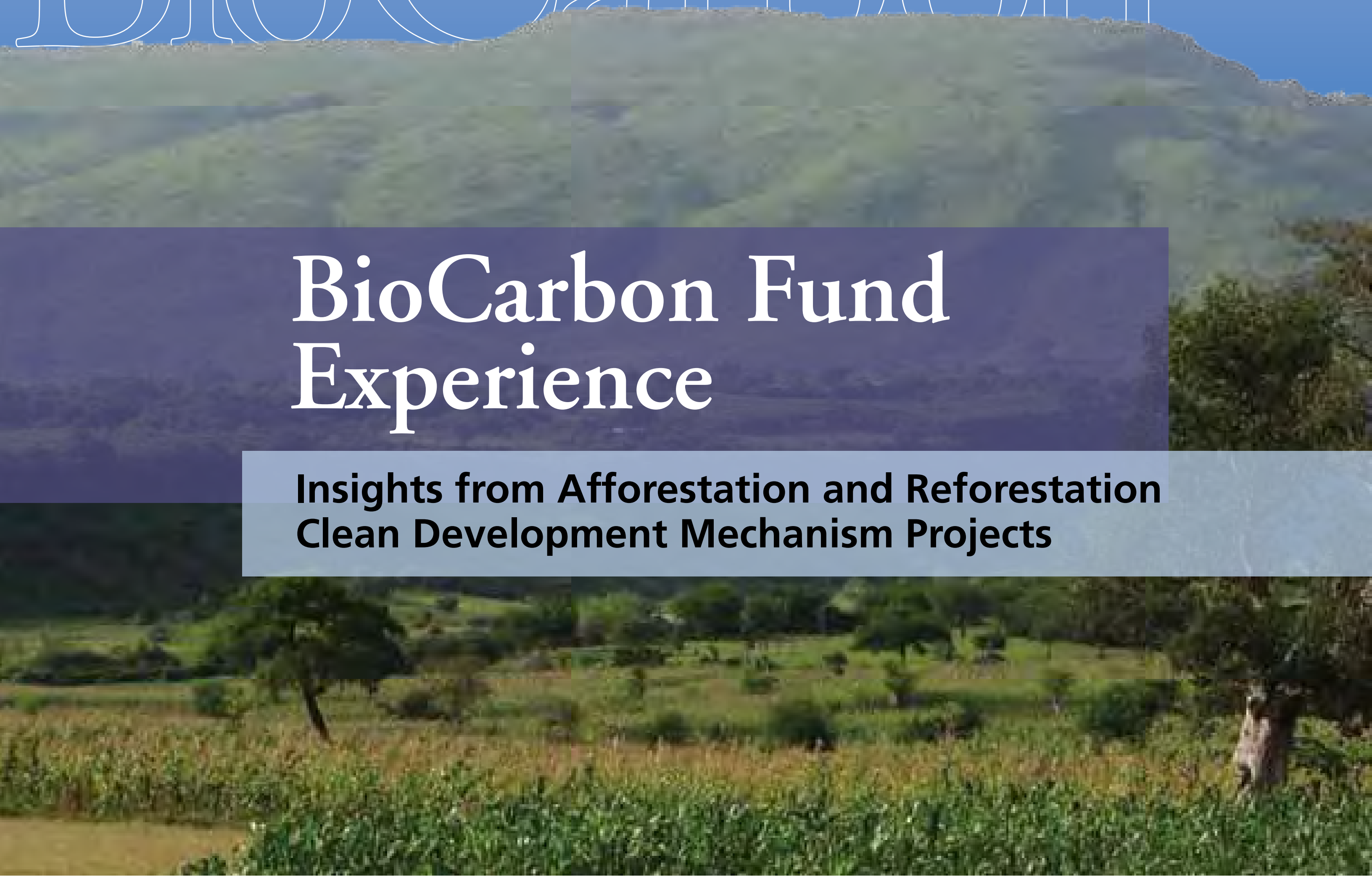
BioCarbon



BioCarbon Fund Experience

Insights from Afforestation and Reforestation Clean Development Mechanism Projects

Bio CF

Carbon Finance
AT THE WORLD BANK

Ethiopia Humbo Assisted Natural Regeneration Project

After, 2010 (front cover)

Before, 2005 (title page)

Images courtesy of World Vision

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Washington, DC, December 2011

Abbreviations and Acronyms

AAU	Assigned Amount Unit
AFOLU	Agriculture, Forestry and Other Land-Use
ANR	Assisted Natural Regeneration
A/R	Afforestation and Reforestation
AR-AM	Afforestation Reforestation Approved Methodology
AR-WG	Afforestation Reforestation Working Group (of the CDM EB)
BioCF	BioCarbon Fund
CAR	Clarification Action Request
CCBA	Climate, Community and Biodiversity Alliance
CDM	Clean Development Mechanism
CDM EB	Executive Board of the CDM
CER	Certified Emission Reductions
CLR	Clarification Request
COP	Conference of the Parties
COP/MOP or CMP	Conference of the Parties serving as the Meeting of the Parties
DNA	Designated National Authority
DOE	Designated Operational Entity
EB	Executive Board
ER	Emission Reduction
ERPA	Emission Reductions Purchase Agreement
ERU	Emission Reduction Unit
EU-ETS	European Union Emissions Trading System
GHG	Greenhouse Gas
IPCC	Intergovernmental Panel on Climate Change
LoA	Letter of Approval
lCER	Long-term Certified Emission Reductions
LULUCF	Land Use, Land-Use Change and Forestry
PDD	Project Design Document
QA/QC	Quality Assurance / Quality Control
REDD+	Reducing Emissions from Deforestation and Forest Degradation in developing countries, the role of conservation, sustainable management of forest and enhancement of forest carbon stocks
RMU	Removal Units
SBSTA	Subsidiary Body for Scientific and Technological Advice (of the UNFCCC)
SMART	Simplified Monitoring for Afforestation/ Reforestation Tool
TARAM	Tool for Afforestation/ Reforestation Approved Methodologies
tCER	Temporary Certified Emission Reductions
tCO_2e	Tonne of Carbon Dioxide Equivalent
UNFCCC	United Nations Framework Convention on Climate Change
VVM	Validation and Verification Manual

Notes: Annex 5 provides a glossary of key terms.

All dollar amounts are U.S. dollars unless otherwise indicated.

The BioCarbon Fund

Housed within the Carbon Finance Unit of the World Bank, the BioCarbon Fund (BioCF) is a public-private initiative mobilizing resources for pioneering projects that sequester or conserve carbon in forest- and agro-ecosystems, mitigating climate change and improving local livelihoods. The overall goal of the Fund is to demonstrate that land-base activities can generate high-quality emission reductions with strong environmental and socioeconomic benefits for local communities.

The BioCarbon Fund became operational in 2004 with participants providing funds for both Afforestation and Reforestation (A/R) Clean Development Mechanism (CDM) projects and for other land-based projects currently excluded from the CDM (e.g., Reducing Emissions from Deforestation and Forest Degradation-Plus (REDD+) and sustainable agricultural land management). The Fund has two tranches. The first tranche became operational in 2004 with a total capital of $53.8 million. Because of the high levels of interest, the second tranche, capitalized with $38.1 million, started in 2007. Participants investing in the BioCF include six public entities and 12 private companies.

Most of the BioCF resources (about 80 percent) have been earmarked to A/R CDM projects (first windows of each tranche); the remainder has been allocated to REDD+ and sustainable land management projects (second windows). The emission reductions generated by these projects are purchased by the BioCF on behalf of its participants and are subsequently transferred to them pro rata their financial participation in the Fund. The contractual undertakings of a project entity and the BioCF for the sale and purchase of ERs are contained in an Emission Reductions Purchase Agreement (ERPA).

As of November 2011, the BioCF had contracted over nine million emission reductions from 21 A/R CDM projects. These projects are located in 16 countries and five regions of the world. The BioCF resources are allocated to projects on degraded lands: more than half to projects with environmental restoration purposes, 25 percent for fuel wood, and 21 percent for timber. All of the projects directly benefit poor farmers. At the time of writing, 13 BioCF projects have been registered under the CDM, one is requesting registration, three are undergoing validation, and four are under preparation. Registered projects are preparing for verification. Projects duly validated start receiving carbon payments as per their ERPA provisions.

Executive Summary

0.1 The Clean Development Mechanism (CDM) of the United Nations Framework Convention on Climate Change (UNFCCC) is one of the flexible mechanisms of the Kyoto Protocol intended to reduce the concentration of greenhouse gas (GHG) emissions in the atmosphere in a cost-effective manner. The CDM allows developed countries to use Certified Emission Reductions (CERs) generated from sustainable development projects in developing countries to meet part of their emission reductions targets under the Kyoto Protocol. Developing countries in return receive investments in clean technology and revenues from the sale of these emission reductions once they are generated. Emission reductions are quantified and certified as Certified Emission Reductions (CERs) by the Executive Board of the CDM (CDM EB). One CER is equivalent to one tonne of carbon dioxide equivalent (tCO_2e), and forest projects account for CERs with a limited validity due to potential reversibility of achieved carbon stock changes.

0.2 The land use, land-use change and forestry (LULUCF) sector is responsible for about 17 percent of global anthropogenic GHG emissions.[1] The UNFCCC has recognized the importance of this sector for stabilizing concentrations of GHG in the atmosphere, and has included Afforestation and Reforestation (A/R) as one of the 15 sectors that are eligible to generate emission reductions and

1 IPCC (Intergovernmental Panel on Climate Change), 2007. Climate Change 2007: Synthesis Report. Contribution of Working Groups I, II, and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. Geneva.

offset credits under the CDM. A/R projects remove carbon from the atmosphere through the planting of trees and by assisting in the natural regeneration of degraded lands. Quantification of emission reductions is done by applying baseline and monitoring methodologies approved by the CDM EB.

0.3 The BioCarbon Fund (BioCF), housed within the Environment Department of the World Bank, is a public-private initiative mobilizing resources for pioneering projects that sequester or conserve carbon in forest- and agro-ecosystems, mitigate climate change, and improve local livelihoods. Most of the BioCF resources (about 80 percent) are earmarked for A/R CDM projects using different carbon sequestration technologies, including assisted natural regeneration, forest restoration, community reforestation, agroforestry, and silvopastoral systems.

0.4 This report presents insights from the BioCF's seven years of experience designing and implementing 21 A/R CDM projects in 16 developing countries. All of the projects directly benefit poor farmers. The report is intended to inform project developers of the challenges and opportunities that A/R CDM projects have encountered on the ground. The insights presented here are also relevant for policymakers and negotiators currently involved in the debate to reform the CDM rules and for informing discussions on new market-based strategies for climate change mitigation in the agriculture, forestry, and other land use (AFOLU)[2] sector.

0.5 Besides the structural hurdle of generating limited CERs, the BioCF experience shows that initially A/R CDM project developers encountered significant difficulties applying the methodologies approved by the CDM EB and preparing their Project Design Documents (PDDs), a requirement for project registration under the CDM. In response to feedback about these challenges, the CDM EB has improved and simplified the A/R CDM rules and procedures. As a result, some project developers are now replicating and scaling up their experience. Some governments are also working to mainstream carbon finance into their national sustainable land-use strategies. BioCF projects have demonstrated that forest carbon finance can contribute to climate change mitigation while achieving important co-benefits in rural areas.

0.6 Despite its potential to mitigate climate change, the A/R sector remains underdeveloped for two main reasons. First, the demand for forest carbon credits is still very limited.[3] Second, most project developers still lack the capacity to apply today's rules for greenhouse gas accounting effectively. The A/R CDM rules and procedures need to be further simplified to become more pragmatic and to accommodate realities on the ground. Moreover, communication between the CDM EB and project developers needs to be more effective and the local capacity for developing forest carbon projects strengthened.

0.7 This report presents the main insights from the BioCF experience in accompanying the development and implementation of A/R CDM projects covering the following aspects: (i) CDM regulations, (ii) land-related issues, (iii) non-permanence, (iv) land-related issues, (v) greenhouse gas accounting, (vi) finance, (vii) institutional arrangements, (viii) and under-delivery risk.[4] A summary of the main insights from each section of this report is presented in this Executive Summary. The report concludes with a discussion of the reforms needed to scale up the A/R CDM in a significant manner and how this experience could inform the ongoing debate about other land-based carbon market mechanisms to mitigate climate change and support rural development.

Co-benefits: An Opportunity for Creating Synergies

0.8 **A/R projects have environmental, economic, social, and institutional co-benefits.** The strength of these co-benefits stems from the type of project, the baseline project situation, the project developer's goals, the level of participation by local communities, and considerations made in project design and implementation.

2 AFOLU is a term that superseded Land Use, Land-Use Change and Forestry (LULUCF) in the latest Intergovernmental Panel on Climate Change guidelines, integrating agriculture, land use, and forestry.

3 The European Union (EU) excludes forest carbon credits from the categories of eligible assets to be used by EU operators to comply with their emission reductions commitments under the EU Emissions Trading Scheme (EU-ETS).

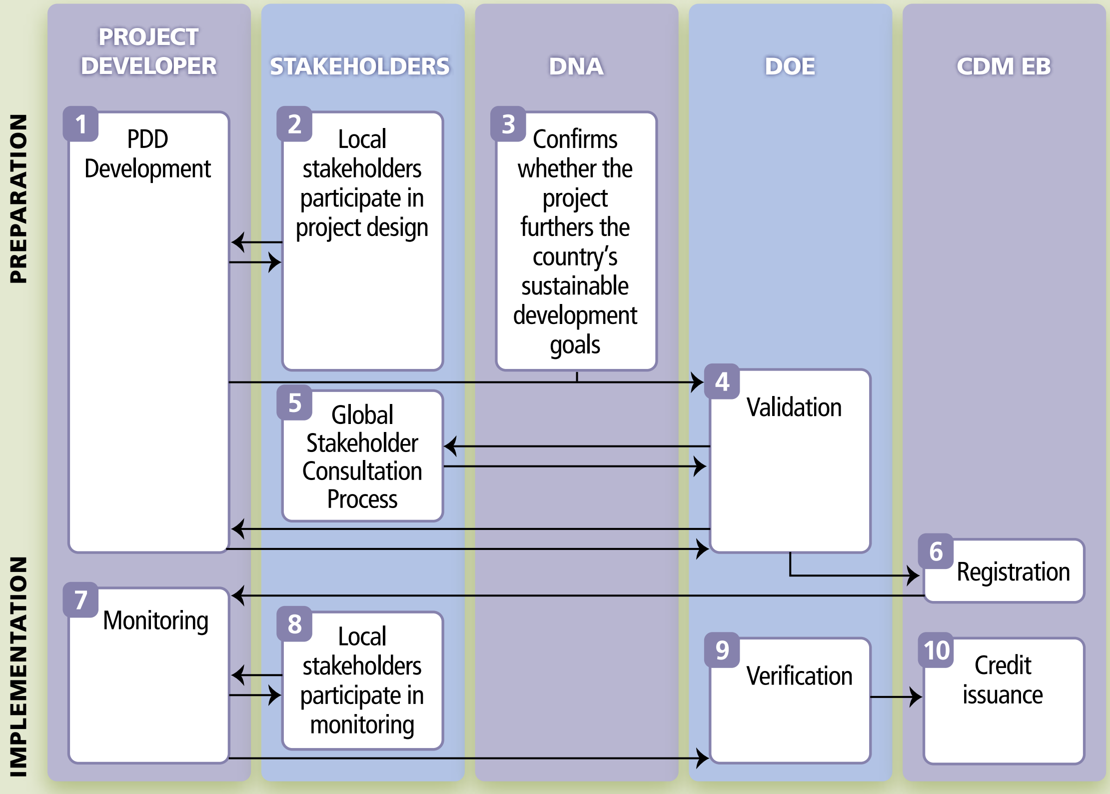
4 The report is based on an analysis and in-depth desk review of project idea notes, PDDs, reports on environmental and social assessments, BioCF annual reports, World Bank evaluation reports, safeguard policy compliance, and CDM validation reports. The data collected were analyzed with descriptive statistics, and illustrative examples were used as case studies.

Box 0.1

Processes and Rules for A/R CDM Projects

A/R CDM projects follow the same processes as the other CDM sectors: project preparation, validation, registration, monitoring, verification, and issuance of certified emission reductions. The crediting period of an A/R project is either a 30-year single period or a 20-year period that is renewable twice.

PROCESSES AND STAKEHOLDERS INVOLVED IN THE A/R CDM PROJECT CYCLE



Steps 1 and 2: Following CDM rules, project developers and local stakeholders produce a Project Design Document (PDD). To do this they have to apply a CDM-approved baseline and monitoring methodology.

Steps 3, 4, and 5: The PDD is validated by a Designated Operational Entity (DOE), an independent auditor. This assessment aims to ensure PDD conformity with the A/R CDM rules and stakeholder comments, as well as the project's contribution to the host country's sustainable development goals. The latter is confirmed by a Designated National Authority (DNA).

Step 6: With a positive validation report, the DOE submits the PDD for registration under the CDM. Before registration, the CDM EB checks the completeness of documentation submitted by the project and reassesses it to address concerns if any were brought up by at least three of its members or a project participant.

Steps 7 and 8: The monitoring plan is implemented by the project developer and local stakeholders. Such a plan is designed based on the GHG accounting methodology selected for the project.

Steps 9 and 10: At verification, the DOE verifies the monitoring report submitted by the project developer; a positive verification report will result in the issuance of Certified Emission Reductions.

Box 0.2

Key Rules for A/R CDM Projects

LAND ELIGIBILITY

Developers must demonstrate that the A/R project will neither cause deforestation nor prevent natural regeneration. To do this, they have to prove that the project land was deforested on December 31, 1989, and at the project start date. Project developers must also demonstrate that any observed deforestation at project start is not temporary.

PROJECT BOUNDARY, CONTROL OVER THE LAND, AND LAND TENURE

Project developers must delineate and provide geo-referenced coordinates of the discrete land areas where trees will be planted. At validation, the project developer must provide the coordinates for the total project boundary (or maps in the case of small-scale projects) and evidence of control over at least two-thirds of the project; evidence for the remainder must be provided at verification. Developers must also demonstrate legal title to the land and rights of access to the sequestered carbon.

GHG ACCOUNTING

The baseline and monitoring methodologies prescribe the procedures to estimate the *ex-ante* "net actual anthropogenic emission reductions by sinks" achieved in projects. In doing this, project developers deduct the GHG removals by sinks that would have occurred in the baseline from the actual emission reductions achieved in the project scenario. The emissions attributable to the project happening within and outside its boundary (leakage) must be deducted from the project removals by sinks. Sources of leakage include displacement of crop cultivation, grazing, and fuel wood gathered on the project land area; other emissions, such as biomass burning, must also be accounted for. Following a monitoring methodology, project developers calculate *ex-post* emission reductions.

NON-PERMANENCE

Reflecting the CDM's approach to non-permanence in the A/R sector, tonnes of CO_2e produced in projects are accounted for as temporary credits. Conversely, credits originated in other CDM sectors are considered permanent. Temporary forest credits have a limited life: credits having a five-year life are called temporary CERs (tCERs) and those expiring at the end of the crediting period (30-year single or 20-year renewable twice period) are called long-term CERs (lCERs). Buyers of tCERs and lCERs must replace them with permanent credits before their expiration dates.

SCALE OF PROJECTS

Projects producing less than 16,000 tonnes of CO_2e per year are allowed to apply simplified modalities and procedures for A/R. Small-scale A/R projects have to be developed or implemented by low-income communities. Following defined rules, a project developer is allowed to bundle small-scale projects as a way to benefit from economies of scale.

0.9 **Co-benefits are an important incentive for local participation in forest carbon projects.** GHG emission reductions are an abstract concept for most local communities. The possibility of benefiting from greater land tenure security, employment opportunities, and new sources of income are in many cases the main incentives for community participation and long-term commitment to forest carbon projects.

0.10 **Forest carbon projects also contribute to climate change adaptation by increasing the resilience of communities and the local environment.** A/R CDM projects contribute to strengthening the natural capital of rural communities participating in projects by recovering severely degraded lands, protecting water resources, and conserving biodiversity. The projects also strengthen the social and financial capital of communities, thus contributing not only to climate change mitigation but also to local communities' adaptation to the adverse impacts of climate change. The fact that these projects are often undertaken precisely for these reasons also makes them potentially more sustainable in the future.

0.11 **There is great potential for synergies between forest carbon projects and other development initiatives.** A/R CDM provides the means for achieving the objectives of other United Nations Conventions, such as combating desertification and promoting biodiversity conservation. A/R projects can also contribute to the Millennium Development Goals by alleviating poverty and promoting the socioeconomic development of rural areas.

Regulatory Issues: The Challenge of Pursuing Forest Carbon Credits with Environmental Integrity, Efficiency, and Effectiveness

0.12 **Designing a project and developing a PDD can be a time-intensive and costly task.** Projects developed by highly motivated entities with good managerial capacity in countries with a strong forestry sector have been the most effective in project preparation and PDD development. Developing a forest carbon project—including writing the PDD—requires a wide range of technical and managerial expertise (e.g., forestry, forest carbon, financing, land-use change, economics, institutional, legal, and coordination). Gathering such multidisciplinary teams in rural areas of developing countries is a challenging task. Reliance on external consultants remains high, increasing projects' transaction costs. In addition, lack of host country forestry sector information for additionality has proven to be a major challenge for timely completion of PDDs.

0.13 **Validation is often delayed because many project developers do not fully grasp the rules for GHG accounting or lack the capacity to track the changes in rules, methodology versions, and required documents forms.** Increased experience in PDD preparation and the development of tools to facilitate GHG accounting have partially addressed these challenges. The CDM EB continues consolidating methodologies and presenting rule changes in a more consistent manner. Still, additional efforts are needed in this direction. Project developers have serious difficulties tracking the latest versions of CDM EB guidance to effectively update their PDDs, and this is a major source of delay in validation. Because of this, developers continue to rely on external consultants for validation, which prevents total ownership of the project and has serious implications for effective implementation of later stages of the project cycle (e.g., monitoring).

