005.

¹⁰⁴ Source: World Bank, *CDM PoA Input*, 2006. Source: World Bank, *CDM PoA Input*, 2007. Source: World Bank, *CDM PoA Input*, 2008. Source: World Bank, *CDM Policy and POA Submission*, 2006.

Figure 11 / Proportion of registered CDM activities and CER issuances (excluding grid connected renewable energy and industrial gas) applying CDCF influenced methodologies¹⁰⁵



- CDCF
- Using CDCF influenced small-scale methodologies
- Using CDCF influenced large-scale methodologies
- Other CDM activities

Furthermore, the CDCF has pioneered PoAs in LDCs and regions previously left excluded from carbon markets and the CDM. This includes enabling the registration of the first PoA in Africa and the first in Uganda as well as the first POA in the Middle East and the first CDM activity in the Republic of Yemen.¹⁰⁶ To date there are 303 PoAs registered and more than half have applied a methodology influenced by the CDCF, as shown on Figure 10.

Two methodologies on grid connected renewables, AMS-I.D. and ACM0002, have been much more widely applied than others. This is mainly due to the large number of renewable energy projects within the CDM in general. To give a better view of the CDCF's achievements within the CDM especially on emission reductions from community level projects, these methodologies as well as those for industrial gas emissions such HFC and N₂O need to be excluded. The CDCF's contributions to the CDM can be seen more clearly in this subset of PoAs, where over half of the PoAs CER issuances were from CDCF assisted projects and projects that used methodologies with some form of CDCF contribution (see Figure 11).¹⁰⁷

¹⁰⁵ Source: UNEP DTU Partnership, *UNEP DTU PoA Pipeline Analysis and Database*, accessed April 24, 2017 from <http://www.cdmpipeline.org/>

¹⁰⁶ Source: UNEP DTU Partnership, *UNEP DTU CDM/JI Pipeline Analysis and Database*, accessed April 24, 2017, <http://www.cdmpipeline.org/>
¹⁰⁷ Ibid.

4. Lessons for post-Paris climate action

One of CDCF's most important results is the accumulation of experience in achieving community co-benefits through carbon finance. This section summarizes the lessons learned over the past 15 years since the establishment of the CDCF, identified through a combination of literature reviews and stakeholder interviews, before concluding with the relevance of such lessons for future climate action.

4.1. Challenges and lessons

As a first of its kind, the CDCF targeted the most challenging project types in a brand new market, while at the same time aiming to benefit communities through carbon finance. The CDCF has faced numerous challenges, some of which changed over time requiring the CDCF to change and adapt.

Challenges and lessons with respect to implementing carbon finance projects in poor regions and LDCs

- ▶ Emission reduction projects in LDCs often require more than price guarantees for their carbon credits and instead need direct investment. While up-front financing from a fund itself can help overcome this access to finance challenge, this also brings increased risk to the fund. Other factors linked to working in LDCs, such as lack of technical capacity, can mean under delivery in terms of the emission reductions. Developing ways to front load carbon revenues can increase the impact of carbon finance but requires innovative approaches and public support to mitigate the associated risks.

- ▶ Community projects in LDCs and poor regions tend to have low emission baselines and diffuse emission sources. This can result in high costs for project development and implementation. A programmatic approach is needed to effectively scale up the emission reductions to ensure financial viability.
- ▶ Pioneering new mechanisms in LDCs requires long delivery time frames and/or crediting periods to allow sufficient time to address unforeseen risks/challenges. Risk mitigation measures and flexibilities need to be devised early on.
- ▶ The knowledge and implementation capacity of the project developer is crucial to ensure the quality of the project. Any instrument seeking to combine emission reductions with community co-benefits – especially in LDCs – should budget for capacity building and technical assistance activities. Such activities should address not only how to ensure the project benefits the local community but also more direct issues such as how to utilize the technology introduced and monitor and report the emission reductions and sustainable co-benefits achieved.

Challenges and lessons with respect to establishing and following the rules for emission reduction programs like the CDM

- ▶ The rules of the program under which the emission reduction is generated (e.g. the CDM) must be flexible enough to account for the situations on the ground in LDCs and poor communities. Innovative and simplified approaches such as automatic eligibility, simplified MRV and scaling up of small activities through programmatic approaches are all needed for projects in LDCs.

- ▶ It is also important to actively engage the regulator and administrators of the program to ensure they understand the practical implications of regulatory requirements on the ground.

Challenges and lessons with respect to setting targets and monitoring progress for a fund that combines emission reductions with community co-benefits.

- ▶ Portfolio development is a long, difficult and expensive process. There is a need to devote sufficient resources up-front to support project development and capacity building. Also, project costs are not linearly proportional to project size, with smaller projects as expensive to develop as larger ones.
- ▶ Successful projects engage the local community to ensure they understand the co-benefits and purpose of the project, as well as their responsibilities, including with respect to MRV. This helps to give the community ownership of and buy in to the project.
- ▶ Community benefit plans (CBPs) are largely successful in monitoring and ensuring community co-benefits are realized. However, implementing these plans can be costly and often requires disbursement of CBP resources, that may not match the delivery timeframe of ERs.
- ▶ Development organizations already present in a region (e.g. the World Bank, African Development Banks, NGOs) need to cooperate and leverage their expertise and capacity to maximize results.
- ▶ Accurate forecasting of project timelines and emission reduction deliveries is critical for the management of stakeholders. This is especially important for private sector participation.

4.1.1. Carbon finance in LDCs

Accessing upfront investment: Carbon finance is a performance-based payment that is made upon delivery of emission reductions. Revenue from the carbon credits provide additional income for the project developers, with some earmarked for local communities, to make the project viable, to continue operating, or to expand.

The CDCF payment is done according to a performance-based contract (or ERPA) under which payments are made upon successful i) issuance of the emission reductions and ii) the provision of the community benefit projects. The quantity of CERs contracted, the length of time over which the purchase is made, and the price per CER are commercial terms agreed between the CDCF and the project developer before ERPA signature. Such future contracts can be leveraged to access external, up front financing. Carbon finance can provide a recurrent and additional source of revenue during the life of the project once it is implemented. However, in the context of LDCs, that typically face lack of supporting infrastructure, technical capacity and institutions, carbon finance contracts do not always bridge the capital investment financing gap—which is a critical stage for many project types in LDCs where access to capital is a well-documented barrier.

While this challenge is recognized under the CDM, there remains a need to identify ways to combine carbon finance with other financial instruments to provide upfront finance for the underlying investment.

“
One of the key challenges faced by the CDCF was capacity building at all levels: from the country level, to the communities and to investors and donors. Capacity building will remain a key challenge for the future.

Teresa Solana Mendez de Vigo,
 Carbon finance expert at the Government of Spain

Reaching the poorest of the poor in LDCs. CDCF projects target communities that lack essential infrastructure and services (such as access to power or basic health care) and have per capita incomes that are below the relative poverty line. Despite the pro-poor orientation, it is not clear to what extent the projects address the needs of the poorest of the poor.¹⁰⁸ For example, initially the Installation of Solar Home systems in Bangladesh program was not reaching the poorest households as both the up-front investment for the solar panel and the maintenance costs were relatively high compared to local incomes. Similarly, the Biogas Support Program in Nepal was reaching remote and poor rural households that owned cattle. However the poorest of the poor were not benefitting given that they typically did not own land nor livestock. To address this microcredit programs had to be promoted to enable the households with the lowest incomes to afford the technology in both cases.

Emission profile of LDCs. Another challenge faced by LDCs is that their emission profiles are low and community level projects tend to be made up of very diffuse and small sources of GHG emissions, for example multiple villages of individual households using firewood for cooking fuel as opposed to a single facility such as coal fired power plants. This means the emission reduction potential per discrete mitigation activity is very low. As such, it is economically challenging to implement CDM projects since CER volumes, and hence carbon revenues, are linked to the amount of emission

reductions delivered. The diffuse nature of the emissions within LDCs also makes CDM projects in the region costly and risky to implement due to traditional rigidity of the CDM rules and challenges in defining the correct project boundaries and start dates, and establishing a practical MRV system. As a result the projects that will contribute most to sustainable development in LDCs through co-benefit generation are often also the most costly and most risky in terms of project implementation, and hence the least attractive from a CER generation perspective.

To address the challenge of diffused small emission sources in community level projects, the CDCF piloted both project bundling and programmatic approaches from an early stage. The PoA approach, in particular, has demonstrated the ability to scale up mitigation actions that can be achieved under the CDM. Under the Installation of Solar Home Systems in Bangladesh program, together thousands of households have achieved hundreds of thousands of CERs.

Capacity limitations. Interviews with the CDCF team and external stakeholders both have pointed to the fact that at the start of the CDM, there was a lack of technical capacity in the regions on mitigation technologies, CDM rules, and development co-benefits.

¹⁰⁸ Source: World Bank, *CDCF making an impact: carbon finance delivers benefits for the poor*, 2013.

4.1.2. The rules of the CDM

The challenge of implementing small-scale emission reduction community focused projects is exacerbated by the evolution of the CDM's regulatory framework over the last 15 years. Specifically:

- ▶ **Period 2002 to 2006.** This is when the CDM and the carbon market were still nascent. The challenge during this period was mainly the lack of appropriate rules and capacity within the CDM to allow for various types of small-scale community focused projects to participate. For example, there were only 18 approved CDM small-scale methodologies available in 2006 compared to 95 as of today.¹⁰⁹
- ▶ **Period 2007 to 2009.** During this period the CDM rules became increasingly rigid especially as concerns grew about the additionality of CDM projects. Additionality refers to the concept that the CDM project should not be business as usual, but only implemented due to assistance from carbon finance. The rigidity of the CDM rules and their interpretation presented considerable challenges. As a result, the timelines for third party audits and UNFCCC reviews increased, as well as the likelihood of a rejection of the project by the UNFCCC at the end of the audit or review processes. For example, in 2006 it took on average 415 days for projects to complete the validation and the registration process. By 2008 this had increased to 800.¹¹⁰

- ▶ **Period 2009 to 2012.** This period saw many rule changes, new innovative CDM methodologies and concepts to help address additionality concerns and reduce regulatory risks. As a result, the first PoAs were registered in 2009 and the first standardized baselines were approved in 2013. The average time it took projects to complete validation and the registration process in 2014 was 417 days, comparable again to 2006.
- ▶ **Period 2012 onwards.** The CDM has been slowing down both in terms of registrations of new projects and reforms of the CDM rules since 2012, primarily due to lack of demand for CERs.