0.14 **Additionality is difficult to demonstrate at the project level.** Although forest projects in most developing countries face barriers that prevent them from happening and succeeding, project developers struggle with providing properly documented evidence of such barriers. Projects for which profitability is not their main rationale (e.g., projects with social and environmental objectives) and in countries with weak forestry sectors struggle the most in demonstrating additionality. Weak evidence of additionality is a frequent reason for clarifications and corrective actions from Designated Operational Entities at validation. In addition, projects in countries with national payment for environmental service programs that started before 2001 find it difficult to demonstrate additionality; therefore, these pioneer countries are discouraged from using CDM as an instrument to attract additional investment to expand or sustain their environmental service programs. Private sector-led projects, on the other hand, find it difficult to balance the need to demonstrate that their projects are the less economic attractive to the CDM and viable to their investors; they therefore end up modifying their business-as-usual project designs to be eligible under CDM, which increases their risk. Thus the private-sector forest industry is discouraged from participating in the A/R CDM (unlike projects in other sectors).

0.15 **Designated National Authorities can have an effect on the time projects spend on validation.** DNAs must play a supportive role and focus on the analysis of the project's contribution to the national sustainable development objectives. In some countries, these entities have at times delayed the issuance of documentation required by projects at validation. This is sometimes due to the DNA's lack of understanding of its role in facilitating project registration and overall project feasibility. Small-scale projects are particularly delayed because of DNAs' difficulties in confirming that projects are developed or involve low-income communities, as per the national relevant definitions. It is important to recognize, however, that DNAs are on a learning curve; in some countries this challenge has been overcome.

0.16 **Designated Operational Entities are on a learning curve for A/R CDM, and this had contributed to delaying the validation process.** The number of DOEs accredited for the A/R sector started to be significant in 2009 when the demand for validation increased. Once accredited, many of the DOEs used their first validation experience as a learning opportunity; this often delayed the validation process. DOE's inexperience is reflected in their paying attention to issues that are no longer relevant, inefficient data collection for the assessments, and lack of sound judgment to assess the application of the A/R CDM rules in light of national circumstances. Project developers cannot neglect DOE's demands at validation, and changing a DOE has time and cost implications. In the BioCF experience, promoting activities that enhance the communication between project developers, the A/R Working Group of the CDM EB, and DOEs helps to smooth validation and verification—but there is no substitute for capacity building for DOEs.

0.17 **Delays at registration and issuance are significant due to the stringent scrutiny of projects by the CDM EB.** At registration, project documentation undergoes a "completeness check" process. Projects frequently fail this check as developers get overwhelmed with complying with the validation process and disregard the importance of presenting the required documentation in a comprehensive and accurate manner. The difficulties in tracking CDM EB decisions are also reflected in this poor performance. Moreover, additional technical review may be required if at least three members of the CDM EB or a party involved in the proposed project activity request it. As stated in the World Bank report *10 Years of Experience in Carbon Finance*, such reviews were frequent in the past. The CDM EB has made important improvements to reverse this trend, but extra examinations at registration and issuance may put A/R projects at risk of not getting carbon credits before the end of the first commitment period of the Kyoto Protocol because the queue of projects requesting registration and credit issuance is increasing as the 2012 deadline approaches.

0.18 **The verification process can be delayed when the specifications of the PDDs are not strictly followed.** Project developers and field teams often disregard the importance of strictly complying with the PDD at implementation. This is compounded by the live nature of such projects and, sometimes, because project developers and field teams are not actually involved in the preparation of the PDD. The monitoring of A/R projects also has its own complexities and requires developers to assess many variables. Significant deviation from the PDD at project implementation will increase the number of formal processes since a revised monitoring plan must be approved by the CDM EB; this can delay credit issuance. To overcome this challenge, it is important to further simplify the monitoring rules and increase local capacity.

The Temporary Crediting Approach to Non-permanence: A Narrow Window of Opportunity for A/R CDM Projects

0.19 **tCERs are more flexible commodities than lCERs.** In the BioCF experience, the shorter lifespan of tCERs is more compatible with the carbon market, land-use-change dynamics, and existing information on project risks. From the buyer's perspective, determining prices for lCERs requires precise and long-term information on project risks, which could be difficult to obtain in certain areas and for certain project types. This conclusion may point to the BioCF's own strategy of acquiring replacement credits; other buyers could arrive at a different conclusion depending on their willingness to take on additional risk.

0.20 **The replacement credit rule increases the risks for buyers of forest credits.** The temporary crediting approach to non-permanence adopted by the UNFCCC for A/R projects allowed this sector to be included in the CDM—but it has also put forest projects at a disadvantage. The price of forest carbon credits depends on future prices for permanent carbon credits, and these are difficult to estimate given the uncertainty and volatility of carbon markets. In addition, since forest credit prices are commonly fixed in an Emission Reductions Purchase Agreement, the willingness to pay for replacement credits is limited as well. This leaves little opportunity to accommodate variations in discount rates and price uncertainties.

0.21 **The non-permanence approach results in delayed carbon revenues.** Projects can only undertake one verification event per each commitment period of the Kyoto Protocol. This has implications for project viability.

0.22 **Temporary crediting as an approach to address the non-permanence of A/R projects has a limited effectiveness.** The impossibility of renewing temporary credits beyond a project crediting period hampers long-term carbon sequestration goals. This could be a perverse incentive for some projects. For example, reforestation projects with environmental goals depend on carbon revenues; the absence of payments after the crediting period could lead to deforestation and forest degradation.

0.23 **The lack of fungibility between temporary credits and credits from other CDM sectors notably reduces the demand for forest CDM credits.** Temporary credits are not always desirable credits as their holders cannot carry them over. This, along with the prevailing notion among potential buyers that credits from A/R CDM projects are not measurable, verifiable, and reportable, as well as that they entail environmental and social risks to local communities and their local environment, have reduced the demand from the European Union Emission Trading Scheme (EU-ETS), which is so far the biggest market for CDM credits.

0.24 **The lessons learned from A/R CDM projects presented in this section can be enriched with experiences in the voluntary carbon market where other approaches to non-permanence are used.** The insights on non-permanence should also contribute to the development of the REDD+ mechanism.

The A/R CDM Land-related Rules: Challenges and Opportunities

0.25 **Complying with the land eligibility and project boundary rules is a challenging task for project developers.** It demands both human and technical capacity to interpret satellite imagery, and resources to invest in technologies. Early projects have struggled the most in assessing land eligibility because of lack of CDM expertise; in many cases assessments were done without taking full account of the CDM-specific requirements and using maps and land-use data for purposes other than CDM. In addition, developers have struggled with tracking the many changes that the CDM EB has introduced to the land eligibility rule. These changes have created ambiguity and generated different interpretations of the rules by validators and project developers respectively. Since consultants external to the project have usually been in charge of doing the land eligibility assessment, stakeholders involved in projects have become increasingly frustrated as the process of selecting eligible lands has to be repeated.

0.26 **Project developers in tropical agriculture lands struggle with identifying eligible lands; this especially affects projects involving multiple farmers.** Tropical vegetation may regenerate quickly, reaching the forest definition; if this coincides with validation, auditors may judge these lands as ineligible (even though these lands may be only temporarily stocked with carbon). Developers find it difficult to demonstrate the temporary nature of the land regeneration as this requires undertaking broader and more complex studies on land-use patterns and ecology. Developers often have to redo the land eligibility analysis until they can find enough lands to ensure project viability, delaying project implementation. Such delays affect farmers' willingness to participate in the project as they lose confidence in the potential benefits of committing their land and investing labor and time in the project. The CDM EB simplified this rule by allowing project developers to present control over the land of two-thirds of the project area at validation, but they still have to present the total delineation of the project boundary.

0.27 **The "1990 rule" excludes areas with significant potential for A/R and results in scattered planting plots.** Many areas in developing countries were deforested and degraded in the 1990s and are therefore ineligible for A/R CDM projects. In some cases, areas neighboring the projects are excluded from participating because of the same rule. This leads to "patchwork forests," negatively affecting the social, ecological, and financial aspects of projects.

0.28 **Carbon finance can contribute to increasing land tenure security in project areas.** With the right institutional instruments in place, different land tenure systems can provide enough security for the development of sound forest carbon projects that ensure farmers' long-term commitment. The indicia of sufficient tenure security for project purposes will differ from context to context. In some contexts, long-established customary rules may suffice even if individual parcels are not formally documented and registered, provided there is political and legal recognition of the legitimacy of those rules. In other contexts, the absence of clear records may be a real concern that needs

Land degradation, the baseline scenario in Moldova.

to be addressed. The possibility of achieving higher levels of land tenure security can be an additional incentive for farmers to participate in forest carbon projects.

0.29 **Securing land tenure can be a costly and time-consuming process.** Carbon finance has contributed to increasing the level of land tenure security in five projects, but this came with a cost as it required time. Depending on the existing level of land tenure security, that cost can be prohibitive. But, in some cases, the benefits of investing in land tenure security—both in terms of project performance and improving local livelihoods—outweigh the costs.

Accounting for Emission Reductions: The Rigor and Practicality Imbalance

0.30 **The level of complexity of early methodologies made them less accessible to project developers.** Only highly skilled professionals were able to understand and follow the first versions of the A/R CDM methodologies. As a result, the CDM EB and the BioCF developed tools to make these methodologies more user-friendly. Still, project developers with low capacity need intensive help to apply them, increasing project transaction costs and under-delivery risks.

0.31 **Simplifications initiated by the CDM EB have been helpful to a certain extent.** The projects registered using the early versions of methodologies have not benefitted from the simplifications as they still need to account for GHG emissions as prescribed in older versions of methodologies. Most recent versions of methodologies are shorter, but the number of procedures, tools, and guidelines has increased. To further streamline the registration process, it is necessary to remove certain requirements for estimation of project emissions and leakage which, relative to the minimal volume of emissions measured, is time-consuming and costly to determine. The use of default data to calculate emissions and leakage based on robust research should be encouraged.

0.32 **Training of project developers is required to strengthen their capacity for GHG accounting.** It is easier for project developers to apply procedures that are closer to those that they are familiar with from traditional forestry projects (e.g., measurement of tree biomass growth). Many forest carbon procedures, however, are not generally used in traditional forest inventory, including estimation of carbon stocks in the baseline as well as measurement of carbon stock changes in non-tree vegetation, soil, litter, and deadwood pools. Similarly, project developers are usually unfamiliar with calculations of project emissions and leakage, principles of stratification, sampling, statistical procedures of monitoring, and measurement.

0.33 **Lack of available data on native species negatively affects projects with a biodiversity focus.** The information required for accounting for emission reductions in A/R projects with a large number of native species is rarely available. Projects that propose to plant these species have to use default data from the Intergovernmental Panel on Climate Change's 2003 *Good Practice Guidance* or other published sources. Use of default data, which is generally conservative, typically penalizes projects (especially with regard to expansion factors). Alternatively, developers use average local data from average sites; where there is a mismatch between site conditions in the inventory sources and planting sites, however, projects overestimate biomass growth in degraded sites, leading to potential project underperformance. Lack of suitable data may force some projects to change the composition of species or to reduce the portion of the project area that is planted with native species. Alliances between project developers and universities or research institutions are needed to produce and publish data to support these projects.

0.34 **Estimation of activity-shifting leakage is time- and information-intensive.** The information required for estimation of leakage emissions associated with shifting of grazing and fuel wood collection is not available in many rural areas of developing countries. Project developers need to spend significant time and resources to collect this data. There is a need to simplify the estimation of leakage emissions. In addition, projects located in degraded areas often have very low leakage risk because of the status of degradation of the surrounding areas; they should be exempted from the monitoring and estimation requirements. In situations with a high probability of leakage, the guidance for leakage assessment in A/R methodologies for large-scale projects should be simplified to allow for the use of discount factors in the calculation of emission reductions (following the guidance presented in the small-scale methodologies) to make the assessment of leakage more practical.

0.35 **Practical challenges arise in monitoring biomass growth.** The effort required for monitoring the carbon component of the project exceeds the workload for monitoring a conventional forest project. Projects have to create a monitoring unit, build and sustain capacity, and maintain reliable records. Since the carbon credits that will be issued are calculated based on verified monitoring data, activity that is not monitored will not earn credits.

Carbon Finance: Catalyzing Underlying Investment for Forest Projects

0.36 **A project entity´s ability to secure investment financing is critical to success in the A/R CDM.** Efforts are needed to facilitate access to financing for developers of A/R CDM projects. A large portion of the project idea notes with emission reduction potential that were submitted to the BioCF could not be considered because of lack of financing. In addition, projects were sometimes delayed in being accepted into the BioCF portfolio because project entities struggled with closing a financial gap. Projects having financial gaps were assessed on a case-by-case basis and accepted into the portfolio if they presented strong evidence of alternatives to fill in the gap. Delays in closing the financial gap, however, negatively affected the implementation of these projects.

0.37 **The A/R CDM has done little to help forest projects overcome the disproportionately large investment barriers they face in most developing countries.** A/R CDM projects are exposed to several disadvantages. First, because of their very nature, the amount of emission reductions (tCO_2e) achieved in these projects is low. Second, the length of ERPA contracts is usually short, reflecting the uncertainty associated with the continuation of the Kyoto Protocol. Third, the transaction costs of meeting the CDM requirements tend to be high due to local stakeholders' poor capacity for adequate project development and implementation. Fourth, the price of temporary credits and their demand are low because of the UNFCCC's approach to non-permanence. As a result, carbon revenues' contribution to improve projects' cash flows is limited. In addition, carbon finance's potential to catalyze underlying investment and front-load capital to cover the high upfront capital needs of forest projects is very limited; financial institutions and banks barely understand carbon finance, or they perceived it as highly risky.

0.38 **Carbon revenues, depending on their size and timely delivery, can positively impact project viability.** In the BioCF portfolio, the potential for carbon sequestration ranges widely (from 3-22 tCO_2e/

hectare/year), depending on the design and objectives of the project and the productivity of the lands. Since carbon revenues are paid on delivery, the timely delivery of carbon revenues depends on the project entity's capacity to secure financing, implement the forest carbon project, and manage project risks. Delays put projects expecting carbon revenues to cover maintenance costs at severe risk. Delays can also lead to changes in expectations and land-use priorities. Project entities must manage the expectations of all project participants and design appropriate incentive schemes.

0.39 **The transaction costs of meeting the CDM requirements were high in most BioCF projects.** The World Bank's development costs for A/R projects exceed \$1 per tCO_2e and are higher than for any other CDM sector. The transaction costs represent from 0.5 to 20 percent of the total project investment. It is impossible at this point to compare the transaction costs with the full potential for carbon revenues since projects have only contracted a small portion of their emission reductions. Project preparation costs, however, have tended to decrease in more recent projects as project developers benefit from increased experience in the application of CDM requirements, an improved understanding of project risks, and an enhanced CDM institutional structure with approved and more simplified methodologies and established DOEs.

0.40 **The price of permanent CDM credits determines the price of credits from A/R projects, which limits the potential of carbon finance to support the viability of projects.** The non-permanence rule—forcing buyers to purchase a replacement credit for each temporary credit purchased—makes the price of a forest carbon credit discounted relative to the price of credits from other CDM sectors. This puts A/R projects at a disadvantage.

0.41 **The threshold beyond which projects no longer qualify as small-scale projects, with simplified modalities and procedures** (16,000 tCO_2e annually), is too low to achieve project viability. The simplified modalities and procedures defined by the UNFCCC for these projects do not significantly reduce transaction costs. The fact that transaction costs of some BioCF small-scale projects are comparable to those of large-scale projects indicates that project developers have little incentive to engage in small-scale projects. In addition, the rule requiring the involvement of low-income communities can further increase transaction costs where capacity is low. In such cases, developers also struggle with bundling projects to benefit from economies of scale. The rules should be further simplified and the cap on emission reductions should be increased to facilitate small-scale projects.

The Institutional Framework: A Key Success Factor for Effective Project Development and Implementation

0.42 **Designing and creating equitable benefit-sharing schemes that effectively improve local livelihoods is essential to the long-term success of forest carbon projects.** The BioCF experience shows that local farmers' participation is driven by the benefits that they can derive from participating in these projects and also from their trust in the project entity. Due to the CDM's technical complexity, getting local farmers to actively participate in all project activities may be an unrealistic goal. It is important nevertheless to keep them well-informed throughout the process and to ensure that local partners agree with the direction that the project takes. Project entities backed by local communities with knowledge of the project area have fared better.

0.43 **Investing in and sustaining local capacity can ensure the permanence of forest carbon initiatives.** Forest carbon projects are long-term partnerships, at the core of which are the farmers/communities and the project entity. These partnerships often need to be extended to bring in capacity where it is missing, such as project design, implementation, management, and funding. Developing capacity in forestry and project management at the local level increases the partnership's resilience to staffing changes. It also creates the potential for communities to take over the project in the future and to continue to invest in forestry activities—increasing long-term sustainability.

0.44 **Institutional agreements defining land use, carbon ownership rights, and benefit sharing play a crucial role in the development of forest carbon projects.** When designed with strong rules of good governance, these agreements help partners understand their rights and responsibilities and reduce the potential for conflicts. Institutional agreements also ensure that all participants share a clear and common vision of the project. Careful planning at an early stage and avoiding complex arrangements are crucial for project success.

0.45 **Private-public partnerships with clear responsibilities for each partner seem to work best.** Projects that have governmental agencies as their lead project entities have, in most cases, performed relatively less well than others. The exception has been countries with centralized governance. Where the project entity is not the government, the success of the project depends on having a constructive collaboration with governmental entities. This is because governments can facilitate the CDM process. They also have the opportunity to promote replication of projects in other areas of the country, taking advantage of the synergies between forest carbon initiatives and other national development strategies.

Risk Measurement and Management: Taking Advantage of Early Lessons on Project Development and Implementation

0.46 **The under-delivery risk of A/R projects arises from multiple aspects of the project and can be measured and managed.** Understanding the risk of A/R projects requires an integrated assessment that takes into account that projects go through at least three different cycles: commercial, operational, and regulatory. The BioCF developed a risk assessment methodology that is used to monitor performance indicators as projects move through the several stages of these three cycles.

0.47 **Most of the operational risks can be anticipated and managed.** Risky elements of projects can be effectively addressed through an appropriate forest management plan and sufficient human and financial resources. At the same time, designing and implementing such a plan requires project developers to have relevant forestry experience and managerial capacity. However, an effective project implementation in itself does not guarantee a successful credit issuance; it is important to crosscheck that the project is being implemented according to the PDD in order to avoid delays in project verification and any shortfall in expected carbon credits.

0.48 **Projects' potential threats to the local environment and the socioeconomic conditions of involved farmers must be anticipated and managed.** All BioCF projects assess the potential of risks to local communities and the local environment and propose actions to manage risks as they comply with the World Bank's environmental and social safeguard policies and CDM requirements. In addition, some projects are required by host country national forestry laws to undertake an impact assessment. Some projects go a further step by undertaking voluntary assessments to get additional certification of the sustainability of their forest management (e.g., Forest Stewardship Council) and/or their capacity to produce the expected co-benefits (e.g., Climate Community and Biodiversity Standard).

Conclusions and Looking Ahead: Building on A/R CDM and Learning Lessons for Other Land-based Climate Change Mitigation Mechanisms

0.49 **Overall, the BioCF experience with A/R CDM projects has been hugely valuable.** It is clear carbon markets can work to bring in revenue streams to rural communities who otherwise have limited sources of income. Furthermore, the BioCF experience has demonstrated that these initiatives are not only mitigating climate change but also improving rural livelihoods, improving resilience to climate change, conserving biodiversity, restoring degraded lands, and strengthening the human, social, and financial capital of local communities.

0.50 **Scaling-up of A/R activities is therefore critical for bringing these benefits to millions of hectares of degraded lands. Whilst successful project entities are willing to replicate their experience,** the overall number of A/R CDM projects remains limited. The approach adopted by the UNFCCC to address non-permanence acts as an structural barrier dampening both demand and supply for forest carbon credits. The demand for forest carbon credits is negatively affected by the lack of fungibility of forest CDM credits with credits produced in other sectors. The supply, on the other hand, is dampened by the low potential volume of credits achievable in projects, short-term ERPA contracts, low prices, and the high transaction costs of meeting the CDM requirements.

0.51 **Current regulatory rules are project-based and, although opportunities to scale up activities through Programmes of Activities exist, they remain to be tested under the A/R CDM and are not**

Himachal Pradesh Reforestation Project: Improving Livelihoods and Watersheds.

Photo: HP Mid-Himalayan Watershed Development Project

likely to address the scale needed to reinvigorate degraded lands. To facilitate the scaling up of A/R activities, it is important that lessons are learned and that bottlenecks and unnecessary obstacles are removed. For this, four critical factors are essential: (i) regulatory improvements, (ii) access to finance, (iii) strengthened capacity, and (iv) increased demand for credits from A/R CDM projects. Based on the lessons that were drawn from the BioCF portfolio, the following actions are recommended:

(i) REGULATORY IMPROVEMENTS

- **Remove regulatory uncertainty.** Much has been invested in building the institutional framework to support A/R projects, and project developers are still interested in undertaking and developing projects in many poor countries where these activities can make a difference in living conditions. The uncertain regulatory environment, however, is creating a dampening effect. (See Paragraphs 0.8–0.11, 0.17, and 0.31.)
- **Make the regulatory process more accessible and predictable by streamlining procedures and following strict timelines.** Finding the CDM EB's latest decisions, guidelines, and versions of tools, as well as PDDs and methodology formats, is challenging for most developers and favors specialized professionals. Following strict timelines for registration and issuance will help increase the predictability of credit issuance. In addition, simplifying the A/R CDM requirements to reduce transaction costs will enhance projects' viability. (See Paragraphs 0.12–0.13, 0.16, and 0.18.)
- **Further simplify the rules and procedures for baseline determination and additionality demonstration.** This could include allowing developers to use standardized baselines established at the national or sub-national level. Simplifying additionality requirements without compromising environmental integrity is also important. Additionality could be demonstrated at the sectoral level by taking into account national circumstances as well as country or regional-wide afforestation/reforestation goals. Projects in countries with weak business environments and facing disproportionately large investment barriers should be automatically additional until certain reforestation goals are met. Projects involving low-income communities with minimal capacity will greatly benefit from such a simplification. (See Paragraph 0.14.)
- **Improve the fungibility of forest project credits by addressing the non-permanence of forest carbon in a broader way and allowing A/R projects to use alternative approaches to temporary crediting.** This has already been recognized by UNFCCC negotiators proposing alternatives alongside current tCERs and lCERs. A decision on this issue is urgently needed. Allow A/R CDM projects to select from a variety of approaches to non-permanence in addition to the temporary crediting approach. The approach(es) to non-permanence should avoid putting forestry projects

at a disadvantage. In designing new approaches, also consider flexibility in the number of verifications permitted per commitment period so that periodic carbon revenues during the commitment period can improve the cash flow to projects. (See Paragraphs 0.19–0.24 and 0.41.)