Of the above periods, the initial challenge of the lack of rules and capacity was to be expected and this is something the CDCF had set out to address from the outset (please see sections 3.2 and 3.3 for details). However, of greater interest here is the CDCF's experience and lessons learned for the second period. As concerns grew in 2007 and 2008 on the additionality of the increasing number of projects entering the CDM system, the CDM regulators increased scrutiny of the evidence for additionality through increased checks (in both number and rigor).¹¹¹

The combination of challenging local conditions and uncertainties generated by a rigid regulatory system resulted in high transaction costs and significant delivery risks and delays in carbon revenues for community level CDM projects in general and especially in LDCs.

109 Source: Klaus Oppermann, *Update on methodologies: Challenges and perspectives for developing the CDCF project pipeline*, 2006. Source: UNFCCC, *Approved small-scale methodologies*, <https://cdm.unfccc.int/methodologies/SSCmethodologies/approved>.

110 Source: UNEP DTU Partnership, *UNEP DTU CDM/JI Pipeline Analysis and Database*, accessed April 24, 2017, <http://www.cdmpipeline.org/>

111 Source: World Bank, *Carbon Credits and Additionality Past, Present, and Future*, 2016.)

As a result, the CDCF often had to decide on trade-offs between carrying out projects with the most community co-benefits and the likelihood of the project successfully navigating the CDM process.

This led the CDCF to recognize the need to focus on improving the regulatory structure to help reduce the compliance risks and associated costs for small-scale projects for communities. This focus was especially evident in CDCF presentations and reports in 2009, with the three most important actions needed identified as being:¹¹²

- ▶ Developing standardized baselines to reduce project costs associated with demonstrating additionality and business as usual scenarios;
- ▶ Developing methodologies with simplified requirements for LDC projects to specifically reduce compliance and implementation costs for projects located in those regions; and
- ▶ Reforming the rules of the CDM to better account for the challenges faced by LDCs and poor communities.

The CDCF has since developed new CDM methodologies specifically targeting community level projects in LDCs such as AMS-I.L. Such methodologies build in simplified requirements for projects in LDCs. They also consider the countries' needs for growth in energy services, given the current significant unmet energy demand, in the calculation of emission reductions. It is important to also note that through these various rule changes and new methodology submissions, the CDCF had considerable interactions with the CDM administrators—the UNFCCC Secretariat.

112 Source: CDCF, *CDCF Successor - 2009 annual meeting*, 2009.

For example, from 2006 through 2008, the CDCF through the World Bank Carbon Finance Unit made at least 11 submissions to the UNFCCC Secretariat on various regulatory related aspects of the CDM.¹¹³ Interviews with the CDCF team also indicate that there were numerous engagements with the UNFCCC Secretariat on CDM rules and impacts on small-scale community projects beyond the formal exchanges relating to the submissions. These interactions are important as they allowed the CDCF to communicate to the administrators and regulators on the CDM the practical realities of the impacts of various rules (or rule changes). This was a time consuming and technically complex engagement but, as indicated by eventual adoption of many CDM rule changes advocated by the CDCF (e.g. automatic additionality for certain small-scale project types and projects in LDCs), this was seen by the CDCF team as worthwhile. Furthermore, it has been noted in more recent research on additionality assessment approaches that the CDM as a whole is also evolving in its approach and moving towards standardization.¹¹⁴

Over the period from 2009 and into 2012 the CDCF carried out a series of internal research and meetings on CDM reform to explore what rule changes could benefit community and LDC projects the most whilst maintaining environmental integrity.¹¹⁵ This ultimately helped to build the strategy for CDM reform of the Carbon Initiative for Development (Ci-Dev), which succeeded the CDCF in formally taking up the task of CDM reform as a key objective (see Box 4).

113 Based upon reviewed internal CDCF documents, including formal submissions to the CDM from the World Bank's Carbon Finance Unit 2006 to 2008.

114 Source: World Bank: *Carbon Credits and Additionality Past, Present, and Future*, 2016.

115 Source: World Bank, *CDM Reform: Improving the efficiency and outreach of the Clean Development Mechanism through standardization*, World Bank, 2012.

Box 4 / The Carbon Initiative for Development (Ci-Dev)

The Carbon Initiative for Development (Ci-Dev) was launched in 2011 by the Carbon Finance Unit of the World Bank to build capacity and develop tools and methodologies that allow the poorest countries in the world to access carbon finance for low carbon investments. Ci-Dev is the only carbon fund that closely followed CDCF's steps of focusing on emission reductions with community co-benefits. Ci-Dev finances projects that increase energy access in low income countries through performance payments based on reduced emissions.

In addition to supporting CDM reform and assisting the decarbonization of communities in LDCs, Ci-Dev also develops business models for its projects that aim to allow those projects to be self-sustaining with carbon financing acting as the initiation energy. The inspirations of many such business models are in fact the CDCF projects, which have successfully utilized CDCF funding to expand their activities or maintain their viability. In many ways CDCF has passed the torch for championing community co-benefits.

4.1.3. Ambition and objective

At the onset, the CDCF was established with very high ambition—to trail blaze carbon finance, to target priority countries, to promote small scale approaches and of course to generate CDM compliant emission reductions and measurable community benefits. Interviews with the CDCF team indicated that while the CDCF has met all of its objectives, emission reduction delivery timelines were longer and the monitoring of community co-benefits more complex than originally anticipated.