- **Simplify the land eligibility requirements by using more flexible criteria to eliminate incentives for deforesting and subsequently reforesting lands.** As the BioCF experience has shown, the current land eligibility requirements in the CDM tend to be socially impractical and can create tensions in regions where neighboring farmers may be excluded. This rule also leads to fragmented CDM project areas, which are impractical from both a project development and an ecological standpoint. In addition, it would help to facilitate the development of projects on agriculture lands in tropical climates by simplifying guidance for accepting the eligibility of lands with temporary stocking and long-term threats, if the project region is under a slash-and-burn type of pattern. Similarly, increasing the flexibility of the project boundary rule and considering accepting evidence other than contracts signed by the participating farmers in two-thirds of the project area before validation to prove that the project area is controlled by the project entity would be helpful. (See Paragraphs 0.25–0.29.)
- **Continue the simplification and consolidation of large-scale methodologies,** including allowing project developers to use default values for estimation of leakage (in line with the simplifications recently made for soil organic carbon) and facilitating the project monitoring process. Appropriate discounting should be allowed at the project level for project developers with less access to sophisticated technology and/or lower institutional capacity. (See Paragraphs 0.30-0.35.)
- **Increase the current threshold of 16,000 tCO2e annually for small-scale projects and revisit the rule that limits the type of people that must be involved in small-scale A/R CDM projects.** Since projects involving low-income communities usually have limited capacity to develop and implement A/R CDM projects, their transaction costs in meeting the CDM requirements are high and their emission reductions volume low, making the projects unviable. Similarly, developers of these projects usually lack the managerial capacity required to bundle projects, making it difficult to benefit from economies of scale. The abovementioned threshold must be increased for these types of projects to be viable and benefit low-income communities. In addition, to be consistent with the CDM rules for projects in other sectors, the low-income requirement for small-scale A/R CDM projects should be removed. (See Paragraphs 0.38–0.39 and 0.41.)
- **Recognize the contribution of A/R CDM projects to the dual objectives of the UNFCCC: sustainable development and climate change mitigation.** Policymakers should consider increasing the eligible land activities to cover croplands, grasslands, wetlands, and sustainable forest management given their roles in environmental restoration and poverty alleviation. (See Paragraphs 0.49–0.50.)

(ii) ACCESS TO FINANCE

- **Innovative ways to finance activities are needed.** Carbon finance is a payment on delivery, and yet the upfront investments needed for A/R projects are significant and economies of scale are not easily attained. Forestry investments are long term and deemed high-risk in many developing countries. Institutional arrangements for financial intermediation, an understanding by financial institutions of the role of carbon credits in financing agriculture and rural development, and some upfront payments based on meeting performance benchmarks are needed. (See Paragraphs 0.37–0.39 and 0.41.)
- **Financial compensation for other benefits should be considered.** The BioCarbon Fund experience has shown that A/R projects encompass both mitigation, through removal of CO_2 from the atmosphere, and adaptation, as they build up the resilience of the environment and communities to harsh environmental conditions. Projects improve living conditions, but the significant additional environmental and social benefits (besides carbon) are not rewarded. (See Paragraphs 0.8–0.11.) In addition, given that co-benefits are a strong incentive for local participation and for improving projects' performance, alternative non-permanence approaches that factor in the role of co-benefits in ensuring the permanence of forest carbon should be explored.

(iii) STRENGTHENING CAPACITY

- **Building and strengthening capacity at the local level is critically needed to ensure successful**

Box 0.3

Regulatory Lessons for Other Land-based Climate Change Market Mitigation Mechanisms

The main BioCF lessons learned for other land-based climate mitigation mechanism are summarized below in the form of recommendations. These recommendations should be considered by parties when discussing a potential work programme for SBSTA on possible additional LULUCF activities under the CDM.

- **Ensure simple and clear procedures and predictable timelines to achieve credit certification.** Lack of predictable carbon revenues deters the carbon finance potential to leverage investment financing from private investors and to significantly impact projects' cash flow.
- **Define a simple approach to non-permanence that ensures the fungibility of LULUCF credits with other credits in the market.** Lack of fungibility has limited the demand for A/R CDM credits. The temporary credit approach produces less-favorable assets difficult to understand and handle by both buyers and sellers. This approach has also led to a reduced price, which severely limits the impact of carbon revenues in projects' cash flows. Several other options to address non-permanence exist and developers of LULUCF activities should be allowed to choose the most convenient option.
- **Simplify additionality demonstration and baseline determination as much as possible.** Modalities and procedures should provide for additionality to be shown at the sector level to diminish the burden on individual projects. Existing unenforced national forestry development plans could be considered sufficient evidence of barriers limiting forest activity at a relevant scale. Similarly, a country's forest conservation, protection, and revegetation goals could serve as a basis for setting a threshold over which individual initiatives may be considered automatically additional. An expanded LULUCF mechanism should avoid disincentives to early movers on payments for environmental services, who have struggled to demonstrate additionality in the A/R CDM context.
- **Develop easy-to-follow rules for *ex-ante* estimation of GHG accounting and allow for progressive adoption of detailed methodologies.** Complex methodologies are time- and resource-intensive, cause confusion, and discourage project developers and investors from participating in LULUCF initiatives. Excessively detailed and complex methodologies should be avoided at least at the onset of the mechanism as developers usually lack the capacity to apply them. Carbon accounting in LULUCF projects should progressively move from simple to refined rules. One alternative could be to allow projects to apply a tiered approach to GHG accounting—in line with IPCC's *Good Practice Guidance for National Inventory of Greenhouse Gases*. More detailed methodologies should be developed based on experience from the ground and countries' advancements in removing data availability and human capacity constraints. Nevertheless, easy-to-follow tools (e.g., Excel-based tools) should be published to facilitate the application of methodologies.
- **Develop easy to follow monitoring methodologies.** Local stakeholders' involvement in carbon monitoring tends to increase project/program ownership, an important under-delivery risk mitigation measure. However, too complex methodologies usually prevent local stakeholders from participating in these tasks. There is room to develop simple yet rigorous monitoring methodologies. In addition, it is important to bear in mind that, because of their dynamic nature, land-use-based carbon initiatives may deviate from the original design at implementation. Modalities and procedures should therefore allow for certain level of changes, and easy-to-assess thresholds should be developed to account for permissible changes at implementation.
- **Avoid restricting the type of people that must be involved in small-scale projects and carefully decide the cap in emission reductions imposed on this type of project.** The participation of low-income people must be promoted through measures such as simple GHG accounting and by removing regulatory and financial barriers rather than enforcing through rules the involvement of low-income communities. This would bring land-based carbon projects/programs into alignment with other CDM sectors. In addition, define a relevant cap for small-scale projects based on technical, social, and financial studies of existing land-based projects to ensure their viability.

forest carbon initiatives. The fact that A/R projects are useful tools for promoting both adaptation and mitigation should be harnessed by building up capacity and strengthening programs in an integrated manner. Local capacity to monitor, verify, and report the project emission reductions are successful factors for credit issuance. There is a need to use official development assistance for projects to build and strengthen such capacity where needed. (See Paragraphs 0.12–0.13, 0.18, 0.25, 0.30, 0.32, 0.36, and 0.39.)

- **Strengthen the capacity of DNAs and DOEs to ensure a smooth validation process.** Understanding the rules for A/R CDM projects is not an easy task for a newcomer, and the challenge is compounded by the fact that the CDM EB changes the rules quite frequently to allow for their improvement and simplification. Since these changes are not retroactive for registered projects, DOEs and DNAs need to be aware of the different sets of rules governing different projects in order to support each one effectively. There is a need for an easy-to-follow manual for A/R CDM to be published periodically, in line with the Institute for Global Environmental Strategies' publication, *CDM in Charts*. (See Paragraphs 0.15–0.16.)
- **Developed countries committed to reducing emissions should continue to support developing countries in removing the capacity-related barriers hindering A/R CDM.** Several capacity-related constrains prevent developing countries from tapping into the opportunities that come with A/R CDM. A wide range of actors need to be involved in A/R CDM project development and implementation, but they usually lack the capacity to support projects effectively. For example, Designated National Authorities' role in approving projects is usually week due to bureaucratic procedures and unclear project approval criteria. Similarly, many Designated Operational Entities lack the necessary expertise for effective assessment of projects at validation and verification and few of these are based in developing countries. Local companies could be trained to provide this expertise. In addition, research institutions are not fully playing their role in helping projects overcome data- and information availability constraints for effective project preparation and monitoring. All these actors not only need to strengthen their individual capacity, but also need to come together along with regulators to ensure both a common understanding of the A/R CDM requirements and a timely provision of feedback from the ground on the application of the rules. Furthermore, the land-use sector in developing countries needs support in strengthening negotiators' capacity on forestry and carbon to be able to influence the rules for land-base projects and programs being proposed under UNFCCC. Developed countries can play a role in helping developing countries fill these capacity-related gaps.

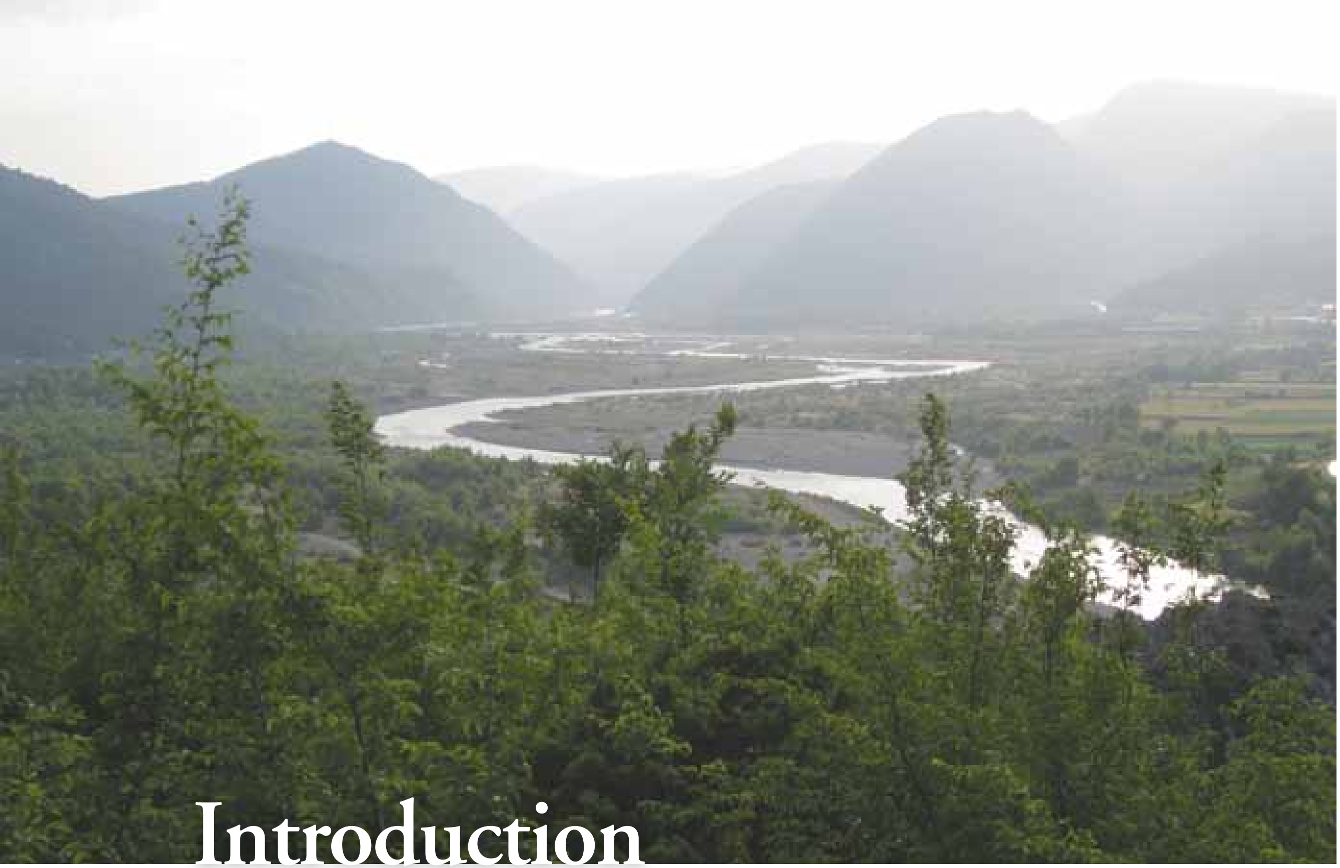
(iv) INCREASE DEMAND

- **Developed countries committed to reducing GHG emissions should stop banning credits from A/R CDM projects in their bilateral/multilateral emission trading schemes.** Where market signals have been given for post-2012 (as from the EU ETS), A/R credits from the CDM remain disadvantaged. Market players should recognize the substantial efforts the CDM's stakeholders have taken to demonstrate that credits from A/R projects are measurable, verifiable, and reportable. In addition, they should recognize that projects apply several safeguard instruments to avoid, minimize, and/or mitigate any potential risk to the local communities' livelihood and environment, as well as the under-delivery risk of emission reductions. It is also worth noting that some projects go even further in guaranteeing the significant delivery of positive net co-benefits by attaining additional certification of their project designs. Moreover some A/R CDM's stakeholders are proposing changes to the non-permanence rules so that forestry projects deliver credits fungible with other carbon assets generated in the market. Strengthening the overall supply of forest carbon credits may be fruitless without a significant demand for these credits from developed countries.

0.52 **As the UNFCCC negotiations evolve, parties in the UNFCCC negotiations are currently discussing further commitments under the Kyoto Protocol.** One of the activities being discussed as part of this is to request that the Subsidiary Body for Scientific and Technological Advice (SBSTA) initiate a work programme to consider and, as appropriate, develop and recommend modalities and procedures for possible additional land use, land-use change and forestry activities (LULUCF) under the CDM. To make such a potential expansion of LULUCF under the CDM successful, the early lessons from the A/R CDM should be incorporated in order to avoid some of the obstacles that have hindered the A/R CDM (see Box 0.3). Many of the lessons learned from A/R also could be helpful in the development of REDD+.

0.53 **In addition, because of the many interactions between different land uses, policymakers need to address the interface of all land-use activities (e.g., A/R, REDD+, agriculture) in an integrated approach.** There is also a need to bring in the biomass-energy dimension. The application of a landscape approach that integrates the land-use and energy sectors at a landscape level would be more practical and cost effective.

0.54 **The BioCarbon Fund will continue to support land-use interventions and is planning to build on its experience to date in A/R through scaled-up programs. The BioCarbon Fund will also work in areas not yet fully explored.** Such pilots are invaluable for showing the opportunities and challenges that can arise in the application of regulatory rules for climate change projects. The Fund is also exploring where methodological improvements can be made. These include applying new CDM developments on standardized baselines and developing methodologies and pilots in landscapes where various sectors (land-use or energy) can be considered as a whole. The BioCF is also working on innovative upfront financing mechanisms to assist the scaling up of rural projects and on approaches to compensate projects for their co-benefits. All of this is in line with the World Bank's triple-win-for-farmers strategy in which the forestry, agriculture, and rural energy sectors are treated in an integrated way to increase food security, to improve the rural poor's resilience to the impacts of climate change, and to mitigate climate change.



Introduction

1

1.1 Carbon finance recognizes the contribution of projects to mitigating climate change. To be able to access carbon finance, projects can certify their emission reductions under a variety of standards, one of which is the Clean Development Mechanism (CDM) of the United Nations Framework Convention on Climate Change (UNFCCC). Project developers can sell their carbon credits either in the voluntary or the regulated market.[1] Since 2002, projects from diverse sectors have been applying the CDM modalities and procedures to generate Certified Emission Reductions (CERs) that are traded in the carbon market Afforestation/Reforestation (A/R) is one out of the 15 sectors[2] that can generate carbon credits under the CDM.

1.2 The purpose of this document is to share the experience of the BioCarbon Fund (BioCF) of the World Bank in developing and implementing 21 A/R CDM projects in 16 countries (see Annex 1). This experience shows that the benefits associated with A/R CDM projects support the livelihood of rural people and their local environment in a significant manner. However, depending on their capacity, projects may struggle with getting credit certification and the associated benefits. This report presents the opportunities and challenges A/R CDM projects face and presents recommendations to facilitate their design and implementation as well as to scale them up significantly.

1 Voluntary market refers to carbon credit transactions that are carried out for purposes other than those regulated by law or conventions.

2 Other sectors are energy industries (renewable/non-renewable sources); energy distribution; energy demand; manufacturing industries; chemical industries; construction; transport; mining/mineral production; metal production; fugitive emissions from fuels (solid, oil, and gas); fugitive emissions from production and consumption of halocarbons and sulphur hexafluoride; solvent use; waste handling and disposal; and agriculture.

TABLE 1.1 EVOLUTION OF A/R CDM COMPARED TO OTHER SECTORS

Modalities and Procedures, Number of Approved Methodologies, and Registered Projects Per Year

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	Total
Year of Decisions on Modalities and Procedures												
Other sectors	x											
A/R CDM			x									
Number of Approved Methodologies Per Year												
Other sectors			10	22	29	22	21	11	17	21	17	170
A/R CDM					1	4	8	3	1	3	1	21
Number of Registered Projects Per Year												
Other sectors				1	62	408	427	430	675	697	860	3560
A/R CDM						1	0	0	10	7	17	35

Note: Data updated up to November 2011.

1.3 This report is organized thematically. This chapter presents a brief introduction to the A/R CDM as well as an overview of the BioCF portfolio, including expected emission reductions and associated co-benefits from projects. Chapter 2 presents the A/R CDM project cycle and addresses the major issues identified by BioCF project developers in completing it. Chapter 3 looks at the non-permanence rule as a major challenge for A/R projects. Chapters 4 and 5 present an in-depth analysis of the rules related to land and greenhouse gas (GHG) accounting respectively. Chapter 6 analyzes the financial challenges A/R CDM projects face and presents some recommendations. Chapter 7 analyzes BioCF projects from an institutional standpoint, presenting the institutional arrangements that BioCF projects use to clarify carbon ownership, agree on land use, and establish benefit-sharing plans; it also identifies the local capacity most needed to develop, implement, and manage an A/R CDM project. Chapter 8 looks at the BioCF experience addressing the under-delivery risk of getting carbon credits. Finally, Chapter 9 draws conclusions and looks at the way ahead for the agriculture, forestry, and other land use sector.

1.4 The targeted audience for this report is forest carbon project developers. The secondary audience is policymakers and the Afforestation/Reforestation Working Group (AR-WG), the body of the CDM Executive Board (CDM EB) responsible for developing A/R CDM rules. The methodology used in this report encompasses an in-depth desk review of documents, including project idea notes, Project Design Documents (PDDs), environmental and social assessments, BioCF annual reports, World Bank evaluation reports on safeguard policy compliance, and CDM validation reports. The data collected were analyzed with descriptive statistics, and illustrative examples were used as case studies.

1.1 Afforestation and Reforestation in the CDM

1.5 The A/R sector has fewer registered projects compared to the overall CDM, and the modalities and procedures were developed slower than in other sectors (Table 1.1). A/R CDM methodologies and procedures were put in place in 2003 at the ninth UNFCCC's Conference of the Parties (COP), two years later than for other sectors. The CDM EB approved the first A/R methodology for greenhouse gases accounting in 2005, and the first A/R project was registered in 2006. This was the only registered A/R CDM project until 10 additional projects were registered in 2009. Because of the intricacy of the A/R CDM rules, up to November 2011 only 35 A/R CDM projects had been registered. This represents less than one percent of the total CDM-registered projects (n = 3560)[3]. By

3 Afforestation/Reforestation is not the only underrepresented sector in the CDM. Overall, the majority of registered projects pertain to five out of the 15 eligible sectors. The transport and construction sectors are the most underrepresented, with seven and zero projects respectively.

APRIL 2004

JUNE 2007

With the Moldova Soil Conservation and the Moldova Community Forestry Development Projects the land has started to recover its productivity and erosion has diminished.

Images courtesy of Moldsilva

the same date, A/R CDM small-scale[4] projects represented one-third of the total number of registered A/R CDM projects, which is less than in the entire CDM (43.52%).

1.6 The CDM EB has approved 14 methodologies for large-scale A/R CDM projects and seven methodologies for small-scale projects. Not all the methodologies are currently being used. Developers of registered large-scale projects have applied half of the approved methodologies for this category, and small-scale ones have applied only one of the seven existing methodologies. The same trend is observed in projects currently under validation.

1.7 The low ratio between number of methodology-approved and registered projects reflects the learning-by-doing process prevalent in the early years of the A/R CDM. Project developers[5] elaborated complex methodologies that needed significant simplification. Project developers' rigorousness in developing methodologies denoted lack of field experience and was in line with the stringent approval process of methodologies led by experts. Most recent versions of methodologies are less complex, reflecting the CDM EB A/R Working Group's significant efforts to incorporate feedback from existing projects; new project developers are benefiting from this improvement.

1.2 The BioCarbon Fund

1.8 The BioCF, which is housed in the Environment Department of the World Bank, is a private-public initiative mobilizing resources to pioneer projects that sequester or conserve carbon in forest and agro-ecosystems, thereby mitigating climate change and improving rural livelihoods.[6] The overall goal of this fund is to demonstrate that forest activities can generate high-quality emission reductions with strong environmental and socioeconomic co-benefits for local communities. The BioCF started operations in 2004 with a total capital of $53.8 million. Because of a high level of interest, a second tranche became operational in 2007 with a capitalization of $38.1 million. Participants investing in the BioCF include six governments and 12 private sector companies.

4 In A/R, small-scale projects are those that sequester less than 16,000 tonnes of CO_2e per year.

5 It is worth noting that, to elaborate methodologies, project proponents ended up hiring highly specialized external consultants who developed methodologies that were scientifically sound but difficult to read and apply.

6 http://wbcarbonfinance.org/Router.cfm?Page=BioCF.

1.9 Within each tranche there are two windows. Window 1 focuses on CDM-eligible projects and Window 2 on non-CDM projects, including Reducing Emissions from Deforestation and Forest Degradation (REDD+)[7] and sustainable agricultural land management. The emission reductions generated by these projects are purchased by the BioCF on behalf of its participants and are subsequently transferred to them, pro rata, their financial participation in the Fund. The BioCF Window 1 participants typically use their credits to meet their Kyoto targets. Participants in Windows 2 of each tranche are supporting the development of new methodologies and expanding carbon markets to encompass more activities, countries, and communities.

1.10 The BioCF is responsible for identifying new project ideas and presenting them to participants for their consideration prior to their inclusion in the portfolio. All forest carbon projects at the World Bank are also subjected to a process of due diligence. This assessment follows the World Bank's environmental and social safeguard policies and is expected to result in proper risk mitigation measures. Once project preparation and due diligence are completed, the negotiation and signing of Emission Reductions Purchase Agreements (ERPA) follows, allowing projects to trade carbon credits as a commodity. As of November 2011, the BioCF had contracted over nine million Emission Reductions (ERs).

1.11 The BioCF supports the A/R CDM sector by contributing to build the forest carbon market. The early development of forest carbon projects by the BioCF exemplifies this. When the first 17 projects entered the BioCF portfolio in 2004 and 2005, there were no methodologies for A/R CDM. Eight BioCF projects developed their own methodologies, seven of which were approved by the CDM EB. These early projects provided an opportunity to test the CDM rules and methodologies on the ground, which has contributed to the publication of guidance, clarifications, and tools by the UNFCCC.

1.12 The BioCF has also supported a variety of capacity-building and outreach activities aimed at directly assisting project entities within the BioCF portfolio, improving the A/R CDM regulatory process,

7 REDD+ also includes the role of conservation, sustainable management of forests, and enhancement of forest carbon stocks.

and creating forest carbon market knowledge. Some of the BioCF activities in this area have included:

- Providing feedback to the CDM EB on the application of the A/R rules on the ground and responding to their requests for information through formal submissions.
- Organizing roundtables with Designated Operational Entities (DOEs), project developers, the A/R Working Group and the UNFCCC Secretariat to discuss issues pertaining to the validation and verification of A/R CDM projects.
- Planning workshops at the request of negotiators from Africa and Latin America on land use, land-use change and forestry (LULUCF) concepts currently under discussion in the UNFCCC negotiations.
- Supporting and developing research materials and publications to inform the debate on LULUCF mitigation strategies.
- Participating in key conferences and events to present the progress made by the pilot projects and activities.
- Developing training materials and organizing workshops to build the capacity of project entities and field teams on the ground.

1.2.1 The BioCF Projects

1.13 The BioCF A/R CDM portfolio is composed of 21 projects located in five regions (Figure 1.1)[8] Compared to the overall CDM, in which the majority of projects are taking place in East Asia, the BioCF is mainly supporting projects in Sub-Saharan Africa, Eastern Europe, and Latin America and the Caribbean (Figure 1.2). As of November 2011, 13 BioCF projects had been registered, comprising around 40 percent of the total number of registered A/R CDM projects; three of these are small-scale projects.

1.14 About 80 percent of BioCF resources are earmarked to A/R projects that use multiple carbon sequestration technologies; the remainder has been allocated to REDD+ and sustainable land management projects. As a result, all of the investments are allocated to projects with several purposes, including environmental restoration (54 percent), fuel wood (25 percent), and timber (21 percent) (Fig. 1.3). All projects plant on degraded lands. Sixty-two percent of the projects in the portfolio are government and nonprofit-led projects; the remainder are private-sector-led projects (see Annex 1).

8 See the list of the active projects in Annex 1 of this report.

FIGURE 1.1 BRINGING CARBON MARKETS TO RURAL AREAS IN DEVELOPING COUNTRIES

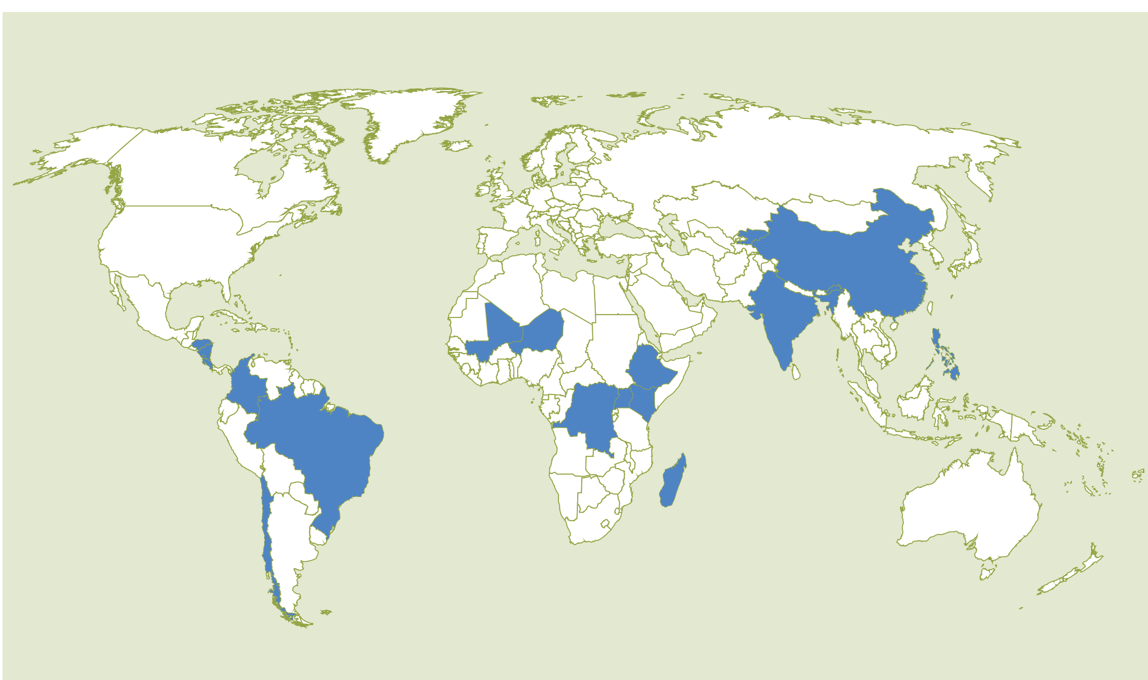
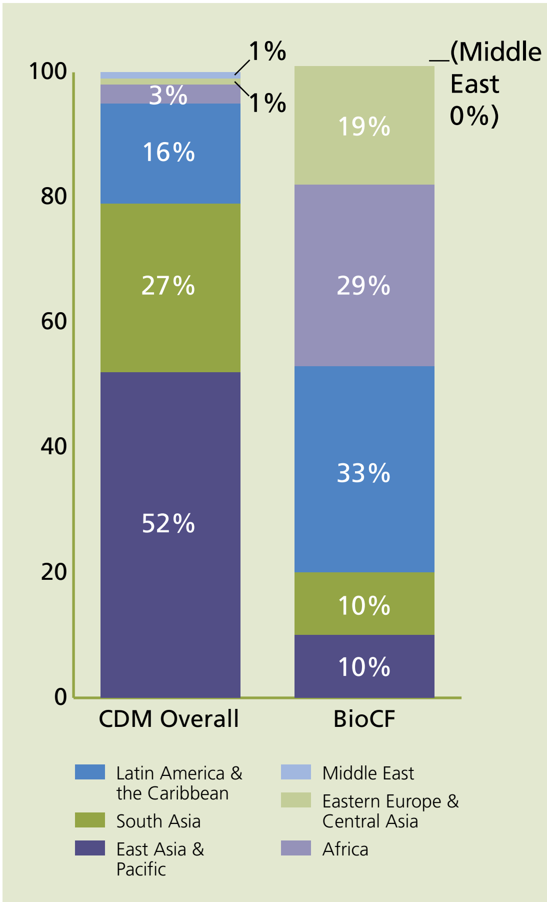


FIGURE 1.2 OVERALL CDM AND BioCF DISTRIBUTION OF PROJECTS ACROSS REGIONS



Source: UNEP RISØ

1.2.2 Expected Benefits

1.15 The CDM, defined in Article 12 of the Kyoto Protocol, was created to provide flexibility to countries with emission reduction commitments to achieve their targets *and* to contribute to sustainable development in developing countries (UNFCCC, 2006a). The BioCF was created as a way to test the benefits of the A/R CDM in different forest projects. The experience shows that A/R CDM projects can produce measurable, reportable, and verifiable carbon credits while significantly contributing to improving rural livelihoods and restoring, conserving, and producing other environmental benefits. The benefits from BioCF projects also go beyond the project area by increasing the resilience of natural and human systems to cope with adverse impacts of climate change and promoting landscape management. The sections below provide examples of expected[9] benefits from BioCF projects.

Emission Reductions

1.16 Afforestation and reforestation projects vary in the amount of emission reductions they can attain. On average, A/R CDM projects sequester 40,000 tCO_2e/year[10]; however, this figure can vary widely depending on several factors. For example BioCF projects' potential for carbon sequestration ranges from 3 to 23 tCO_2/ha/year, reflecting variances in types of ecosystems, project areas, forest management, tree species, and level of soil degradation, among others. Expected emission reductions are, therefore, limited by project entities' objectives, with projects for which commercial purposes are not their main rationale usually garnering the lowest productivity as they plant slow-growing native species in low densities. Small-scale projects have a built-in revenues ceiling as they cannot exceed 16,000 tonne of CO_2e per year.[11]

Environmental, Economic, and Socio-institutional Benefits

1.17 At the project level, A/R CDM projects deliver three types of benefits:

Environmental: There are net positive impacts on environmental services that go beyond carbon sequestration and global climate change mitigation, such as conservation of local biodiversity, control of soil erosion, and improved water infiltration.

Economic: Project participants benefit from revenues from the sale of carbon and other forest products, from short- and long-term employment opportunities created by the project, and from access to markets for the sale of forest products.

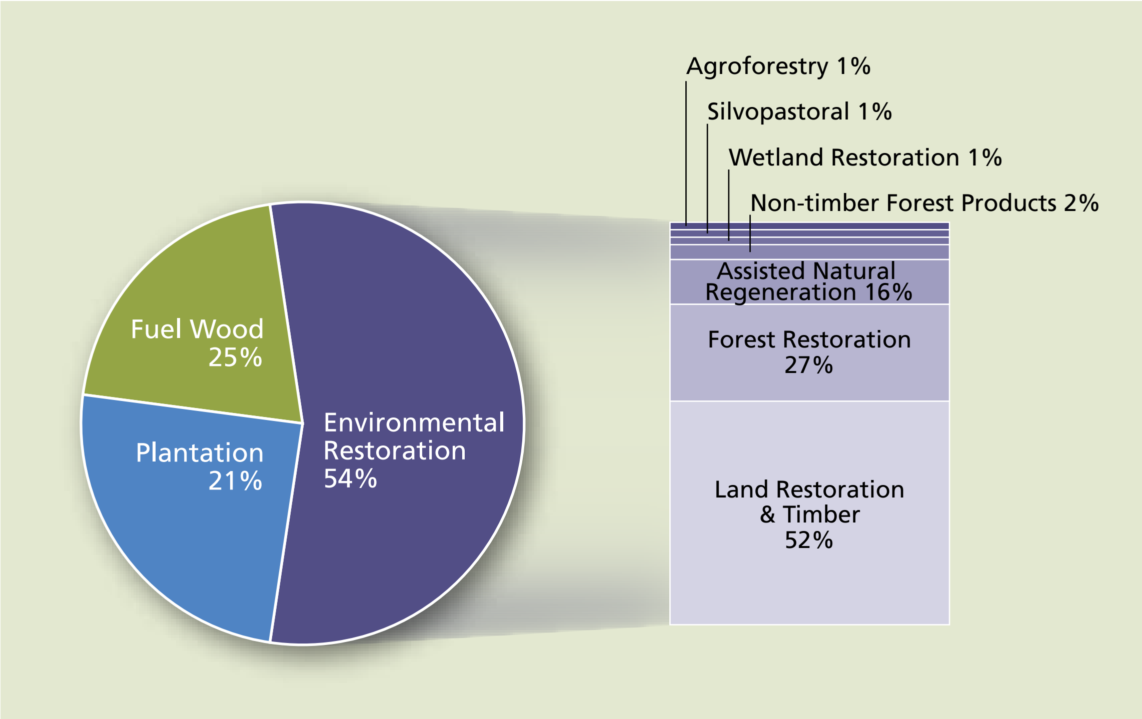
Social and Institutional: Stronger local organizations and empowered communities are among the positive effects from the institutional frameworks in place to ensure adequate project implementation.

9 Since most projects are at an early stage of implementation, data presented in this report are based on early results.

10 This is the average volume expected by projects so far registered under the CDM. Forty-thousand tCO_2e/year is a low value compared with the average expected emissions of projects in other sectors of the CDM, which can achieve around 400 $ktCO_2e$/year. A few project types can even exceed 3,000 $ktCO_2e$/year (see Chapter 6 Paragraph 6.24 for more information).

11 See Chapter 6 for a detailed discussion on small-scale projects.

FIGURE 1.3 PERCENTAGE OF RESOURCES INVESTED IN DIFFERENT CARBON SEQUESTRATION TECHNOLOGIES IN BioCF A/R PROJECTS



Note: Projects usually deploy a combination of carbon sequestration technologies.

1.18 Project benefits are influenced by many factors. These factors include the project objective, land use activity, location, scale, level of participation of local communities, and land condition before project implementation. Table 1.2 presents a general overview of the co-benefits BioCF projects expect to achieve from nine carbon sequestration technologies. Some of the environmental, economic, and social co-benefits listed in the table are further described in more detail.

ENVIRONMENTAL BENEFITS

1.19 The environmental co-benefits BioCF project developers expect to obtain from their projects can be grouped into three categories: biodiversity conservation, soil rehabilitation, and watershed protection. Examples of these co-benefits are presented below.

Biodiversity

1.20 About 70 percent of BioCF projects are implemented on severely degraded barren lands; the remaining 30 percent are implemented on degraded agriculture and pasture lands. By their very nature, these reforestation activities are improving biodiversity in the project areas. Reforestation contributes to the dispersal of forest native species by extending areas of forest habitat or providing connectivity among habitat patches in a formerly fragmented landscape. More than 20 percent of the BioCF projects are implemented in areas with nearby forest patches or within natural reserves to create corridors and enhance the viability of wildlife populations in mega-diverse world regions.

1.21 Over 80 percent of the project areas in the BioCF portfolio are planted with native species or with a mix of native and exotic species. This creates diverse multi-strata plantations to restore local biodiversity (Figure 1.4). One of the most diverse projects in the BioCF portfolio, is expected to plant about 80 native species in riparian areas.

1.22 In the implementation stage of BioCF projects, the potential for biodiversity conservation is often fostered by minimizing harvesting, thinning, and weeding. In addition, as part of their land management plan, projects outline strategies to address potential threats to local biodiversity (such as invasive species and fires).

TABLE 1.2 PROJECT CATEGORIES IN THE BioCF PORTFOLIO AND THE ASSOCIATED NON-CARBON BENEFITS

Project Categories (108,200 ha; n=21)	Approach/Definition	Co-benefits		
		Environmental	Economic	Social and Institutional
Plantation (19,760 ha; n=8)	Establish plantations of fast-growing trees for extraction of timber. These plantations can be established by local communities and individuals on their own land or by private companies. The land before the plantations was in some cases severely degraded and in other cases degraded agricultural and pasture land.	■ Prevent fire and erosion ■ Improve soil and microclimate ■ Sustainable wood supply to reduce the pressure on natural forests ■ Improve the connectivity of fragmented forest resources ■ Improve soil productivity ■ Contribute to maintaining or improving ecosystems functions	■ Income generation ■ Employment opportunities ■ Sustainable supply of forest products and services ■ Alleviate local poverty ■ Increase biomass production ■ Gain valuable foreign exchange ■ Integrate the local population on a sustained economic development process ■ Access to markets and financial credit	■ Technical training ■ Improve local capacity ■ Develop a forestry model ■ Empower local communities ■ Strengthen social cohesion ■ Reduce migration
Assisted Natural Regeneration (8,740 ha; n=3)	Removing barriers to natural forest regeneration such as soil degradation, competition with weedy species, and recurring disturbances.	■ Regenerate native forest ■ Biodiversity conservation ■ Improve the connectivity of fragmented forest resources ■ Soil protection ■ Protection of fragile water catchment areas ■ Improve regional water supply ■ Greater infiltration of water and build up to topsoil will enhance forest growth	■ Poverty alleviation ■ Income generation ■ Employment generation ■ Sustainable fuel wood and other NTFP supplies to local communities ■ Positive contribution to the local economy ■ Increased fodder productivity on arable land, improved pastures ■ Gain valuable foreign exchange	■ Land tenure security ■ Technical training ■ Improve local capacities
Silvopastoral (500 ha; n=1)	Planting suitable trees into permanent pasture land to support cattle ranching.	■ Reduce pressure on primary forests ■ Increase productivity and soil quality of marginal and degraded lands	■ Income generation ■ Long-term employment opportunities ■ Access for rural population to forest and livestock products ■ Improve/diversify local economy ■ Poverty alleviation ■ Local food and energy security ■ Gain valuable foreign exchange	■ Stronger community organizations ■ Investments in education, health and recreation ■ Technical training ■ Reduce migration
Fuel Wood (4,040 ha; n=2)	Reforestation on degraded land to supply fuel wood to local communities and cities.	■ Reduce the pressure on primary forests ■ Improve the connectivity of fragmented forest resources ■ Increase habitat available for wildlife	■ Income generation ■ Short-term employment opportunities ■ Sustainable supply of fuel wood ■ Improve/diversify local economy ■ Gain valuable foreign exchange	■ Technical training ■ Improve local capacities

Notes:

- Some projects have more than one land-use activity within the project boundary. Some of the categories in this table are subcomponents of such projects.
- The co-benefits presented in this table were listed by project developers in their PDDs after analyzing and addressing potential negative social and environmental impacts from their projects.

TABLE 1.2 PROJECT CATEGORIES IN THE BioCF PORTFOLIO AND THE ASSOCIATED NON-CARBON BENEFITS (CONTINUED)

Project Categories (108,200 ha; n=21)	Approach/Definition	Co-benefits		
		Environmental	Economic	Social and Institutional
Agroforestry (760 ha; n=2)	The deliberate use of woody perennials on the same land as agricultural crops, pastures, and animals. This may consist of a mixed spatial arrangement in the same place, at the same time, or in a sequence over time.	■ Reduce pressure on primary forests ■ Biodiversity conservation	■ Increase self-reliance ■ Increase local incomes ■ Improve/diversify local economy ■ Improve regional economy and welfare ■ Improve food security ■ Gain valuable foreign exchange	■ Increase community capacity for management
Land Restoration and Timber (42,900 ha; n=4)	Rehabilitate and restore severely degraded land to supply timber and non-timber products to local communities and timber to governments and private companies. These projects have soil restoration as a main objective.	■ Improve local environment ■ Hydrolology and watershed protection ■ Reduce soil erosion ■ Improve nutrient cycling within soil ■ Reduce vulnerability of forest ecosystems ■ Reduce pressure on natural forests ■ Biodiversity conservation ■ Increase habitat available for wildlife	■ Income generation ■ Employment opportunities ■ Increase biomass and fuel wood supply ■ Financial benefits to the landless and the poor ■ Gain valuable foreign exchange	■ Reduce pressure on primary forests
Forest Restoration (20,910 ha; n=6)	Rehabilitate and regenerate severely degraded forest to supply non-timber forest products to communities and ecosystem services.	■ Improve local climate ■ Improve water quality downstream ■ Improve water infiltration ■ Improve soil quality and fertility ■ Reduce rainfall impact on soil ■ Enhance ecological functions ■ Enhance forest connectivity ■ Biodiversity conservation	■ Income generation ■ Employment opportunities ■ Improve local economy ■ Supply non-timber products ■ Alleviate local poverty ■ Gain valuable foreign exchange	■ Land tenure security ■ Improve local capacity ■ Technical training ■ Enhance sociocultural conditions ■ Create recreational opportunities for local residents ■ Enhance aesthetics
Wetland Restoration (1,200 ha; n=1)	Rehabilitate and regenerate severely degraded wetland ecosystems to their natural state.	■ Enhance biodiversity in the coastal wetland ■ Increase habitat available for wildlife ■ Improve soil conservation ■ Improve water quality ■ Prevent salt water intrusion ■ Enhance the ecosystem's capacity to function as natural windbreak protecting the island from tropical storms	■ Income generation ■ Employment opportunities ■ Improvement of fishing habitats (economic and leisure purposes) ■ Create a potential for ecotourism in the region ■ Gain valuable foreign exchange	■ Enhance sociocultural conditions ■ Technical training ■ Improve local capacities for land management activities

Notes:

- Some projects have more than one land-use activity within the project boundary. Some of the categories in this table are subcomponents of such projects.
- The co-benefits presented in this table were listed by project developers in their PDDs after analyzing and addressing potential negative social and environmental impacts from their projects.

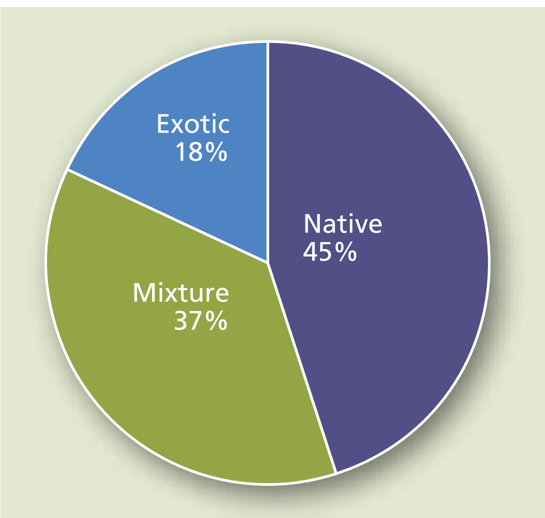
TABLE 1.2 PROJECT CATEGORIES IN THE BioCF PORTFOLIO AND THE ASSOCIATED NON-CARBON BENEFITS (CONTINUED)

Project Categories (108,200 ha; n=21)	Approach/Definition	Co-benefits		
		Environmental	Economic	Social and Institutional
Non-timber Forest Products (9,320 ha; n=2)	Reforestation of severely degraded areas to supply non-timber forest products such as Arabic gum, rubber, and honey to local communities and companies.	■ Combat desertification ■ Shade and windbreaks for cropland ■ Improve soil fertility ■ Reduce soil erosion	■ Catalyst for other NTFP initiatives ■ Income generation ■ Employment opportunities ■ Improve local economy ■ Sustainable fuel wood supply ■ Economic empowerment ■ Gain valuable foreign exchange	■ Land tenure security ■ Technical training ■ Improve local capacities for land management activities

Notes:

- Some projects have more than one land-use activity within the project boundary. Some of the categories in this table are sub-components of such projects.
- The co-benefits presented in this table were listed by project developers in their PDDs after analyzing and addressing potential negative social and environmental impacts from their projects.