In hindsight, a more focused approach of targeting fewer key criteria for project selection and objectives could have been more efficient and helped to reduce emission reduction delivery pressures. The ambitious targets meant that quality projects that met all the criteria were difficult to identify and develop.

CDCF projects included a clear 'results framework' i) for the World Bank loan and safeguards, ii) for the CERs as per CDM rules and iii) for the community benefits as per the CBP included in the ERPA. Given the small size and complexity of CDCF projects it was important to establish few, simple and meaningful indicators to ensure efficient and effective monitoring, commensurate with the size of the project. Each CBP was unique as it was designed in consultation with beneficiary communities and varied greatly based on the priority needs.



The CDCF is clearly a win-win opportunity: it can help people in some of the poorest countries in the world, and it can help companies to benefit from their engagement through some return on investment and demonstrating corporate social responsibility.

Markus Dimmler,
Energy and utility expert at BASF

In addition, the CDCF portfolio of projects was diverse in terms of capacity of the project developer, technology, location, funding sources, co-benefit type and beneficiary community. As a result CDCF faced a significant challenge in identifying synergies and developing monitoring and validation schemes that were complimentary to the objectives within each project as well as across the CDCF project portfolio. To address this, the CDCF developed “The Carbon Finance Toolkit: ensuring benefits for communities” and also developed individual CBP monitoring templates for each project to capture more qualitative information from all stakeholders (in addition to the quantitative indicators developed in the CBP). CDCFplus resources also helped to defray co-benefit verification costs the extent of which had not been foreseen.

A more systematic approach especially on some of the qualitative benefits, e.g. gender equality benefits, could have increased effective monitoring of community co-benefits. Ultimately establishing a few, simple and meaningful indicators may go longer in helping to ensure efficient and effective monitoring of CBPs.

Achieving reliable volume and flow of CERs.

Implementing projects which combine a reliable volume and flow of CER payments in low income areas remains challenging. Forecasting of emission reductions and project timelines for the projects was also highlighted by stakeholders as a major challenge. In some cases the CDCF project portfolio took longer to deliver CERs than

expected in the ERPA. This was for example due to project implementation delays, CDM regulatory delays, changes in Annex I country registry rules and impact of floods, earthquakes or droughts on project performance. This affected donors in different ways. For those who had hoped to utilize their Kyoto first compliance period CERs for their compliance targets, this sometimes resulted in the delivery of CERs that could no longer be used. This also had a negative impact amongst some private sector donors who felt they were left with assets of little value.

Approaches that better communicate the value of the projects beyond emission reductions could help gain wider private sector participation. Stakeholder interviews indicated that private sector willingness to participate in instruments similar to the CDCF increases when participants’ contributions can be linked directly to the community benefits generated.

4.2. The CDCF's potential influences for the future and the continuing need for combining climate action with community co-benefits

With the uncertainties surrounding the implementation of the Paris Agreement it is currently unclear what the future of the CDM will be. However, the CDCF can inform the discussions on further interlinking of sustainable development co-benefits with GHG emission reductions in the future carbon market mechanisms.

Specifically, the CDCF can feed into the discussions on the new mechanism set up by Article 6.4 of the Paris Agreement.

"A mechanism to contribute to the mitigation of greenhouse gas emissions and support sustainable development is hereby established under the authority and guidance of the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement for use by Parties on a voluntary basis. It shall be supervised by a body designated by the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement, and shall aim:

(a) *To promote the mitigation of greenhouse gas emissions while fostering sustainable development;*

(b) *To incentivize and facilitate participation in the mitigation of greenhouse gas emissions by public and private entities authorized by a Party;*

(c) *To contribute to the reduction of emission levels in the host Party, which will benefit from mitigation activities resulting in emission reductions that can also be used by another Party to fulfil its nationally determined contribution; and*

(d) *To deliver an overall mitigation in global emissions."*

Article 6.4, Paris Agreement, Conference of the Parties, Twenty-first session, Paris, 2015

This new mechanism puts a strong emphasis on the need to combine mitigation and sustainable development. Many people who worked at CDCF or have benefited from CDCF's technical assistance and capacity building efforts are now contributing to development of this new mechanism.

Stakeholders involved in the CDCF expressed a continued interest not only in projects that reduce emissions and generate community co-benefits but also in instruments that promote such projects. This interest stems from ethical considerations as well as a need to scale-up what CDCF demonstrated through innovation to reach the 2°C target and have transformational impacts on the development of communities in poor regions.

However, views on how such instruments could operate in the future do differ significantly. A private sector stakeholder interviewed believes that the future of such instruments would be mainly in the form of responsible or ethical investment. At current market prices, the main driver for private sector participation reductions would be more from a CSR perspective and less from a carbon asset perspective. In such a case, the community co-benefits would essentially become the core co-benefits and projects would become more similar to traditional development aid projects, with a focus on emission reduction co-benefits.

Public sector stakeholders see that there is still a need, if not even more so than before, for instruments like the CDCF in the future due to the increasing focus on resilience and adaptation which has historically not been prioritized as much as mitigation. Climate change adaptation has a strong emphasis on actions at the community level, especially those in the poorest regions of the world that are also the most vulnerable. Future instruments could explore and promote projects that not only have community and mitigation co-benefits but also adaptation co-benefits. This could come under new non-market approaches set by Article 6.8 of the Paris Agreement.