FIGURE 1.4 TYPES OF TREE SPECIES PLANTED IN BioCF PROJECTS



1.23 BioCF projects' contribution to biodiversity conservation also goes beyond project boundaries. By supplying fuel wood, timber, and other forest products to local communities and markets, planted forests reduce the pressure on the tropical natural forests that contain about 70 percent of the world's biodiversity.

Soil Rehabilitation

1.24 Soil restoration is an integral part of the design and management plan of most BioCF projects, and it influences the choice of species and techniques applied throughout project implementation. Projects contribute to reducing soil erosion, improving nutrient cycling, improving soil quality and fertility, reducing the impact of rainfall on soil, increasing soil water infiltration, and reducing desertification. The BioCF projects in Moldova (Box 1.1), China, and Ethiopia exemplify this.

Watershed Protection

1.25 BioCF projects are expected to improve water quality downstream, improve water recharge in reservoirs, improve groundwater quality, and provide hydrology and watershed protection. Almost 30 percent of the BioCF projects are developed in watershed areas and integrated into wider watershed management plans. One of these projects, the Himachal Pradesh Reforestation project in India, seeks to implement A/R CDM activities in degraded lands in the watersheds of the Mid-Himalayan region (Box 1.2). Another BioCF project with net positive benefits on watersheds is planting trees in riparian areas which function as buffers to keep sediments and pollutants away from water bodies.

ECONOMIC CO-BENEFITS

1.26 The economic co-benefits BioCF project developers expect to obtain from projects can be direct and indirect. While direct benefits are employment opportunities and income generation, the indirect

Box 1.1

Moldova Community Forestry Development Project

This project aims to create new community forests on over 10,000 ha by means of afforestation of eroded and unproductive lands, application of agroforestry practices, and creation of forest protection belts. The project will also improve forest and pastoral resources at the local and regional levels, provide wood to the local population, and contribute to local and regional sustainable development.

The BioCF project proposes to restore the productivity of degraded pastures, glades, and abandoned arable lands in the northern, central, and southern regions of the country through A/R activities. Past forest management by Moldsilva, the national forest agency of the Republic of Moldova, has shown that A/R activities with locally adaptive and naturalized species is a cost-effective way to prevent soil erosion, prevent landslides, stabilize slopes, and generate wood and non-wood products to meet the requirements of rural communities.

ACTIVITIES IN PLACE TO ADDRESS LAND DEGRADATION

For severely degraded lands, the project has elected to plant locally adapted and naturalized species, such as *Robinia pseudoacacia and Populus sp*. mixed with native species. Moldova forest management experience has shown that *Robinia* adapts easily to poor sites on which other species cannot cost-effectively be established. Native species are proposed to be planted as site conditions improve, after one or two rotations of naturalized and locally adaptive species. Secondary plantings using native species such as oak *(Quercus sp.)* and associated species are expected to improve the productivity and the vegetative cover of restored lands. For the partially degraded areas, the lead species chosen were oak *(Quercus sp.)* and poplar *(Populus alba, P. nigra)*. Other broadleaf species and shrubs were planted to improve floral diversity.

METHOD USED TO ASSESS LAND CONDITION IN THE PROJECT AREA

The land condition in the project area was assessed through a baseline study that demonstrated that the historical land-use trend of degradation would continue in the absence of the project. The project developer evaluated the likely impacts from the project using a scale from -3 to +3 in each land-use category,[1] where -3 refers to major negative impact and +3 to major positive impact. This evaluation was also done in the baseline scenario, resulting in a score of -14. Variables such as soil type, depth, gradient, intensity of erosion, and drainage were considered in this assessment. In the project scenario, a significant positive impact on soil is expected: +2 in the short term (5 years) and +6 in the long run (project period).

1 The categories were landslides, ravines, other degraded lands, degraded arable lands, degraded pastures, glades, and open places.

ones are reduced migration, increased soil fertility, and secured sources of fuel wood. Examples of these co-benefits are presented below.

Employment Generation

1.27 BioCF initiatives create short- and long-term employment opportunities in the project areas. Short-term jobs are mostly seasonal, employing the people living in the vicinity of the project area in project preparation activities. The work includes planting nurseries, soil preparation, digging trenches, and plantation activities. Long-term employment opportunities include activities such as maintenance and protection of the project area, harvesting, and thinning. The number of jobs created depends on the type and size of the project. In general, land restoration, forest restoration, timber, and fuel wood projects are more labor intensive than assisted natural regeneration, silvopastoral, and agroforestry projects (Box 1.3).

1.28 The number of jobs created by a project also depends on the terms agreed to between project developers and participating communities during project design. In some projects, when local beneficiaries work in project activities as a means to contribute to their development, the labor is considered equity and participants receive a share of the benefits incurred from the project.

1.29 Employment opportunities are highly valued by local communities, especially in poor rural areas. In many of the stakeholder consultation meetings carried

Box 1.2

India Himachal Pradesh Reforestation Project: Improving Livelihoods and Watersheds

The main guiding principles of this project include the adoption of native and locally preferred tree species for reforestation and the provision of technical, financial, and capacity development support to reforestation activities as part of the Himachal Pradesh-Himalayan Watershed Development Project. The project supports soil and moisture conservation and grassland development. The main environmental objective of this forest project, in addition to carbon sequestration, is the improvement of the productive potential of the degraded land around the watershed catchment areas.

The project is expected to bring additional value to the ongoing catchment/drainage treatment activities undertaken as part of the larger project. A number of streams originate in the area and feed major northern Indian rivers. These streams and springs are likely to increase their discharge rate as a result of the A/R activities. This will, in the long run, help stabilize the sources of these springs and streams.

out during BioCF projects, employment opportunities was mentioned as an outcome that communities welcomed as local individuals prioritized being able to work and provide for their families.

Income Generation

1.30 Before the BioCF projects, the main economic activities in most of the project areas were subsistence agriculture and small animal husbandry. More than 30 percent of the BioCF projects were developed in extremely poor areas where the mean annual income was less than $1/day. These areas were often inhabited by marginalized communities with little or no access to income-generating opportunities.

1.31 Local communities that participate in BioCF projects can benefit from the additional income generated from employment and the sale of carbon, timber, and non-timber forest products (Box 1.4). In over 70 percent of the projects with local participants, farmers receive at least part of the revenue accrued from the sale of carbon credits; in 80 percent of the projects, they are also entitled to timber and other tradable forest products. Forest is seen as a security buffer or savings for bad times.

Other Economic Co-benefits

1.32 Forest carbon projects also have other, less direct economic co-benefits. In some BioCF projects initiated by private project developers, access to regional and international markets for forest products is an important asset for local individuals and communities. For example, Achats Service International, the project developer in the Niger Acacia Plantation project

Box 1.3

Employment Opportunities Created by the Facilitating Reforestation for Guangxi Watershed Management in the Pearl River Basin Project in China

This was the first A/R project to be registered under the CDM, and it aims to sequester carbon through reforestation in watershed areas along the Pearl River Basin while enhancing the livelihoods of local peoples.

The A/R CDM activity proposes to create a significant number of person-days of temporary employment from planting, weeding, harvesting, and resin collection. It also aims to create 40 long-term jobs during the crediting period. Most of the jobs will be filled by local farmers and others in communities involved in the project and neighboring farmers whose lands do not fall within the project boundary. The project will also provide employment opportunities to local ethnic minority groups.

Box 1.4

Income Generation in the Reforestation on Degraded Lands in Northwest Guangxi, China

This project aims to reforest over 8,000 ha of severely degraded land spread over two watersheds and encompasses strategies to control soil and water erosion and to improve local livelihoods in a poor rural area.

The A/R CDM activity proposes to generate over $50 million in total income in its first crediting period (20 years renewable twice), from employment, the sale of wood and non-wood products, and the sale of emission reductions. The mean net annual income per capita in the project area is expected to increase by 64 percent relative to the baseline year.

enables local communities to supply Arabic gum to international markets where prices are more competitive. This is also the case in the India Improving Rural Livelihood project, where the partnership with the private project developer provides local participants[12] with market support for the sale of wood products. The lack of market access was a barrier to economic development; each of these projects has enabled local participants to overcome that barrier.

1.33 Some BioCF projects are also expected to reduce migration from rural to urban areas. The main cause of migration is the lack of income-generating opportunities in these poor rural areas. With new opportunities for employment and additional income, there is less incentive to abandon the rural areas. The Himachal Pradesh BioCF project in India, for example, anticipates that the flow of carbon revenues will in the long run reduce the migration of the rural population to urban areas in search of employment.

1.34 BioCF projects are also expected to increase soil fertility and provide a sustainable supply of fuel wood for local communities, increasing food and energy security. Before the projects began, these areas were degraded with low or no productivity; this, in turn, affected individuals' ability to meet their basic needs. With these projects, the soil in these areas becomes more productive, increasing productivity on arable lands and contributing to improved pastures.

SOCIAL AND INSTITUTIONAL CO-BENEFITS

1.35 BioCF project developers expect to achieve several social and institutional co-benefits from their projects. These are land tenure security; increased local capacity on forest and project implementation; local empowerment; gender equality, ethnic minorities' participation, and overall rural development. Examples of these co-benefits are presented below.

Securing Land Tenure

1.36 Forest carbon finance can contribute to increasing land tenure security in project areas. With the right institutional mechanisms in place to clarify carbon ownership and ensure adequate project implementation, projects with different land tenure situations can participate in the CDM. Four BioCF projects in Africa are evidence of this. Land is a key element of wealth for the poor, and secure land tenure increases people's welfare. Secure tenure can contribute to poverty reduction by increasing farmers' ability to receive financial compensation for the investments they make on land and by providing these individuals with better access to credit.

Increasing Local Capacity

1.37 Designing and implementing forest carbon projects requires a wide range of local technical expertise. It is therefore essential that projects invest in creating and sustaining local capacity. Many BioCF projects received financial support from grants (e.g., Policy and Human Resource Development from Japan and the Norwegian Trust Fund) for technical assistance and capacity building. The BioCF project in Niger, for example, has promoted capacity building in techniques for planting and maintaining Acacia trees and for processing and tapping of Arabic gum. These communities were also trained in forest inventory techniques for accurate carbon measurement. With the technical capacity in place, these communities will be able to develop Arabic gum plantations in other areas. Capacity building also increases the community's social capital.

12 There are more than 1,500 participants, including minorities.

Communities in Moldova planting on the project land.

1.38 BioCF projects have also contributed to fostering local knowledge about climate change impacts and potential mitigation actions. In some cases, the benefits from the transfer of know-how and training in climate change have even contributed to national policies. In Ethiopia, for example, the project developer has supported the national government in international negotiations under the UNFCCC and is currently providing technical support for the design of a strategy to scale-up forest carbon initiatives to the national level. These projects also contribute to improving the knowledge base on lesser-known tree species and on forest projects overall.

Empowering Local Communities and Strengthening Local Institutions

1.39 The success of forest carbon initiatives depends on the active participation of local farmers and communities. Participation is enabled by investments in capacity building and by strengthening local institutions. The strengthening of local institutions, such as local rural cooperatives, forest management committees, watershed management committees, and other community-based organizations has mobilized landholders around a common goal. This has increased farmers' negotiating power with outside actors, fostered common interests, and promoted enhanced communication flow (Aquino et al., 2011).

1.40 Empowering local communities and increasing the sense of community ownership of a project also helps to ensure adequate project implementation and increase the survival rate of the trees planted. In the BioCF projects in Ethiopia and Himachal Pradesh in India, for example, local communities are expected to manage the project on their own in the long run.

1.41 In some projects, investments are made to empower women and minorities. The Kenya Aberdare Range project is one example. The project developer, Green Belt Movement, is a local NGO with a strong background in initiatives that empower women and local communities. The Himachal Pradesh project in India also has women's empowerment as one of its co-benefits. In this case, part of the revenues accrued from the sale of emission reductions from the project will be invested in local organizations that work with local women. At the same time, these institutions will play a key role in protecting and managing the A/R CDM project.

1.42 A/R CDM projects have also provided opportunities to address equity issues. For example, eight out of the 21 projects target rural people that live below national and provincial poverty levels. The income generation of landholders involved in one project in Asia, for example, was less than $145 per capita in the baseline scenario. Similarly, the unemployment rate in the region of a project in South America was as high as 22 percent.

Other Social and Institutional Co-benefits

1.43 In some projects, local participants opted to invest the revenues from carbon and other forest products in local development projects rather than to receive it in cash. This is what has happened in the Humbo Assisted Natural Regeneration project in Ethiopia, where the local communities have jointly identified priority areas for investment. (See Box 7.1.)

BENEFITS BEYOND THE PROJECT BOUNDARIES

1.44 Vast hectares of deforested and degraded forest lands around the world offer opportunities for forest landscape restoration. Tapping this potential could lead to significant benefits in terms of climate change mitigation, biodiversity, and poverty alleviation; the A/R CDM is a useful tool to realize such potential. In addition, by strengthening the natural, human, social, and financial capital of the rural poor, A/R CDM projects contribute to increasing the resilience of rural people and their environment to the adverse impacts of climate change. More than that, the projects' efforts to prevent leakage[13] are proving to be entry points to extend the benefits of projects at the landscape level. Some projects plant fruit gardens, fuel wood plantations, and improved pastures as a way to avoid displacement of crop cultivation, grazing, and fuel wood collection caused by the A/R CDM project. Leakage management provides strong incentives for communities to manage their forest, pastoral, and agricultural resources in an integrated manner and stimulates project developers to work in alliances with organizations operating in the same area to minimize leakage.

1.45 About a third of the projects in the BioCF portfolio expect to certify their project designs to guarantee the delivery of net positive benefits to the local farmers or communities and to the local environment. All of these projects are applying the Climate, Community and Biodiversity Standard, which assesses several non-carbon characteristics of the project design. This standard allows for verification of projects' co-benefits throughout their lifetime comparing them against the baseline situation; it also awards projects that are relevant for promoting/conserving biodiversity hotspots (CCBA, 2008).

1.46 In doing this, projects expect to gain a better price, or at least a market-access premium. Studies of the forest carbon market report that forest carbon projects' positive contribution to the local environment and communities' well-being is an important attribute for credit buyers (Hamilton, 2010). Although such an expected price premium has not materialized yet, developers expect this to develop in the future. Besides, with the regulatory uncertainty surrounding a second Kyoto Protocol commitment period, voluntary carbon markets, where co-benefits have proven to be in demand, are an important niche to sell the surplus of carbon credits beyond those contracted with the BioCF.

13 Leakage refers to the greenhouse gases emissions happening outside the project boundary attributable to the A/R CDM project.

1.2.3 Replicating the Experience—Power of the Pilot

1.47 Because of the benefits of the A/R CDM, some project entities are replicating their first experience. Both China and Moldova, the first entities to ever register A/R CDM projects, have embarked on new projects. Moldsilva, the state forest agency of the Republic of Moldova, initiated its first A/R project prior to the approval of A/R CDM rules, thus investing significant efforts in information gathering, financing, and institutional development. Its second project is close to registration and increases the role of local communities (and in-kind contributions). The Republic of Moldova has afforested most of its degraded lands through the A/R CDM. This success is attracting buyers of carbon credits from the voluntary carbon market.

1.48 World Vision Australia and World Vision Ethiopia, NGOs with longstanding experience in rural development in Ethiopia, are also going beyond their first forest carbon experience, the Humbo Ethiopia A/R CDM project. The success of this first large-scale African A/R CDM project ever registered has inspired the Ethiopian Government to consider mainstreaming carbon finance into its sustainable land management program as a new model of sustainability.

1.49 Similarly, private-sector-led projects are replicating their first CDM experience. Chinese private forest companies, with the support of the regional government of Guangxi, have incorporated lessons learned in a second project that has a more innovative financing model. In the same way, Novacel, a recent player in the A/R CDM, has attracted national and international recognition because of an innovative model to finance agroforestry and secure fuel wood, a major challenge in Kinshasa, Democratic Republic of Congo. Novacel registered its first A/R CDM project in 2011 and is considering replicating its experience.

Humbo Ethiopia Assisted Natural Regeneration Project.

1.2.4 Looking Ahead

1.50 Consistent with the UNFCCC's ultimate goal, the BioCF looks forward to support developing countries in scaling up the A/R CDM and integrating it into landscape-based carbon management strategies. Inspired by the opportunities these projects bring to rural areas, the BioCF will continue seeking the recognition this mechanism deserves as a tool for sustainable development. Achieving this will require fully exploiting the opportunity for synergies among forest carbon projects and United Nations conventions dealing with crosscutting issues (e.g., Convention on Biological Diversity, the Convention to Combat Desertification, and the Millennium Development Goals). Alliances are needed to leverage finance (e.g., through the recognition of the market value of other ecosystem services) and improve projects' performance in terms of environmental benefits other than carbon. Intending to enlighten the reform of the CDM and the development of other land-base climate change mitigation market mechanisms, this report documents lesson learned—and both the opportunities and the challenges in developing and implementing A/R CDM projects.

CDM Regulations

2

2.1 Introduction

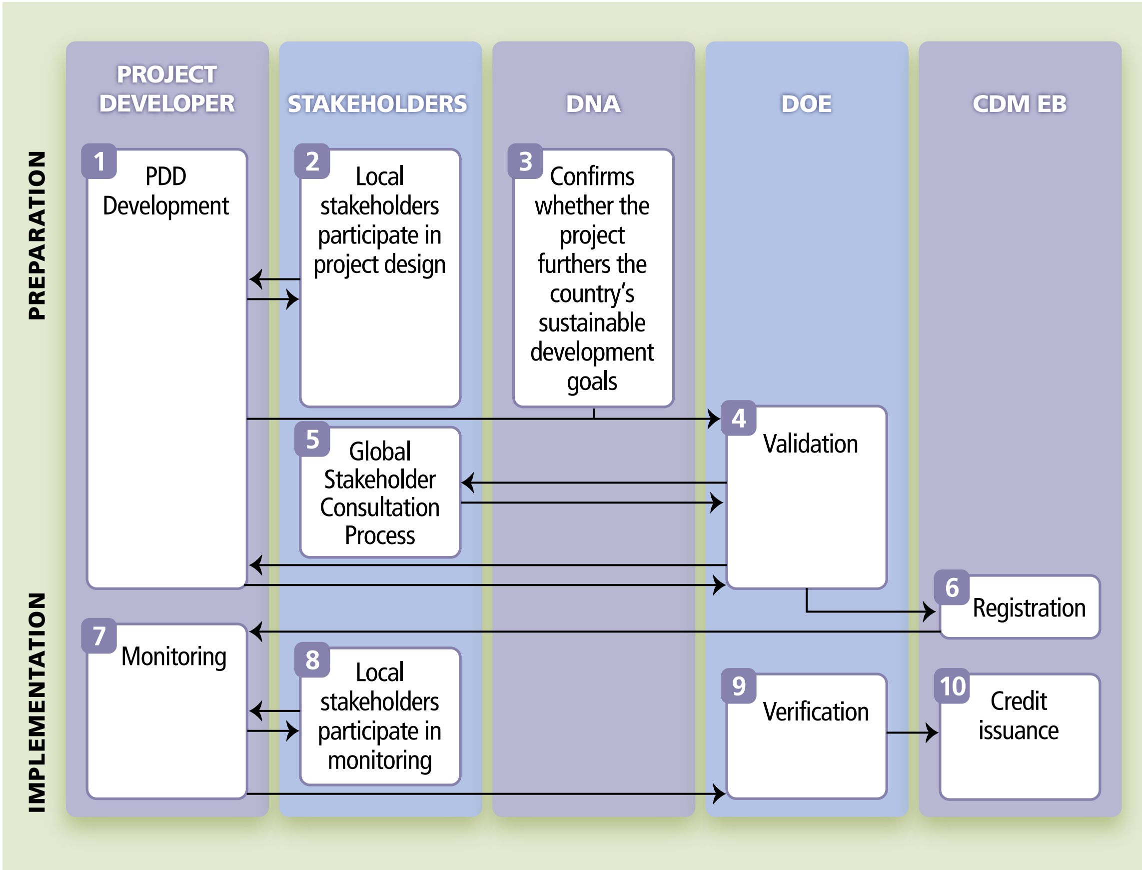
2.1 Regulatory issues pertain to rules and procedures that CDM A/R projects need to follow for registration and credit issuance. On average, BioCF projects have spent close to four years achieving CDM registration. Developers of recent projects are taking advantage of methodologies, simplified procedures, and lessons learned from previous projects, to reduce this time. The impact of these improvements, however, can be marginal considering that the post-preparation regulatory stages are increasingly lengthy. This chapter examines the regulatory issues relevant to A/R projects. Section 2.2 explains the regulatory A/R CDM cycle, Section 2.3 highlights the challenges encountered by the BioCF projects, and Section 2.4 offers recommendations for improvements.

2.2 Regulatory Process

2.2 The CDM cycle comprises the following stages: Project Design Document (PDD) preparation, validation by a Designated Operational Entity (DOE), registration with the CDM EB, verification of emission reductions by a DOE, and credit issuance by the CDM EB.[1] The principal actors therefore are local stakeholders and project developers, Designated National Authorities (DNA), DOEs, and the CDM EB (Figure 2.1). These stages and the role played by the principal actors at each stage are described in the following sections.