The momentum around carbon pricing instruments has been increasing over the past decade. A myriad of instruments is being implemented, including emission trading systems, carbon taxes, and offset mechanisms. Cooperation between countries and between instruments is important to ensure cost-effective mitigation. For all stakeholders interviewed during the preparation of this study, the concerns around the future of the carbon market was a persistent theme. While all have expressed their interest in future CDCF-like instruments, demand for the emission reductions from CDCF-like projects remains an open question. Market forces are a key factor for ensuring the sustainability of instruments that utilize results based carbon crediting and payments. The implementation of the Paris Agreement and of countries' NDCs, as well as the evolution of instruments such as the Carbon Offsetting and Reduction Scheme for International Aviation, will need to be considered in the design of any successor of the CDCF.

Annex I / List of CDCF participants

Table 7 / List of CDCF participants (2015)¹¹⁶

Number	CDCF participants
1	Austria - Kommunalkredit Public Consulting GmbH
2	BASF SE
3	Belgium - Brussels Capital Region
4	Belgium - Walloon Region
5	Canada - Department of Foreign Affairs
6	Daiwa Securities Co. Ltd.
7	Danish Carbon Fund (DCF)
8	Endesa Generacion S.A.
9	FUJIFILM Corporation
10	Gas Natural SDG, S.A.
11	Goteborg Energi AB
12	HC ENERGIA
13	Idemitsu Kosan Co., Ltd.
14	Italy - Environment Ministry
15	JX Nippon Oil & Energy Corporation
16	KfW Bankengruppe
17	Kingdom of Spain
18	Luxembourg - Ministry of Environment
19	Okinawa Electric Power Co., Inc.
20	SSAB Europe Oy (formerly Rautaruukki Oy)
21	Statkraft Carbon Invest A.S.
22	Statoil ASA
23	Swiss Reinsurance Company
24	The Netherlands - Ministry of Infrastructure and the Environment

¹¹⁶ The CDCF participants are presented in alphabetical order. Source: World Bank, *CDCF Annual Progress Report FY2015 and business plan and budget FY2016t*, 2015.

Annex II / CDCF community co-benefits and Sustainable Development Goals

The key community benefits of the 26 projects¹¹⁷ that remain in the CDCF portfolio today were identified based on a combination of CDCF project documents including project implementation completion and results reports, CDM sustainable development co-benefits description reports, project specific information on the World Bank Carbon Finance website and CDM project validation reports. Please note that all projects are considered to contribute strongly to SDG 13 and 17, while SDG 14 and SDG 16 are not applicable due to the emission mitigation focus of the CDM. The matrix in figure 12 shows how benefits or project activities are mapped to the SDGs. The specific breakdown of the main benefits and their contributing SDGs are provided in the tables following the matrix. Sources for each project are mentioned in footnotes next to the table titles.

Figure 12 / Matrix for mapping community benefits to the UN SDGs which they are most likely strongly contributing to

SDG	Name	Brief Description	Criteria to determine if project benefit have high likelihood of contributing to the SDG
SDG 1	No poverty	End poverty in all its forms everywhere	Benefits that bring people's income from beneath to above the poverty line
SDG 2	Zero hunger	End hunger, achieve food security and improved nutrition and promote sustainable agriculture	Benefits that improve agricultural production, reduce malnourishment or improve food security
SDG 3	Good health and well being	Ensure healthy lives and promote well-being for all at all ages	Benefits that improve health for local people such as increased health service coverage, reduce health risks
SDG 4	Quality education	Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all	Benefits that increase the number of children in education, improve education facilities or increase the number of qualified teachers
SDG 5	Gender equality	Achieve gender equality and empower all women and girls	Benefits that result in equal treatment between genders such same working conditions, same education opportunities
SDG 6	Clean water and sanitation	Ensure availability and sustainable management of water and sanitation for all	Benefits that increase the number of people using safe drinking water and safely managed sanitation services, improve water use efficiency
SDG 7	Affordable and clean energy	Ensure access to affordable, reliable, sustainable and modern energy for all	Benefits that increase the number of people using power or fuel from renewable resources, increase energy efficiency
SDG 8	Decent work and economic growth	Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all	Benefits that increase employment opportunities, improves employment conditions (income, working hours, facilities), reduce work place injury and health risks
SDG 9	Industry, innovation and infrastructure	Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation	Benefits that improve local connectivity such as roads access for rural communities and coverage of mobile networks, increase number of sustainable industries
SDG 10	Reduced inequalities	Reduce inequality within and among countries	Benefits that increase access to services or income by the poor or people from marginalised social groups
SDG 11	Sustainable cities and communities	Make cities and human settlements inclusive, safe, resilient and sustainable	Benefits that increase the number of safe and affordable housing, improved urban planning, increase safe disposal of urban waste, increase public transport access, improve resilience of settlements to natural disasters

117 This annex captures benefits of similar projects in a consolidated table, e.g. benefits of the projects Activity-1 to Activity-4 of the Biogas Support Program in Nepal are similar and summarized in one consolidated table. This information has been highlighted in the footnotes of consolidated tables.