1 See http://cdm.unfccc.int/Projects/diagram.html for more information on the regulatory CDM process.

FIGURE 2.1 STAGES OF THE A/R CDM PROJECT CYCLE AND PRINCIPAL ACTORS



2.3 Most of the insights and lessons learned presented in this report are from the PDD preparation to registration stages (stages 1 to 6 in Figure 2.1). As no forestry project has completed the monitoring and verification stages, only early insights on monitoring are presented. The experience gained in the verification and credit issuance of energy sector projects, for example, is highlighted to reflect the regulatory issues pertinent to these stages.

2.2.1 Project Preparation

2.4 Project entities assess the economic, social, and technical aspects of proposed projects and discuss these with potential investors at an early stage. Successful initiatives translate into projects for which a PDD is developed.[2] In the PDD, the developer must demonstrate that the proposed project complies with all CDM requirements, including additionality and clear legal land tenure rights, and that the project will not be established on forested lands or on lands with the potential to become forested lands.[3] Preparing a PDD also involves delineating the project boundary, estimating the emission reductions from the project, and outlining the forest management and monitoring plan that will be implemented during the project crediting period.[4] To quantify the emission reductions, project developers must apply a CDM EB-approved baseline and monitoring methodology.

2.2.2 Validation

2.5 Validation is an independent assessment of the project design against the CDM rules and requirements. It is carried out by a DOE[5] duly accredited by the UNFCCC. The validation of a project starts after

2 The PDD template can be found on the CDM Web site (http://cdm.unfccc.int/Reference/PDDs_Forms/PDDs/index.html).

3 As per the CDM forest definition of the respective host country.

4 The crediting period for A/R CDM projects is either 30-year single or 20-year renewable twice (UNFCCC, 2006b).

5 At the time of writing, the UNFCCC had accredited 19 DOEs to validate and verify A/R CDM projects. Developers of large-scale projects have to use the services of different DOEs when undertaking validation and verification.

the project is submitted to the UNFCCC. The project first goes through a 45-day global stakeholder consultation[6] process during which the DOE collect public comments on the project via the CDM Web site. As part of the validation, the DOE reviews project documentation, conducts site visits, and produces draft and final validation reports. A DOE can also request clarifications (CLRs) and corrective actions (CARs) to the project documentation in order to collect sufficient information to assess the project's compliance with the A/R CDM requirements and the applied methodology.[7] Project developers and validators usually have back-and-forth communications until the DOE is able to close out the request. After the completion of validation procedures, the DOE presents a final validation report, which is then submitted to the UNFCCC. If the DOE concludes that the project design is compliant with all CDM requirements, the project is submitted to the CDM EB for registration of the project as a CDM project activity.

2.2.3 Registration

2.6 Successfully validated projects are submitted to UNFCCC to request registration. The project documentation submitted by project entities is then reviewed by the UNFCCC Secretariat for completeness. According to the modalities and procedures for A/R CDM projects, a successfully completed registration process should take a maximum of eight weeks, unless a party involved in the project or at least three members of the CDM EB request a technical review of the project to address concerns. Therefore, a successful validated project can be delayed at registration by the UNFCCC/CDM EB.

2.2.4 Project Implementation, Monitoring, Verification, and Credit Issuance

2.7 The crediting period of an A/R CDM project starts when project implementation starts: usually, developers start implementation and PDD preparation simultaneously.[8] Monitoring is the next step after registration. The monitoring plan, included in the PDD, is the basis for implementing the monitoring procedures. It lists the variables that need to be monitored and measured as per applied methodology at specified intervals during project implementation. It also specifies the procedures that developers must undertake to assure the quality of both measurements and data storage. The project developer compiles the monitoring results in a monitoring report which is published and subject to verification.

TABLE 2.1 AVERAGE YEARS BioCF PROJECTS HAVE SPENT ON THE CDM CYCLE

	Pre-2007	Post-2007
Preparation	3.9	1.4
Validation	1.2	1.1
Registration	0.3	0.4
Total	**5.4**	**2.9**

2.8 Verification is the periodic independent review and *ex-post* determination by the DOE of the emission reductions achieved by the registered project since its start. The DOE assesses the monitoring report and checks compliance with the registered project design, monitoring plan, and the applied methodology.[9] As per the CDM modalities and procedures for A/R projects, only one verification is expected to take place per commitment period of the Kyoto Protocol. Project developers can decide on the date of the first verification; subsequent verifications have to be carried out at 5-year intervals. Lastly, the CDM EB issues Certified Emission Reductions (CERs) based on the verification and certification reports submitted by the DOE.

2.3 Challenges

2.9 The challenges encountered by BioCF project developers while going through the CDM cycle are

6 The global stakeholder process is 30-days long for small-scale projects, which are those that reduce less than 16,000 tCO_2e annually (UNFCCC, 2008j).

7 DOEs check the project compliance with the A/R CDM requirements according to: the modalities and procedures defined by the UNFCCC for the A/R sector, the validation and verification manual, the applied methodology, and the CDM EB guidance, clarification, and tools published to facilitate project preparation.

8 The project design registered usually differs from the original project design, as the latter is based on early (and often inaccurate) screening of the proposed project compliance with the A/R CDM requirements. Projects have to provide evidence of project implementation start, and those new projects (starting after August, 2, 2008) that started implementation before the global stakeholder process must inform the DNA and the UNFCCC Secretariat about the commencement of the project activity and of their intention to seek CDM certification (UNFCCC, 2009o).

9 An important element of verification is that DOEs checks that there is no coincidence in carbon stock and verification events.

TABLE 2.2 PROJECT START IN THE BioCF, A/R CDM METHODOLOGY, TOOL, AND GUIDANCE DEVELOPMENT

Year	Number of Projects Entering the BioCF Portfolio	Number of A/R CDM Methodologies Approved by the CDM EB	Number of Tools Published by the CDM EB	Number of Guidance Statements Published by the CDM EB	Number of Clarifications to Methodologies Published by the CDM EB	Tools Developed by the BioCF	DOEs Accredited
2004	9						
2005	8	1	1	1	3		
2006	3	4		7	3		1
2007	3	8	8	1	4	TARAM[a]	1
2008	2	3	3	3	1		2
2009		1	2	5			10
2010		2				SMART[b]	2
Total	**25***	**19**	**14**	**17**	**11**		**16**

* Twenty-five projects entered the BioCF portfolio; four faced prohibitive barriers and discontinued project development.

a The Tool for Afforestation/Reforestation Approved Methodologies (TARAM) facilitates the ex-ante estimation of carbon credits in A/R CDM projects (See www.biocarbonfund.org). It is described in detail in Chapter 4.

b The Simplified Monitoring Afforestation and Reforestation Tool (SMART) facilitates the ex-post estimation of carbon credits. SMART is in the final stages of development. It is described in detail in Chapter 4.

related to project developers' difficulties in applying the A/R CDM rules and complying with the procedures to achieve carbon credit issuance. These difficulties translate into delays in complying with each stage of the project cycle and into increased transaction costs. Although the most recent BioCF projects have considerably reduced their time for preparation, validation, and registration, the timelines have remained the same. Table 2.1 illustrates the length of time both early starters and recently developed BioCF projects have spent in each stage of the project cycle (from preparation to registration). While early project development started when no methodology existed, and early projects served as testers of the first versions of the methodologies, projects developed more recently (from 2007 onward) have benefited from significant rules simplification.

2.3.1 PDD Preparation

2.10 Preparing a PDD has been a complex task for most project developers in the BioCF portfolio. As previously stated, the challenges have been greatest for projects that entered the portfolio before the CDM infrastructure was developed. Significant amounts of guidance and clarification by the CDM EB, as well as tools to facilitate methodology application, have now been developed (Table 2.2).

2.11 Despite CDM EB guidance on GHG accounting and tools, some project developers have encountered challenges when applying the rules. These challenges are related to:

- Choosing an appropriate methodology;
- Determining a baseline scenario;
- Demonstrating additionality;
- Providing evidence of legal land tenure and carbon rights;
- Demonstrating land eligibility;
- Delimiting project boundaries; and
- Applying a GHG accounting methodology.

2.12 This chapter addresses some of the issues on this list. The land-related issues (tenure rights, eligibility, and project boundary) and challenges related to GHG accounting are analyzed separately in Chapters 4 and 5 respectively.

CHOOSING A METHODOLOGY

2.13 Different methodologies are selected based on "applicability conditions"[10] which define their relevance to a particular project. Conditions include whether the land is in use as cropland, grassland, or

10 Applicability conditions in a methodology refer to the list of characteristics that projects should comply with.

degraded land prior to the project establishment; the type of project activities proposed (e.g., assisted natural regeneration (ANR), A/R, agroforestry, and so forth); the type of activities that will be displaced as a result of project implementation; and the category of carbon pools to be monitored.

2.14 Project developers have faced difficulties in selecting a suitable methodology for their projects. Some applicability conditions appear to be overlapping, and developers cannot easily understand the impact of their selection on the final amount of emission reductions. In addition, assessing some applicability conditions requires time-intensive collection of primary data (see Chapter 5). The CDM EB has made efforts to solve some of these problems; for example, it has consolidated five similar large-scale methodologies[11] into two. A decision tool to guide in the selection of a methodology would alleviate even further some of the difficulties associated with methodology selection.

TRACKING RULE CHANGES

2.15 Developers also struggle with adapting to a new methodology. The CDM EB reviews methodologies as requested by project developers. If necessary, simplified versions of old methodologies are subsequently published. Since projects have to be registered with a valid methodology, once a revised methodology is published developers have an 18-month grace period to register their projects with the old version of a methodology; otherwise they have to change to the new version. Changing versions often reveals that project developers previously did unnecessary work. For example, one of the BioCF projects starting PDD development in 2006 assessed leakage[12] from fossil fuel combustion as requested in version 1 of the selected methodology—but this was no longer a requirement in version 4 of the methodology, which the project developer had to use for registration in 2008.

2.16 Project developers spend significant time analyzing a methodology prior to its selection and struggle both with finding the latest versions of the methodologies on the CDM Web site and understanding the implications of the changes in terms of transaction costs and emission reductions. Changes incorporated in later versions may restrict project activities, result in fewer emission reductions, or make certain projects ineligible for use of the methodology. In addition, when starting the global stakeholder consultation process, project developers have to use the most updated version of PDD templates and the most recent versions of the CDM EB tools. Project developers usually complete the PDD step by step; since this can take several years, by the time of finalization the document templates and tools applicable early on may no longer be valid.

2.17 The CDM EB's efforts to simplify methodologies are relevant, but developers struggle with tracking the multiple changes to the rules that comes with the changes. Project developers need to ensure that they use the latest version of relevant documents[13] in developing a PDD and avoid inconsistencies throughout while applying the changes. However, this is not an easy task for project developers. Although the CDM EB uses multiple resources to publish the changes to the rules, and the CDM has facilitated some procedures[14] to alleviate these problems, the resources are useful only to those familiar with the CDM EB decision-making process—and A/R project developers typically are not. In addition, the CDM EB in itself struggle with documenting such changes in its multiple documents. Specific rules sometimes change after the latest versions of relevant documents are published, leading to multiple interpretations of the rules by project developers and validators. One example of this is with regards to the latest version of the validation protocol as it requires DOEs to check project developers' demonstration of afforestation, ignoring a previous decision of the CDM EB in which discrimination between reforestation and afforestation is no longer a requirement.

2.18 There are some useful resources that help project developers find the A/R CDM rules and track

11 For example, the CDM EB created the Afforestation Reforestation Approved Consolidated Methodology 0001 (AR-ACM0001) using Afforestation Reforestation Approved Methodology 0004 version 4 (AR-AMv4) and the new proposed Afforestation Reforestation New Methodology 00032 version 02 (AR-NM00032v2). In another case, it merged two existing methodologies.

12 Leakage refers to emissions happening outside the project boundary that are attributable to the project. See Chapter 4 for more information.

13 Including the more recent PDD formats, versions of methodologies, CDM EB tools, guidance, and clarifications of specific rules and procedures.

14 For example, the grace period to register projects with an expired methodology went from 8 weeks in 2006 to the 18 months in 2010 (see Annex 10 of the 27th meeting report, page 2, Paragraph 15 and Annex 3 of the 54th meeting report, page 6, Paragraph 36). The CDM EB has also improved the way it presents, on the CDM Web site, the decisions taken by the CDM EB that affect project development.

Without the BioCF A/R CDM projects, this pattern of land degradation would have continued in Moldova.

Photo: Moldsilva

CDM EB changes. The *CDM Rulebook,*[15] published by Baker and McKenzie, covers all CDM sectors and is useful to both users new to A/R CDM as well as those with more experience in the sector. Still, specific CDM EB or UNFCCC decisions are difficult to track. Another important resource is the CDM Pipeline, a UNEP-RISØ Excel Data Sheet[16] that contains information on the overall progress of the CDM, including methodology approval. Efforts like CDM in charts of Institution for Global Environmental Strategies to document rule changes in the non-forestry CDM have also proven useful in facilitating project development (IGES, 2011).[17]

2.19 Recently, in 2011, the CDM EB took an important step to address both the A/R CDM stakeholders' challenges to track the rules and the fact that early registered projects could not benefit from recent methodology simplification and consolidation. Early versions of methodologies applied in registered projects contain requirements that were withdrawn in recent versions. The new guideline allows a registered A/R CDM project to apply at the time of verification the improvements included in recent versions of the applied methodology (UNFCCC, 2011e).

DETERMINING THE BASELINE SCENARIO

2.20 The baseline net greenhouse removals by sinks is the sum of the changes in carbon stocks in the carbon pools within the project boundary that would have occurred in the absence of the proposed A/R CDM (UNFCCC, 2006b). A project's baseline scenario has to be justified according to the provisions of the methodology. Challenges arise when selecting a baseline scenario because doing this requires addressing the interactions between the policies of several sectors (e.g., agriculture, energy, and livestock) and requires studies on land-use change (and the expertise to develop them is still scarce in many developing countries). Most existing methodologies, therefore, recommend selecting the baseline scenario by applying a historical approach[18] under which land use and land cover maps are used to demonstrate that past land-use trends will continue in the future. Although this approach is often considered less difficult to apply,[19] in the absence of official records such land-use and land-cover analysis is challenging.

2.21 This problem has important implications for project preparation and implementation. A poorly chosen baseline scenario increases the risk of rejection of the project as a CDM activity. At the same time, having a baseline that relies on weak land-use and land-use change assumptions also has major

15 See http://www.cdmrulebook.org/home.

16 This database is updated every three months by the Capacity Development for the Clean Development Mechanism Project of UNEP-RISØ Centre. See http://cd4cdm.org/.

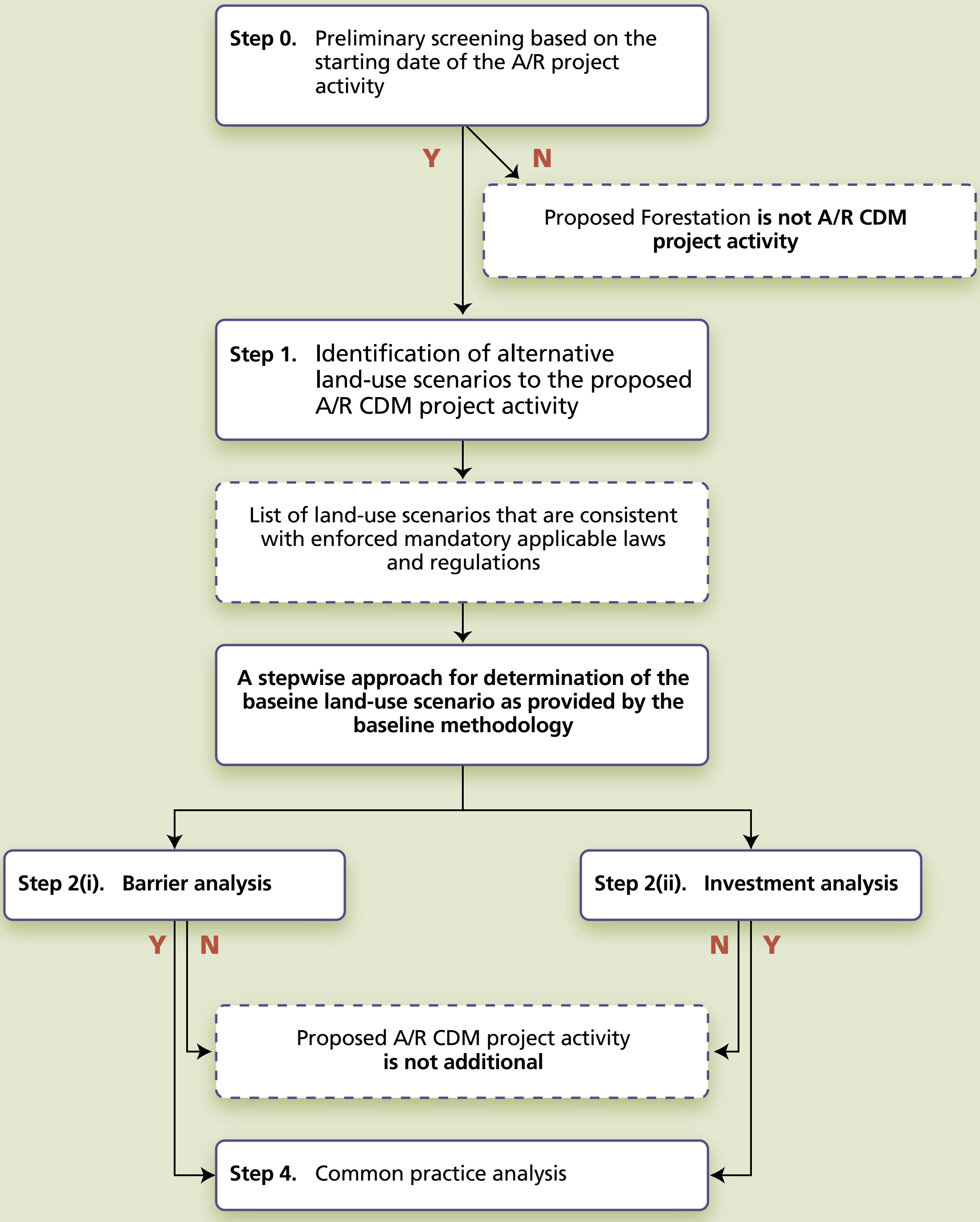
17 Although it presents a brief information on A/R, it is not enough to guide project development.

18 Project developers can justify the appropriateness of their choice of a baseline scenario by applying one of three approaches that help them explain the future land-use trend. The three approaches are a) existing or historic; (b) economically attractive course of action; or c) most likely at the time the project starts (e.g., because of the likely implementation of certain laws).

19 The other two approaches are economic and likely trends. Applying them requires project developers to develop assess plans for land management/investments during the project period. Identifying realistic future land-use analysis is specially complex in projects involving multiple farmers because their land-use decisions for at least 20 years highly depend on market trends and other hard-to-predict variables.

Box 2.1

Tool for Assessing the Additionality of A/R CDM Projects



Source: UNFCCC, 2007g.

implications for project economics.[20] As a result, determining the appropriate baseline scenario for a project is an important task—and one for which many project developers lack the right capacity.

2.22 This problem is common to all CDM sectors, and the UNFCCC made a step in the right direction at the last COP in Cancún in 2010. A standardized baseline[21] can enhance the objectivity, efficiency, and predictability of mitigation actions under the CDM and, as cited in the COP decision, "could be established for a Party or a group of Parties to facilitate the calculation of emission reductions and removals and/or determination of additionality for projects, while providing assistance for assuring environmental integrity" (UNFCC, 2010a).[22] Standardized baselines should be allowed in the A/R sector at the discretion of the DNAs of countries hosting CDM projects, and the CDM EB should periodically review them. It is worth mentioning that some A/R CDM methodologies go a bit in this direction by using discounted reforestation rates as a benchmark for additionality determination (e.g., ARAM0005). This should be further promoted and such discounts could be defined by the corresponding DNA.

DEMONSTRATING ADDITIONALITY

2.23 A CDM project is defined as additional if anthropogenic GHG emissions are reduced below those that would have occurred in the absence of the registered CDM project activity (UNFCCC, 2006a). Since additionality is a central concept of the CDM, it has important implications for the economics of projects—and it ultimately determines the type of forest projects that are able to gain access to carbon finance. These economic implications are addressed in Chapter 6. This chapter only focuses on the challenges project developers have encountered when complying with the additionality requirement.

2.24 To ensure a systematic demonstration of additionality, the CDM EB suggests project developers apply the "*Tool for Demonstrating and Assessing Additionality in A/R Projects*" (Box 2.1), which most A/R CDM methodologies have adopted. This tool allows for comparison between the proposed project and credible land-use alternatives to demonstrate (i) that the alternative scenarios are not adversely affected by the barriers that prevent the proposed forest project from happening, or (ii) that the proposed forest project is unlikely to be financially viable. Projects also have to confirm their additionality arguments by explaining how forest projects occurring in the surrounding area are not similar to the proposed project (UNFCCC, 2007g; UNFCCC, 2007h; UNFCCC, 2009p).[23]

Documenting Financial and Other Barriers

2.25 Documenting evidence of barriers is difficult and time-intensive. Project developers have to demonstrate that the proposed project is in addition to what would have happened in the business-as-usual scenario by presenting evidence of existing prohibitive barriers to the proposed project. Such barriers can be investment, financial, technological, ecological, institutional, and/or cultural, among others. Because official or published information is often not available on cultural (e.g., traditions because of land users' preference to follow prevailing practices), institutional, capacity, and social barriers, most project developers in the BioCF portfolio chose to document investment barriers. There are two additional reasons for such a preference. First, as CDM provides mainly a financial incentive, the most obvious barrier it can help overcome is a financial barrier. Second, information collected from financial agencies, officials, and/or third-party agencies is relatively easier to obtain and is likely to be accepted by DOEs during validation. In fact, some DOEs frequently apply the investment guidelines despite the CDM EB clarification that they are not mandatory for A/R CDM projects[24] In addition, it is difficult for DOEs to endorse unclear additionality arguments based on poorly justified, non-investment barriers.

20 Relying on weak land-use and land-use change assumptions directly impacts the calculation of emission reductions from projects and constitutes the basis for land opportunity cost estimations, which are the starting point for designing effective carbon payment schemes that keep participating farmers interested in the project in the long run.

21 The concept of standardized approaches is not new to the CDM. It has already been introduced into a few CDM methodologies and tools in sectors other than A/R.