SDG	Name	Brief Description	Criteria to determine if project benefit have high likelihood of contributing to the SDG
SDG 12	Responsible consumption and production	Ensure sustainable consumption and production patterns	Benefits that reduce food and commercial wastage, increase recycling
SDG 13	Climate action	Take urgent action to combat climate change and its impacts	Applicable to all CDCF projects, benefits that reduce GHG emissions, increase in GHG sequestration
SDG 14	Life below water	Conserve and sustainably use the oceans, seas and marine resources for sustainable development	N/A
SDG 15	Life on land	Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss	Benefits that reduce desertification, improve conservation and biodiversity, increase forest coverage, increase recovery of degraded land
SDG 16	Peace, justice and strong institutions	Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels	N/A
SDG 17	Partnership for the goals	Strengthen the means of implementation and revitalize the global partnership for sustainable development	Applicable to all CDCF projects, benefits that from or promotes 'North South' and 'South South' cooperation on clean technology transfer, finance of sustainable development projects, technical assistance and capacity building for of sustainable development related knowledge

Note: Criteria to determine if project benefits have high likelihood of contributing to specific UN SDGs are derived through a simple analysis of which kinds of project benefits would overlap with formal SDG indicator as used by the UN (<https://sustainabledevelopment.un.org/?menu=1300>).

Table 8 / Animal Manure Management System (AMMS) GHG Mitigation Project, Shandong Minhe Livestock Co. Ltd., Penglai, Shandong Province, P.R. of China: community co-benefits overview¹¹⁸

Community co-benefits	SDGs contributed towards
Construction and operation of the improved AAMS and Power Generation	Affordable clean energy; sustainable cities and communities
Improved road conditions and related facilities	Industry, innovation and infrastructure
Improved drinking water wells and pipelines, improved drinking water quality	Clean water and sanitation; good health and well-being
Supply of free digested solid and liquid fertilizer	Zero hunger
Training on using digested solid and liquid fertilizer	Zero hunger

Table 9 / Biogas Support Program - Nepal (BSP-Nepal) Activity-1, Activity-2, Activity-3, Activity-4: community co-benefits overview^{119, 120}

Key community co-benefits	UN SDGs contributed towards
Air quality improvements (reducing fly ash and suspended particulate matter)	Good health and well-being
Improving soil quality by adding soil nutrients	Zero hunger
Protecting forests	Life on land
Creating job opportunities and business opportunities, improving working conditions	Decent work and economic growth
Improved health & safety, e.g. reducing accidents	Good health and well-being
Optimizing women empowerment	Gender equality
Increasing affordability and reliability of energy	Affordable and clean energy

¹¹⁸ Source: World Bank, *Implementation completion and results report on a proposed purchase agreement of emission reductions from the community development carbon fund for the China: Shandong Minhe poultry biogas project*, 2014.

¹¹⁹ The key benefits of the Biogas Support Program Nepal Activity-1 to Activity-4 are captured in a consolidated version. The benefits are similar as they are similar projects. Source: CDM, *Sustainable development co-benefits description report*, 2017, accessed April 20, 2017, <http://cdmcobenefits.unfccc.int/Pages/SD-Reports.aspx>

¹²⁰ Note that the Sustainable Development Report for the project *Biogas Support Program - Nepal (BSP-Nepal) Activity-2* does not indicate any impact on gender equality. Source: UNFCCC, *CDM Sustainable development co-benefits description reports 2017*, accessed April 20, 2017, <http://cdmcobenefits.unfccc.int/Pages/SD-Reports.aspx>.

Table 10 / Moldova Biomass Heating in Rural Communities (Project Design Document No. 1)¹²¹ Biomass Heating in Rural Communities (Project Design Document No. 2): community co-benefits overview¹²²

Community co-benefits	SDGs contributed towards
Fuel switching from existing fossil fuels (coal, wood and mazut) to renewable fuels	Affordable and clean energy
Technology transfer to local communities on modern heat production equipment and materials	Sustainable cities and communities
Upgraded heating systems of public buildings resulting in reduced fuel consumption and energy consumption	Affordable and clean energy
Improved living conditions in public buildings: school children, hospital patients and staff benefit from higher indoor temperature during winter	Good health and well-being

Table 11 / Community-Based Renewable Energy Development in the Northern Areas and Chitral (NAC), Pakistan: community co-benefits overview¹²³

Community co-benefits	SDGs contributed towards
Increased access and reliability to electricity	Affordable and clean energy
Reduction of local air pollution	Good health and well-being

Table 12 / Rwanda Electrogaz Compact Fluorescent Lamp (CFL) distribution project: community co-benefits overview¹²⁴

Community co-benefits	SDGs contributed towards
Affordability and reliability of energy	Affordable and clean energy
Reduction of production costs	Decent work and economic growth
Preventing end of life products (solid waste)	Responsible consumption and production; sustainable cities and communities

Table 13 / Energy Conservation and Greenhouse Gases Emissions Reduction Moldova: community co-benefits overview¹²⁵

Community co-benefits	SDGs contributed towards
Fuel switching from existing fossil fuels (coal, wood and mazut) to natural gas/liquid fuels	Affordable and clean energy
Technology transfer to local communities on modern heat production equipment and materials	Sustainable cities and communities
Upgraded heating systems of public buildings resulting in reduced fuel consumption and energy consumption	Affordable and clean energy
School children, hospital patients and staff benefit from higher indoor temperature during winter	Good health and well-being

121 Source: UNFCC, *Project 0159: Moldova Biomass Heating in Rural Communities (Project Design Document No. 1)*, n.d., accessed April 25, 2017, <https://cdm.unfccc.int/Projects/DB/DNV-CUK1133985182.37/view>

122 The key benefits of the Biomass Heating in Rural Communities Project Design Document No. 1 and No. 2 are captured in a consolidated version. The benefits are similar as they are similar projects. Source: UNFCC, *Project 0159: Moldova Biomass Heating in Rural Communities (Project Design Document No. 1)*, n.d., accessed April 25, 2017, <https://cdm.unfccc.int/Projects/DB/DNV-CUK1133985182.37/view>

123 Source: World Bank, *Validation Report, Community-Based Renewable Energy Development in the Northern Areas and Chitral (NAC) in Pakistan*, accessed April 24, 2017, <https://cdm.unfccc.int/filestorage/Y/D/U/>

124 Source: UNFCCC, *CDM Sustainable development co-benefits description report*, 2017, <http://cdmcobenefits.unfccc.int/Pages/SD-Reports.aspx>.

125 Source: World Bank, *Moldova Energy Conservation and Greenhouse Gas Emissions Reduction*, 2007, <https://cdm.unfccc.int/Projects/DB/DNV-CUK1134568842.81/view>.

Table 14 / India FaL-G Brick and Blocks Project No.1, No. 2, No.3, No.4: community co-benefits overview¹²⁶

Community co-benefits	SDGs contributed towards
Emission reductions because of promotion of cleaner brickmaking technology	Affordable and clean energy
Provision of health insurance and accident cover since the inception of the project	Good health and well-being; decent work and economic growth
Improved living and working conditions for workers (including basic sanitation facilities, personal safety gear and 500 rupees in saving or in-kind benefits)	Decent work and economic growth
Permanent employment for workers (compared to seasonal employment in clay brick industry)	Decent work and economic growth
Campaigns on HIV/AIDS risks starting before the execution of the ERPA until accomplishment	Good health and well-being
Improved knowledge on health status (first aid kits distributed to each worker, health and safety sensitization materials, mosquito nets, tarpaulin, overcoats for women workforce)	Good health and well-being

Table 15 / Guanganrun Hydropower Project in Hubei Province, P.R. China: community co-benefits overview¹²⁷

Community co-benefits	SDGs contributed towards
Improvement of reliability and accessibility of water supply, saving and conservation of water	Clean water and sanitation
Improved land irrigation	Zero hunger
Job creation and generation of new sources of income	Decent work and economic growth
Community/rural advancement, poverty alleviation	Zero poverty
Improvement of energy supply	Affordable and clean energy

Table 16 / Hubei Eco-Farming Biogas Project Phase I: community co-benefits overview¹²⁸

Community co-benefits	SDGs contributed towards
Cheaper, safer and more reliable energy for cooking in poor rural homes	Affordable and clean energy; sustainable cities and communities
Improvement of household sanitation	Good health and well-being
Increase in job opportunities for local farmers Reduction of household labor	Decent work and economic growth
Increased use of biogas slurry to replace the use of livestock manure and chemical fertilizers on farmland	Life on land; clean water and sanitation
Health benefits (e.g. reduction of incidences of cough and diarrhea among children)	Good health and well-being

¹²⁶ The key benefits of the FaL-G Brick and Blocks Projects No.1, No. 2, No.3, No.4 are captured in a consolidated version. The benefits are similar as they are similar projects. Source: World Bank, *Implementation completion and results report on a proposed purchase agreement of emission reductions from the community development carbon fund for the FaL-G Bricks and Blocks project*, 2013.

¹²⁷ Source: CDM, *Sustainable development co-benefits description report*, 2017, accessed April, 20, 2017, <http://cdmcoenefits.unfccc.int/Pages/SD-Reports.aspx>.

¹²⁸ Source: World Bank, *Implementation completion and results report on a proposed purchase agreement of emission reductions from the community development carbon fund for carbon finance operations Hubei eco-farming biogas project*, 2014.

Table 17 / Improving Kiln Efficiency in the Brick Making Industry in Bangladesh (Bundle-1,2): community co-benefits overview¹²⁹

Community co-benefits	SDGs contributed towards
Emission reductions because of promotion of cleaner brickmaking technology	Affordable and clean energy
Reduction of air pollution	Good health and well-being
Provision of basic sanitation and washing facilities for men and women on each plant	Good health and well-being; gender equality, clean water and sanitation
Provision of on-site first aid and health clinic to provide primary health care (health clinic built, biweekly doctor's visits are ensured)	Good health and well-being
Construction of multipurpose centers at each plant, separate eating rooms for men and women, construction of dormitories for non-local workers	Good health and well-being; gender equality
Provision of safety gear and appropriate clothing	Decent work and economic growth
Creation of new permanent employment for men and women	Decent work and economic growth

Table 18 / Installation of Solar Home Systems in Bangladesh: community co-benefits overview¹³⁰

Community co-benefits	SDGs contributed towards
Improved access to clean and reliable electricity for households, farmers, and businesses	Affordable and clean energy; sustainable cities and communities
Healthier work and home environment (lamp replacements reduce indoor air pollution, fire incidences and health risks such as respiratory and eye-related diseases)	Good health and well-being
Local job creation because of local community involvement in maintenance activities	Decent work and economic growth

Table 19 / La Esperanza Hydroelectric Project: community co-benefits overview¹³¹

Community co-benefits	SDGs contributed towards
Local employment in construction and operation	Decent work and economic growth
Rural electrification and improved quality of electric service	Affordable and clean energy
Watershed management and reforestation	Life on land
Road maintenance and repairs	Industry, innovation and infrastructure

¹²⁹ Source: World Bank, *Implementation completion and results report on a proposed purchase agreement of emission reductions from the community development carbon fund for the Bangladesh brick kiln efficiency project*, 2014.