22 See FCCC/KP/CMP/2010/12/Add.2.

23 See http://cdm.unfccc.int/methodologies/ARmethodologies/tools/ar-am-tool-01-v2.pdf.

24 There are several examples where the general CDM rules are applied to the A/R sector, neglecting that this sector is different in many respects from the energy-related sectors. Examples of these are the requirement of coordinates of polygons as evidence of project location instead of sample points (see Chapter 3) and the consideration of single years to account for the cap in emission reductions for small-scale projects (see Chapter 6).

TABLE 2.3 ISSUES HIGHLIGHTED IN DOE REQUESTS FOR CLARIFICATION OR CORRECTION

DOE Requests for Clarification or Correction[a]	Frequency (n=11)	Explanation
Inconsistent information	45%	The information presented on the same topic in different sections of the PDD is sometimes inconsistent, which reflects the low capacity of project entities to understand the regulatory requirements and/or to synthesize relevant information from multiple sources.
Recommended tools are not properly applied	40%	The CDM EB has approved several tools and guidance to facilitate the implementation of regulatory requirements. Some project entities ignore or improperly apply the tools and guidance; this then needs to be corrected during validation.
Multiple interpretations of rules	35%	The different interpretations of rules by project entities and DOEs can lead to multiple iterative communications and delays in project validation.
Incorrect versions of methodologies and document formats	72%	Changes in the versions of approved methodologies, tools, and document formats require the project entities to track the changes and revise their project documentation several times during validation. This contributes to delays.

a Specific examples of DOE's queries on land tenure, land eligibility, and GHG accounting are presented in Chapters 3 and 4.

2.26 However, evaluating financial indicators has also proven to be subject to significant review because of poor argumentation or the use of low-quality data, resulting in CARs and CLRs that are often not easy to address. Therefore additionality in the A/R sector should be simplified. The CDM EB should allow for an assessment of additionality against performance indicators of the overall sector in the host countries, and benchmarks defined based on national forest plans should be allowed. Furthermore, since projects planting non-commercial native species often face obvious challenges and prohibitive barriers that prevent them from happening, they should be considered automatically additional.

Linking Additionality and Baseline Determination

2.27 Developers often have difficulty in understanding the link between assessing additionality and determining the baseline scenario. Although both steps require analyzing future land-use scenarios, they are treated separately in several[25] methodologies. The CDM EB sought to address this in 2007 by publishing the "*Combined Tool to Identify the Baseline Scenario and Demonstrate Additionality in A/R CDM Project Activities*." This tool helps identify the baseline among a list of likely land-use scenarios and establish the additionality of the project scenario. This new tool is simpler as it allows project developers to determine the baseline scenario based on qualitative analysis of the emission reductions in alternative land-use scenarios (UNFCCC, 2007h). When applying this new tool, however, project developers must perform both barrier and investment analyses (Annex 2). Further simplification of the combined tool is still needed to account for the complexity of land-use issues[26] and information constraints in developing country contexts and to reduce the transaction costs for projects.

The "Common Practice" Analysis

2.28 The common practice analysis step of the additionality assessment requires comparing the proposed carbon project to similar activities being carried out in the project's region. Through this step, the CDM EB seeks to confirm the additionality demonstrated in previous steps; it is a plausibility check. In the BioCF experience, developers encounter difficulties in comparing the outcomes of proposed projects to other projects. This is because projects can differ significantly in specific features (e.g., land tenure, species planted, types of soils, rainfall pattern, and others), making it difficult to collect evidence of all of them to conclude that the proposed project activity differs from existing reforestation projects in the

25 Most early versions of methodologies still have to apply the first version of the tool to demonstrate additionality. As early starters in the A/R CDM, most BioCF projects apply early versions of methodologies.

26 The combined tool to identify the baseline scenario and demonstrate additionality streamlines both processes, making it clearer for project developers. However, it still requires significant amount of information as developers have to identify credible and realistic alternative land-use scenarios and analyze the barriers affecting them. In addition, in cases in which there are several land-use scenarios, including afforestation and/or reforestation, applying investment analysis is mandatory. Although project developers are allowed to select the baseline by carrying out either a qualitative assessment of the emission reductions or an investment analysis in cases in which the list of alternative land uses does not include afforestation and/or reforestation, there is no clear criteria to help them to select the qualitative assessment. Moreover, the common practice is still needed to reconfirm additionality.

project region. In addition, in many countries data shortage is a barrier in itself to undertaking the common practice analysis; statistics data on reforestation are often incomplete or unavailable. The CDM EB should facilitate the common practice analysis by setting criteria to help define an existing project as automatically different from the proposed project.

2.29 The A/R Working Group continues making important efforts to simplify the additionality requirement. Recently, in 2011, and following UNFCCC guidance provided in Cancún in 2010 on seeking alternative approaches to additionality, it recommended to the CDM EB approve guidelines to simplify the assessment of additionality in projects that produce no financial benefits or insignificant benefits (i.e. not exceeding 10 percent of the CDM revenues), provided that developers demonstrate both that the proposed activity is not of common practice in the region and that there are no enforced mandatory applicable laws and regulations leading to the establishment of the proposed type of forest activity (UNFCCC, 2010a; UNFCCC, 2011d). This would help a number of projects for which profitability is not the main rationale (See Chapter 6).

2.3.2 Validation

2.30 Problems in completing a PDD in an effective manner are reflected in validation. A low-quality PDD and poor supporting documentation often delays validation, increases the demand for DOE services, and leads to delays in obtaining letters of approvals from DNAs. The delays in validation also lead to delays in payments to local communities for protection and maintenance of projects. The challenges related to the quality and completeness of project documentation are exemplified in the sections below.

QUALITY OF PROJECT DOCUMENTATION

2.31 Limited documented project-level information to complete the CDM requirements and project entities' low capacity to interpret the A/R CDM rules have affected BioCF projects. These problems have been evidenced in DOEs' requests for clarification and corrections to PDDs. Table 2.3 summarizes the issues highlighted in draft validation reports based on 11 projects.

2.32 In addition to the time spent on validation and increased transaction costs, these problems also impact negatively on the overall availability of DOEs. DOEs with strong expertise in A/R CDM are scarce, in part because accreditation of DOEs for the A/R sector started late relative to other sectors. Moreover, once accredited, DOEs have to build their capacity based on experience gained throughout validation (Table 2.2).

2.33 Because DOEs have little incentive to assess the application of A/R rules in light of host countries' national circumstances, some DOEs adopt the most stringent interpretation of relatively vague rules.[27] The reason for such stringency is twofold: ambiguous rules lead to multiple interpretations, and DOEs proceed with excessive caution to avoid losing their UNFCCC accreditation. The CDM EB has made some effort to reduce ambiguity in A/R CDM rules. In 2008, for example, it published the *Validation and Verification Manual* (VVM) to facilitate a common understanding of the rules among DOEs and to promote quality and consistency of the documentation and procedures followed in the validation and verification processes. The VVM is a guide for DOEs on how to assess the CDM requirements. In addition, guidance and clarifications are published by the CDM EB to address ambiguities in the application of the A/R CDM rules. Although this is a step in the right direction, efforts are still needed to improve both the clarity of the rules and the communication between project entities, DOEs, and the CDM EB (UNFCCC, 2009n).

COMPLEMENTARY DOCUMENTATION

2.34 DNAs and project entities' poor management capacity, along with bureaucratic procedures, delay the provision of the documentation essential for project validation and registration. In one of the BioCF projects, the DNAs delayed the issuance of the Letter of Approval by eight months. In another project, it took close to a year for a project entity to provide reliable evidence of the project starting date.[28] In addition, the fact that some DNAs issue Letters of Approval only after the draft validation report is issued leads to delays.

27 For example, for DOEs only a few CDM requirements (i.e., forest definition of host country) are country-specific; the remainder have to be applied without considering national circumstances.

28 Because trees grow slowly to sequester a significant amount of carbon by the end of the first commitment period of the Kyoto Protocol, A/R projects usually start planting activity before project registration. This is accepted under the CDM as long as the project developer transparently demonstrates that the benefits of the CDM were a decisive factor in the decision to proceed with the project activity.

2.3.3 Registration of Projects

2.35 So far, the average time period for registration[29] of BioCF projects is more than twice the eight-week period envisioned in the Marrakesh Accords. Overall, however, the time period for registration might be reducing as a result of CDM EB improvements in processes and project developers' efforts to provide high-quality documentation when submitting their projects for registration. The first BioCF project registered[30], in 2006, spent 14 weeks to obtain registration; however, projects registered between 2009 and 2010 increased their time—spending on average 24 weeks to get to registration; but one project registered in 2011 spent only 11 weeks. Efforts are needed to achieve registration within the originally envisioned eight-week period, especially given the high number of projects expecting to achieve registration by the end of 2012.

2.36 Insights from the BioCF's registered projects indicate that half of the projects did not pass the completeness check because of issues such as (i) inconsistency in the technical information presented throughout the PDD; (ii) use of the incorrect versions of tools, PDD forms, and methodology templates; (iii) inconsistencies in the project name among the different documents submitted; (iv) mistakes in the date of the global stakeholder process; and (v) lack of GIS files as evidence of project boundary delineation.

2.37 To reduce the chance of a project failing the completeness check, the BioCF has intensified its internal review of quality documentation. From this exercise, it has become clear that project developers do not properly follow the reporting requirements included in the VVM. Also, project developers often fail to document changes in versions of PDDs generated while responding to CARs and CLRs, something that would be useful for DOEs at verification.

2.38 A similar trend can be observed in a bigger sample of projects. The World Bank report—*10 years of Experience in Carbon Finance*—illustrated the time to registration across all CDM sectors; the nine-week average time period to registration achieved in 2005 increased threefold in 2009 (World Bank, 2010b). The main cause of reported delays was the additional review of projects by the CDM EB. To stress this, the World Bank report illustrated that, at the time of its publication:

- About 50 percent of the registered projects had been the object of a request for review prior to registration;
- Thirty percent of projects registered in 2004 were reviewed at registration, while in 2007 this figure reached 70 percent;
- Delays at registration were close to three months during 2005-2007, rising to seven months for projects registered in 2008-2009.

The CDM EB has made considerable efforts in 2010 to reduce the rate of projects reviewed at registration. The share of projects requesting registration and registered automatically increased from 66 percent in June to 76 percent by the end of the year.

29 Counted from the submission for registration onward.

30 The "Facilitating Reforestation for Guangxi Watershed Management in Pearl River Basin" Chinese project was the first BioCF project to achieve CDM registration (November 2006).

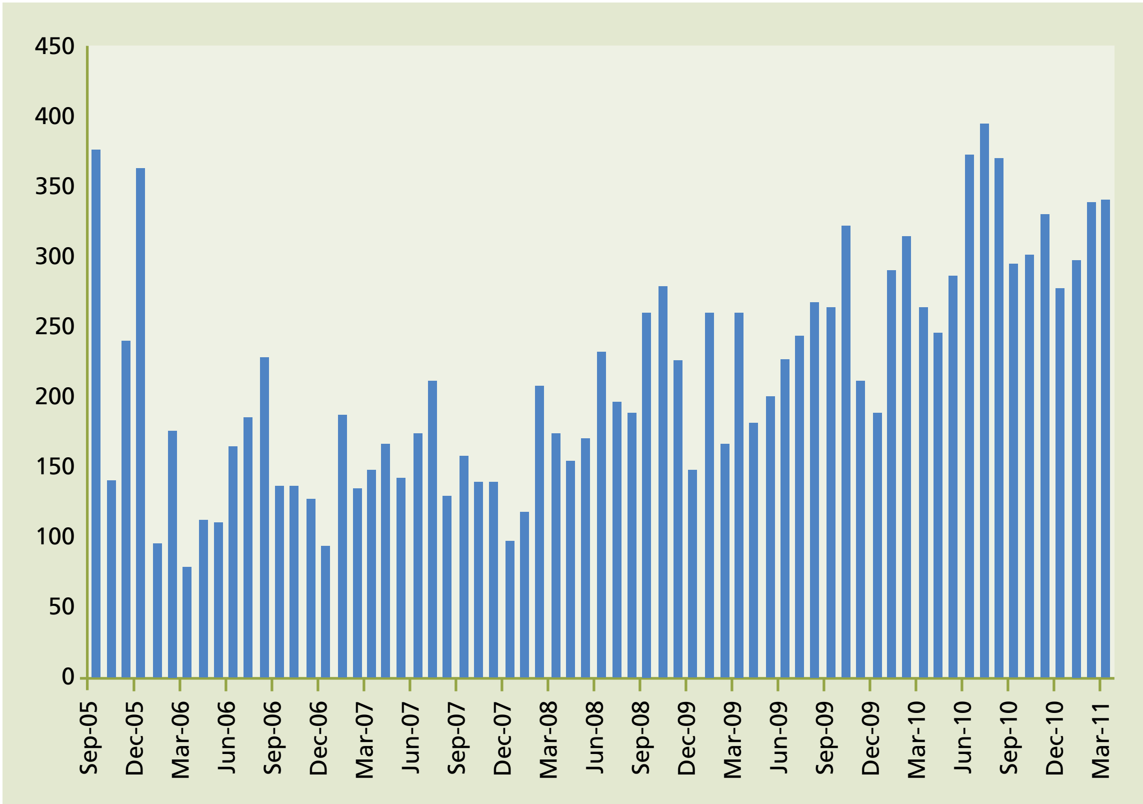
2.3.4 Project Implementation, Monitoring, Verification, and Issuance of Credits

2.39 The BioCF has limited experience in monitoring A/R CDM projects. Although all the projects have trained their teams on forest carbon monitoring, at the time of writing only the 13 registered projects are able to focus on this task.[31] Five out of the 13 have

31 All projects have started monitoring since project implementation began. However, in practice, projects focusing on completing project preparation and validation often neglect monitoring; they start focusing on it once registration is achieved.

Verification of the Southern Nicaragua CDM Reforestation Project.

FIGURE 2.2 MEAN TIME FOR ISSUANCE OF CERs EACH MONTH FROM 2005 TO 2011



Source: CD4CDM, July 1, 2011 www.cd4cdm.org

informally assessed the consistency between project implementation and the PDD as well as the correct implementation of the monitoring plan.

2.40 Because of their dynamic nature, A/R projects are likely to deviate from the PDD at implementation. This is particularly true in the case of projects involving multiple farmers who, for different reasons, may neglect the agreed-upon land-use contract in favor of more desirable alternatives. Other unforeseen causes can also lead to deviation from the PDD. Deviation in project implementation from the PDD can delay verification and credit issuance; A/R projects cannot afford such delays because verification can happen only once every five years[32] and there is uncertainty about the continuation of a second commitment period of the Kyoto Protocol. As in any other CDM sector, if such a deviation occurs, depending on the scale of changes, developers have to either report the changes to the CDM EB or produce a revised monitoring plan that reflects the changes and request the approval of the CDM EB.

2.41 The early experience with monitoring also reveals project developers difficulty in implementing a monitoring plan. The reasons for this are twofold. First, the PDD sometimes evolves substantially[33] from the original project design, and local stakeholders who participated in the design become unfamiliar with the changes. Second, local stakeholders with poor forestry experience lack the capacity to deal with forest inventories, and most developers struggle with monitoring emissions and leakage as these are completely new concepts for them. Efforts are needed to strengthen local capacity on forest carbon monitoring and to simplify the monitoring requirements by reducing the number of variables to be monitored. Particular efforts are needed regarding the monitoring of leakage. (See Chapter 5 for early lessons on monitoring of A/R CDM projects).

32 In non-A/R sectors, there is no once-per-commitment period limit for verification and issuance.

33 Project developers change the project design either to incorporate changes in the rules introduced by the CDM EB or to adopt appropriate rules for a project.

2.42 The credit issuance process itself is not free from challenges. The experience of the World Bank shows that non-A/R CDM projects have undergone an additional review by the CDM EB at this stage. As in the registration stage, the CDM EB may put a request for issuance under review if at least three of its members raise concerns about a project. The World Bank report on experience with carbon finance estimates that projects without a request for review take at minimum close to 14 weeks for issuance of CERs. A request for review only contributes to delaying the issuance of credits (World Bank, 2010b). In fact, CD4CDM reports that projects have spent on average from 14 weeks (56 days) to close to 87 weeks (350 days) per issuance, with the highest time lags occurring in 2010 and 2011 (Figure 2.2).

2.4 Recommendations

2.43 Some recommendations for the COP/MOP and the CDM EB are listed below. Best practices for project developers and other stakeholders were collected based on the BioCF experience and are presented in Chapter 8.

RECOMMENDATIONS FOR THE COP/MOP

- Remove regulatory uncertainty. Much has been invested in building the institutional framework to support A/R projects, and project developers are still interested in undertaking and developing projects in many poor countries where these activities can make a difference in living conditions. The prevailing uncertain regulatory environment, however, is creating a dampening effect.

RECOMMENDATIONS FOR THE CDM EB

- Continue methodology consolidation in the short-term, develop a tool to facilitate methodology selection, and develop a periodical manual to facilitate tracking of rule changes (see Paragraphs 2.13–2.14).
- Facilitate the calculation of emission reductions by allowing for the determination of standardized baselines established at the national or sub-national level, instead of in a project-by-project basis. A standard baseline would be a single, standard estimation of green house gases that would not have been removed in a region if certain projects were not implemented, as a result of the current and projected land-use pattern (see Paragraphs 2.20–2.22).
- Simplify additionality requirements where additionality could be demonstrated at the sectoral level by taking into account national circumstances as well as country or regional-wide afforestation / reforestation goals. In addition, projects facing disproportionately large barriers should be automatically additional. For example projects in countries with weak business environments, and planting lesser-known species for non-commercial purposes should not have to prove additionality (see Paragraphs 2.23–2.29).
- Continue to improve communication between project developers, DOEs, and the A/R Working Group to avoid multiple interpretations of the rules. Create a continuous and transparent forum to stimulate the incorporation of feedback from the ground, and provide an efficient mechanism for project developers to appeal against DOEs and CDM EB decisions (see Paragraphs 2.30–2.33).
- Streamline the CDM procedures to improve the predictability of carbon revenues (see Paragraphs 2.9, 2.15–2.19, 2.35–2.38, and Chapter 6).

3

Non-permanence

3.1 Introduction

3.1 One of the main concerns of the parties to the Kyoto Protocol regarding the inclusion of forestry into the CDM was the potential reversibility of the carbon stored in trees as a result of biotic or abiotic disturbances. The UNFCCC, therefore, decided to consider A/R as a technology that provides a temporary solution to climate change mitigation. As a result, A/R projects can generate temporary carbon credits[1] that in time need to be replaced with permanent credits (UNFCCC, 2006b).

3.2 The temporary crediting approach to non-permanence adopted by the UNFCCC opened the door for the forestry sector to be one of the technologies to mitigate climate change. This has contributed to highlight the relevance of managing the risk of emission reductions reversal in projects. Temporary crediting has also served to test the type of assets buyers and sellers of forest carbon credits are willing to accept when trading carbon.

3.3 Despite these advantages, numerous challenges exist in applying temporary crediting. The need to replace forest carbon credits discourages carbon investors from acquiring forest credits (as they need to purchase both assets—a temporary CER and a permanent credit—to replace the temporary one). This has negative consequences for the economics of projects because applying the non-permanence rule results in lower-priced forest carbon credits, thereby limiting the potential for carbon

1 Emission reductions from avoided deforestation is not considered an eligible option under the Kyoto Protocol for the first commitment period, but is being discussed under the UNFCCC framework.

finance to help overcome traditional financial barriers of forestry projects. It also discourages projects with long-term carbon sequestration goals. More importantly, the temporary crediting approach has reduced the demand for forestry carbon credits because they are difficult to manage and transfer.

3.4 This chapter presents an overview of the BioCF's experience with the temporary crediting approach and the challenges faced by project developers. Section 3.2 introduces the rules related to the temporary crediting approach. Section 3.3 presents the BioCF project developers experience in selecting the type of credits for use in their projects. Section 3.4 presents the challenges encountered by BioCF projects in applying the temporary crediting approach to non-permanence. Section 3.5 looks at relevant criteria for designing alternative options for addressing non-permanence in an eventual Kyoto Protocol's second commitment period. Finally, Section 3.6 presents recommendations for policymakers, CDM negotiators, project developers, universities, and research centers.

3.2 Temporary Crediting

3.5 The countries committed to emission reductions under the Kyoto Protocol[2] can use temporary credits to achieve no more than one percent of their annual emission reduction targets (times five) during the first commitment period of the protocol.[3] Parties using these temporary credits have to replace them with permanent credits before their expiration (UNFCCC, 2006d). Temporary emission reductions, therefore, are seen by many as an opportunity for Annex B countries to gain time to develop the technologies required to effectively address climate change mitigation. While still complying with their reduction obligations, temporary credits represent a renting of reservoirs of temporary storage carbon as more expensive strategies (i.e., research for technology development and innovation) are developed.

2 Annex B countries.

3 As set out in Paragraph 14 of the Annex to decision 16/CMP.1: "For the first commitment period, the total of additions to a Party's assigned amount resulting from *eligible* land use, land-use change, and forestry project activities under Article 12 shall not exceed one percent of base year emissions of that Party, times five." Article 12 refers to the Clean Development Mechanism, and the eligible activities are afforestation and reforestation.

3.2.1 Types of Forestry Credits

3.6 The modalities and procedures of the CDM define two types of forest credits: temporary Certified Emission Reductions (tCERs) and long-term Certified Emission Reductions (lCERs), each representing one tonne of carbon dioxide equivalent (tCO_2e). While the amount of tCERs is equal to the tonnes of CO_2e sequestered every verification, the amount of lCERs is the carbon sequestered since the last verification (Figure 3.1).

3.7 A key difference between the two types of credits is their term of expiration. While tCERs expire at the end of the commitment period of the Kyoto Protocol following the one in which they were issued, lCERs expire at the end of a project crediting period,[4] provided that the carbon stocks are still in place.[5] Therefore, the expiration date of both tCERs and lCERs is an additional element in the credit serial number (Figure 3.2).

3.8 At the time of PDD preparation, project developers must select the type of temporary credits they will use. This decision will remain fixed during the project crediting period. Projects are expected to issue credits only once every commitment period of the Kyoto Protocol, and they are issued upon project verification.[6] Project developers choose the date of the first verification; subsequent verifications are automatically set every five years thereafter (UNFCCC, 2006b).