¹³⁰ Source: World Bank, *Bangladesh, People's Republic of: Installation of Solar Home Systems in Bangladesh (Grameen)*, accessed April 20, 2017, <https://wbcarbonfinance.org/Router.cfm?Page=Projport&ProjID=37262>.

¹³¹ Source: World Bank, *Project appraisal document on a proposed carbon finance operation in the amount of USD 1.4 million to consorcio de inversiones, SA for the Honduras La Esperanza Hydroelectric Development*, December 2, 2014.

Table 20 / Micro hydro Promotion Nepal: community co-benefits overview¹³²

Community co-benefits	SDGs contributed towards
Local employment in construction and operation	Decent work and economic growth
Shift in the main source of lighting from kerosene to electricity	Affordable and clean energy
Decrease in expenditure for lighting	Reduced inequalities
Time savings for household members	Good health and well-being

Table 21 / Uganda Municipal Waste Compost Program: community co-benefits overview¹³³

Community co-benefits	SDGs contributed towards
Enhanced environmental planning and management capacity of municipalities and communities (e.g. training and logistical support, provision of grant funds)	Sustainable cities and communities
Construction of a school	Quality education
Construction of latrine pits	Clean water and sanitation
Construction of health centers and roads	Industry, innovation and infrastructure
Energy saving stoves for households to reduce inhaled smoke, number of trees cut and energy loss	Affordable and clean energy; good health and well-being
Establishment of training and education centers for agriculture, water and energy saving practices	Industry, innovation and infrastructure
Improvement of water sources through the construction of wells, water storage tanks or rain water harvesting jars	Clean water and sanitation

Table 22 / Olkaria II Geothermal Expansion Project: community co-benefits overview¹³⁴

Community co-benefits	SDGs contributed towards
Excavation of water pan for watering livestock	Decent work and economic growth
Construction and equipment of six classrooms at local primary school and local nursery school	Quality education
Construction of a waterline	Clean water and sanitation
Reduction of GHG emissions by displacing fossil fuel based electricity generation with geothermal power generation at existing power plant	Affordable and clean energy

¹³² Source: World Bank, *Implementation completion and results report on a proposed purchase agreement of emission reductions from the community development carbon fund for the Nepal village micro hydro project*, 2017.

¹³³ Source: World Bank, Uganda: *Municipal Waste Compost Project*, accessed April 20, 2017, <https://wbcarbonfinance.org/Router.cfm?Page=Projport&ProjID=48162>.

¹³⁴ Source: World Bank, *Implementation completion and results report on a proposed purchase agreement of emission reductions from the community development carbon fund for the Kenya Kengen Carbon Finance Umbrella project*, 2017.

Table 23 / Optimization of Kiambere Hydro Power Project: community co-benefits overview¹³⁵

Community co-benefits	SDGs contributed towards
Access to water: water line reduced and distance travelled to reach portable water reduced from 17 kilometers to at most five kilometers	Clean water and sanitation
Updated health care centers (maternity wing and male, female and children wards)	Good health and well-being
New small dispensary built in a more central location	Good health and well-being
New five classroom school and new classrooms in primary school	Quality education
Better access to renewable electricity for local communities	Affordable and clean energy; sustainable cities and communities

Table 24 / Redevelopment of Tana Hydro Power Station Project: community co-benefits overview¹³⁶

Community co-benefits	SDGs contributed towards
Improved roads	Industry, innovation and infrastructure
Assistance provided to complete local dispensary	Good health and well-being
Access to drinking water from their weirs	Clean water and sanitation
Better access to renewable electricity for local communities	Affordable and clean energy; sustainable cities and communities

Table 25 / Santa Rosa hydroelectric: community co-benefits overview¹³⁸

Community co-benefits	SDGs contributed towards
Cleaner irrigation water	Clean water and sanitation
Road maintenance	Industry, innovation and infrastructure
Plantation of vegetation	Life on land
Local employment	Decent work and economic growth
Provision of free electricity to local orphanage run by NGO Achalay Foundation	Affordable and clean energy
Local infrastructure improvements (installation of fence around local school, construction of two new classrooms in local school, construction of computer lab in local school and construction of community centers)	Industry, innovation and infrastructure

¹³⁵ Source: World Bank, *Kenya: Optimization of Kiambre Power Station Project*, accessed April 20, 2017, <https://wbcarbonfinance.org/Router.cfm?Page=Projport&ProjID=35854>.

¹³⁶ Source: World Bank, *Kenya: Redevelopment of Tana Power Station Project*, accessed April 20, 2017, <https://wbcarbonfinance.org/Router.cfm?Page=Projport&ProjID=35847>.

¹³⁷ Source: World Bank, *Implementation completion and results report on a proposed purchase agreement of emission reductions from the community development carbon fund for the Peru Santa Rosa Hydropower project*, 2012.

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