3.2.2 The "Replacement Rule" Associated with Temporary Credits

3.9 Before temporary credits expire, buyers have to replace each unit with a permanent credit to achieve full compliance with their commitments. According to the modalities and procedures for A/R projects, both tCERs and lCERs can be replaced with other units, including Assigned Amount Units (AAU),[7]

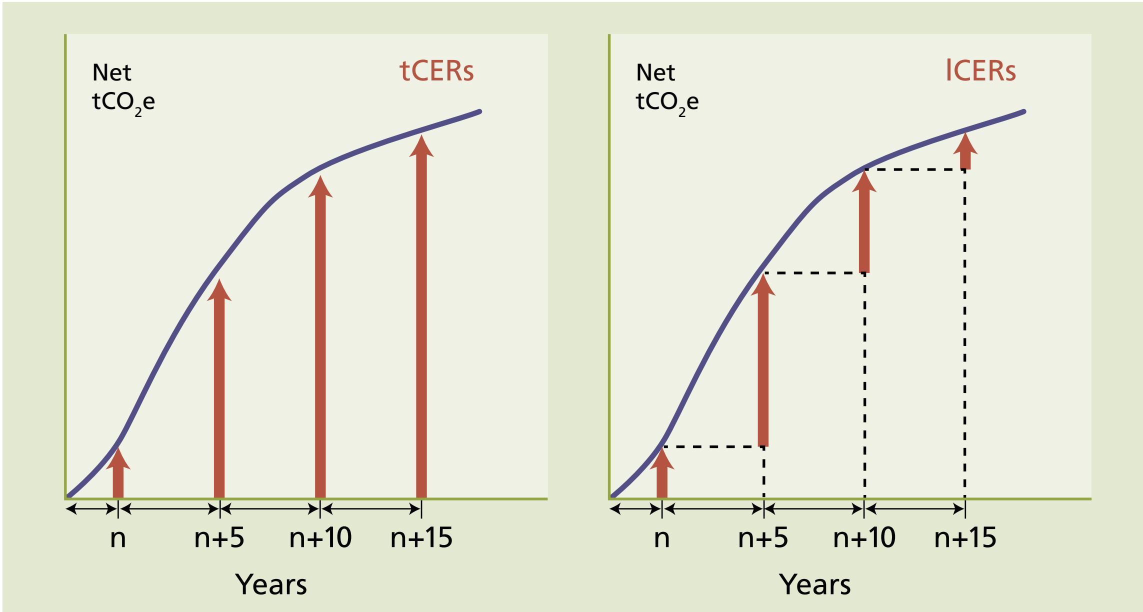
4 The crediting period is the duration of time selected by the project participants during which the A/R CDM project activity will be implemented and GHG emission reductions will be generated and, therefore, tCERs and lCERs are issued. The time length of the crediting period for A/R projects can be 20-year renewed twice or a single 30-year period.

5 When a DOE's certification report indicates a reversal of net anthropogenic GHG removals by sinks since the previous certification, the project must replace an equivalent quantity of lCERs.

6 See Chapter 2 for more details on the verification process.

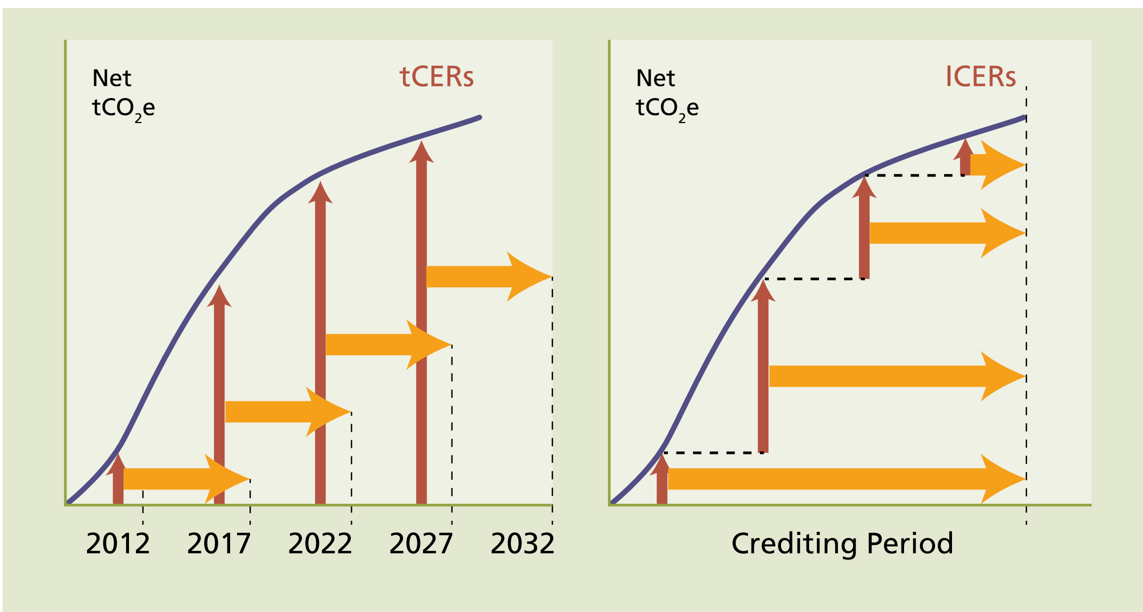
7 AAUs are units issued by parties to the Kyoto Protocol into their national registry up to their assigned amount, calculated by reference to their base year emissions and their quantified emission limitation and reduction commitment (expressed as a percentage).

FIGURE 3.1 ACCOUNTING OF tCERs AND lCERs



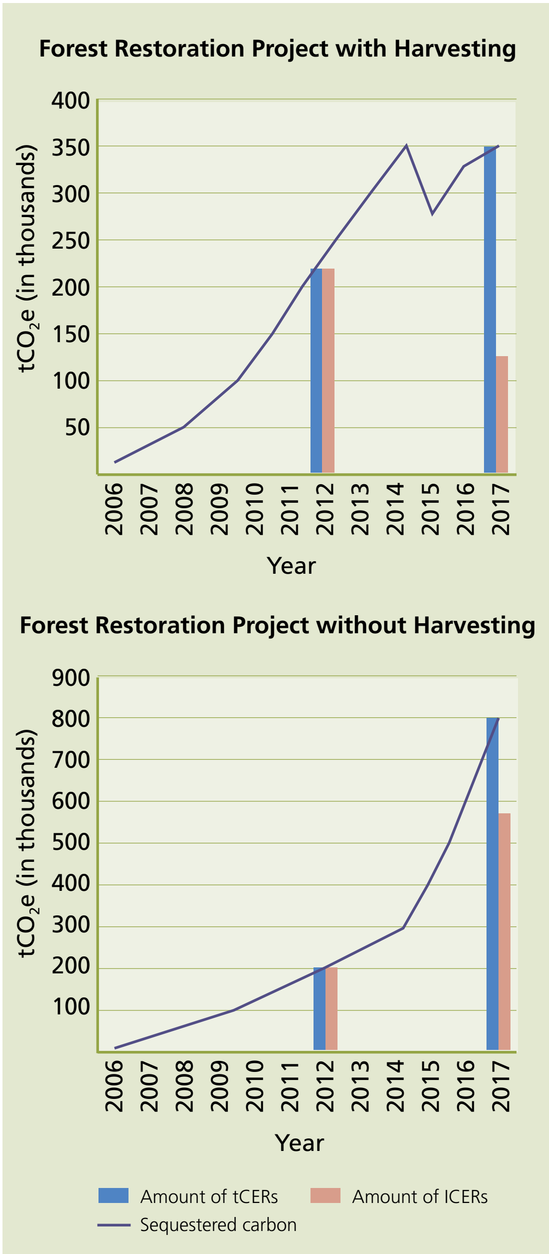
Source: Pedroni, 2005

FIGURE 3.2 EXPIRATION OF tCERs AND lCERs



Source: Pedroni, 2005

FIGURE 3.3 COMPARISON OF tCERs AND lCERs IN TWO BioCF A/R CDM PROJECTS



Note: A graph for their entire crediting periods is not presented as the projects have still not contracted their post-2017 expected emission reductions.

Certified Emission Reductions (CER),[8] Emission Reduction Units (ERU),[9] and permanent Removal Units (RMU).[10] A tCER can also be replaced with another tCER—but not with an lCER. Finally, an lCER can be used to replace another lCER only in cases of reversals of GHG removals since the previous certification.

3.10 For each Kyoto Protocol commitment period, each Annex B Party shall, therefore, include in its national registry a lCERs and/or tCERs replacement account to register the replacement credits. The replaced lCERs or tCERs are registered in a retirement account. Thus, the quantity of replacement credits and tCERs transferred into the tCER replacement account for the commitment period shall be equal to the quantity of tCERs that were retired or transferred to the replacement account for the previous commitment period. Similarly, the quantity of replacement credits and lCERs transferred into the lCERs replacement account for the commitment period shall be equal to the quantity of lCERs that had to be replaced during that commitment period (UNFCCC, 2006b).

3.11 Annex B Kyoto Protocol Parties have less flexibility when dealing with temporary forest carbon credits in comparison with permanent CERs. For example, temporary credits must be exclusively used to comply with commitments for the Kyoto Protocol commitment period in which they are issued. They cannot be carried over to a subsequent commitment period. In contrast, these countries can carry over up to 2.5 percent of their original allocation of AAUs from the first to a subsequent commitment period (UNFCCC, 2006b).

8 CERs are units produced in projects using the Clean Development Mechanism of the Kyoto Protocol. CERs generated in CDM sectors other than the Afforestation and Reforestation sector can be used for replacement purposes.

9 ERUs are converted from either an AAU or an RMU and issued to project participants in joint implementation project activities. Joint implementation projects are developed by an Annex B country.

10 RMUs are issued by parties to the Kyoto Protocol for net removals by sinks in activities covered by Article 3.3 and Article 3.4 of the Kyoto Protocol (in the land use, land-use change, and forestry sector).

3.3 tCERs vs. lCERs

3.12 Temporary Certified Emission Reductions have a clear advantage on the cash flow front when compared with lCERs. All project developers of BioCF projects have selected tCERs instead of lCERs.[11] Although both assets can be issued every five years after the first verification, the carbon stock that generated tCERs in one crediting period (i.e., the first vintage) can be reassessed once the tCERs have expired—and new credits issued in the next period. If this same first vintage is issued as lCERs, however, the credits would be committed from the certification date to the end of the project crediting period. This means that developers would receive less money from a stream of lCERs than tCERs.[12]

3.13 There are other challenges, as well, with using lCERs. First, purchasing these credits requires buyers and sellers to commit to the whole project crediting period. Second, the lack of certainty about a second commitment period of the Kyoto Protocol has also made lCERs less attractive to project developers. Determining a price for lCERs requires buyers to have a clear understanding of both the project risk profile (Dutschke, 2010) and future prices of permanent carbon credits during the project crediting period and at the time of expiration of the lCERs (Lecocq and Couture, 2008). Establishing such a long-term liability, understanding the long-term project risk, and predicting future prices of carbon credits are all difficult to achieve in an uncertain carbon market environment.

3.14 Figure 3.3 illustrates the partial stream of tCO_2e for two BioCF projects with a 30-year crediting period. One is a reforestation project planting 4,000 ha with a mixture of native and introduced species and a first harvest happening at Year 10. The other is a forest restoration project planting close to 14,000 ha of land with native species; no harvesting is planned. The figure also illustrates the amount of tCERs and lCERs both projects would produce during the ERPA term. Assuming a $5 price per tCO_2e, the contract value until 2017[13] for tCERs in project 1 is about $2.8 million compared with $1.76 million for lCERs. Similarly, in project 2 the value of the contract with tCERs is $4.8 million compared to $3.8 million if using lCERs. This is a hypothetical example which uses the same price for the tCER and lCER; however, no market information exists for lCERs and it is uncertain that an lCER would be the same as the price of a tCER.

3.15 In addition to the income stream derived from the BioCF ERPA contract, when the 2012 vintage of tCERs expire after 2017 the project developer is free to issue new carbon credits and sell them to another buyer (or the same, if applicable). In this scenario, project 1 could accrue about $4 million after 2017 from its stream of tCERs instead of $1.76 million from lCERs. Similarly project 2 could accrue $5.8 million after 2017 from its stream of tCERs instead of $3.8 million from lCERs.

3.4 Challenges in Applying the tCERs Accounting Method

3.16 Because the experience of the BioCF relates to tCERs, subsequent sections focus on issues related only to tCERs. In addition, the challenges highlighted are particular to the strategies used by BioCF participants to replace their temporary forest credits.

3.4.1 For Buyers

3.17 The concept of temporary crediting has been difficult to apply mainly because it relies on the existence of subsequent Kyoto Protocol commitment periods. For example, because of the "replacement rule" the price of a tCER was calculated as the difference between current prices of CERs and the discounted price of a CER to be generated post-2012. Participants of the BioCF were only willing to acquire forestry credits because the BioCF can package tCERs with replacement credits for which information on project risks is available. This was possible because the BioCF is housed within the World Bank that manages other carbon funds, where credits from projects in other sectors are being generated and could be used as sources of replacement credits.[14] Even so, this has not been an easy task as estimation of future prices of CERs is highly speculative given the uncertainty of the carbon market.

11 One lCER ERPA was negotiated and signed, but the project developer subsequently changed it to a tCER contract.

12 This can also depend on the difference in price between the two types of assets.

13 The value of ERPAs until 2017 were discounted at a 10-percent rate for the purpose of this exercise.

14 BioCF participants have to acquire replacement credits generated in other World Bank CDM projects; acquiring them from projects generated elsewhere would be costly as it would require assessing such projects against the World Bank's safeguard policies.

3.18 Another challenge in applying temporary crediting is that there is very little supply for replacement credits. Sellers of permanent CERs are willing to receive low prices for their future vintages of credits when they can benefit from this (e.g., by being paid in advance as a way to close their financing gap). This situation not only increases the risks for both buyers and sellers of replacement credits, but also the transaction costs.

3.19 Indeed, involving the buyers of forestry credits in risky forward purchases of replacement credits negatively affects the demand for CDM forestry credits. To back up advance purchases of CERs, sellers have to secure a letter of guarantee. In one case, after a thorough analysis of the risks involved, the BioCF's participants agreed to purchase forward CERs from a CDM non-forest project provided that the project entity presented a letter of guarantee issued by a commercial bank to hedge against the under-delivery and noncompliance risks. Local commercial banks, however, refused to issue a letter of guarantee for a seven-year forward purchase transaction[15] because the time span of the transaction exceeded their standard.[16] In addition, the seller of the carbon credits was unwilling to cover the cost of such a guarantee, which for just a four-year transaction would have represented two percent of the guaranteed amount. This would have reduced even further the earnings from the sale of credits and eventually discouraged the seller from entering into the agreement.

3.20 BioCF participants decided to acquire the replacement credits as soon as possible and only used CDM projects as sources of replacement credits. Their motivation for this was to minimize their risks and to benefit as much as possible from the relative maturity of the CER markets. Notwithstanding this, both the BioCF and sellers of credits have had difficulty in agreeing on future prices of CERs and discount rates for forward purchases of credits. The BioCF participants' options were also bound by the need for projects generating CERs to comply with the World Bank's environmental and social safeguard policies. Acquiring CERs from projects outside the World Bank portfolio would have required project developers to demonstrate their compliance with such policies, which would have added transaction costs.

Natural regeneration is taking place on severely degraded lands in the Humbo Ethiopia Assisted Natural Regeneration Project with some supplemental planting.

3.4.2 For Sellers of Forest Carbon Credits

3.21 Carbon finance is intended to help forest projects overcome prohibitive investment and financial barriers; the reduced prices of forest credits resulting from the "replacement rule," however, limit such potential. The time span between verifications, which relates to non-permanence as each project is expected to have only one verification every commitment period of the Kyoto Protocol, also limits the impact that carbon finance can have on forestry projects The first verification usually starts when projects have sequestered enough carbon to collect at least enough carbon revenues to cover the transaction costs of meeting the CDM requirements; subsequent verification will occur at a five-year interval. Since the projects receive carbon revenues upon certification, carbon finance does not contribute to covering the high upfront investment required in forestry projects[17] and the maintenance costs do not materialize for a number of years.

3.22 Allowing flexibility in verification timing and intervals could benefit projects that can afford the costs associated with more frequent verifications. This would also reduce the under-delivery risk of projects involving multiple farmers, as timely carbon payments

15 The purchase had to be done in 2010 for vintages of CERs to be delivered from 2013 to 2017.

16 Another reason for this may have been that the local commercial bank was not equipped to understand CDM risks.

17 Carbon credits, however, can help secure debt financing backed by future carbon flows to inject as upfront financing. See Chapter 6 for more discussion on challenges to achieve this.

would increase their interest in maintaining the trees in the long run. In the absence of such an option, the BioCF participants and other buyers of forestry credits have to make upfront investments to cover project preparation costs as a way to recognize the difficulty of a cash flow limited to once every five years and after verification. For example, the BioCF included in its ERPA contracts a provision that allows for annual payments to projects based on successful project validation (and other conditions as defined on a project-by-project basis). Unlike most buyers, however, the BioCF's participants take on the risk of converting the validated emission reductions into tCERs.

3.4.3 Price of Temporary Credits and Cost of Carbon Sequestration

3.23 Low prices for forest credits may not cover the cost of sequestering carbon in different types of projects. As stated before, prices for credits generated in forestry CDM projects are low because they are discounted from prices of credits generated in other CDM projects (see Paragraph 3.17). This makes the viability of forest carbon projects highly dependent upon scale and species type, discouraging small-scale[18] projects and those planting slow-growing species. The revenues from the sale of carbon might not be sufficient to cover all project costs as there are also additional environmental services that might be provided, yet carbon cash flows are the only revenue. In projects of a more commercial nature, however, the total costs of the projects may be offset by the revenues from timber or other products.

3.24 Overall, with low carbon prices, carbon finance is doing little to help forest projects overcome the disproportionately large financial barriers to investment they usually face in developing countries (See Chapter 6). As a result of the "replacement rule," prices paid by the BioCF per validated tCO_2e are low, ranging between $4-5 per unit.

3.4.4 Temporary Crediting and Long-term Carbon Sequestration

3.25 The accounting methods for forestry credits do not provide appropriate incentives for long-term carbon sequestration. The fact that tCERs can be replaced with other tCERs offers a window of opportunity to increase the demand for tCERs by developers of these projects. In practice, however, buyers of forestry credits (i.e., the BioCF's participants) have not been willing to use tCERs for replacement purposes mainly because of their interest in bringing forward the "final" replacement in order to avoid the greater uncertainty associated with acquiring replacement credits.[19]

3.26 Had BioCF's participants selected tCERs as sources of replacement credits, their projects would not have been able to supply tCERs in a continuous manner as temporary credits cannot be renewed beyond the final project crediting period. For example, even when a project planting for environmental purposes could supply tCERs over a number of commitment periods (provided that the carbon remains sequestered), once the crediting period ends the Annex B country would stop buying credits from the project and replace the tCERs with permanent assets (e.g., CERs, AAUs, ERUs, and RMUs) or with tCERs from another project. This rule could perversely encourage the carbon sequestered in trees to be released into the atmosphere immediately after the end of the crediting period.

3.4.5 Fungibility of Forestry Credits

3.27 The lack of fungibility of tCERs with units generated via other mechanisms of the Kyoto Protocol limits the demand for this type of credit. The European Union's provisions regarding forestry CDM credits exemplify this; European private companies are not allowed to use forestry CDM credits to achieve their emission reduction commitments. The lack of fungibility of forestry credits with other CERs and European Union Allowances, along with difficulties in addressing the liability of replacements, have been important reasons for excluding forestry credits from the European Union Emissions Trading Scheme[20]

18 Although the UNFCCC defined simplified modalities and procedures for small-scale projects, four BioCF small-scale projects have proven that this has not contributed to reducing transaction costs in a significant manner. See Chapter 6, Finance, for more information on transaction costs.

19 Other buyers, however, may find attractive the option of using tCERs as source of replacement credits.

20 In 2005 the European Union established its Emissions Trading Scheme, a cap-and-trade system to limit the GHG emissions of companies from the electric power industry and certain industrial sectors of its country members' economies. Under ETS, EU member states determined the total amount of allowances and distributed them among their own facilities. These facilities were then enabled to trade allowances. The first trading period was from 2005-2007; the second one is running from 2008-2012. The EU-ETS created the "linking directive" to allow the companies to use credits from the CDM and joint implementation to comply with their commitments. The companies were allowed to use credits from all CDM sectors except A/R for compliance.

Box 3.1

The Forest Carbon Market

LULUCF assets continue to be a marginal piece of the CDM carbon market. They represent only ten percent of the volume transacted in 2010 in the CDM (World Bank, 2010a). The greatest forestry activity is still in the voluntary market, with 73.3 million tCO_2e (equivalent to $297.8 million) transacted as of today, of which close to 40 percent in volume and 44 in value was transacted in 2010 only (Diaz et al., 2011). Overall, 2010 was a record year for activity in the voluntary carbon markets; while the volumes remain low (e.g., less than 0.3 percent of the global carbon markets), transaction volumes increased 28 percent between 2009 and 2010 (World Bank, 2011).

TABLE 3.1 VOLUME AND VALUE OF THE FOREST CARBON MARKET

Markets	Volume (million tCO_2e)		Value (million $)	
	Historical Total	2010	Historical Total	2010
Voluntary Over the Counter	58.7	27.3	243.0	124.5
Chicago Climate Exchange	2.9	0.1	5.2	0.2
Total Voluntary Market	**61.6**	**27.4**	**253.3**	**124.7**
A/R CDM	7.8	1.4	32.2	6.3
New South Wales	3.1	1.1	11.8	0.0
New Zealand ETS	0.8	0.2	5.7	0.2
Total Regulated Market	**11.7**	**2.7**	**49.6**	**6.4**
Total Global Market	**73.3**	**30.1**	**297.8**	**131.1**

The greatest forestry activity is in the voluntary over-the-counter market (driven without any sort of emission cap), with 80 percent of the historical value transacted to date. In comparison to the overall carbon market for forestry assets, the A/R CDM market represents 0.14 percent of the value of transactions to date. This low proportion is primarily due to the fact that there are no tCERs issued in the market thus far. A large proportion of the CDM A/R transactions represent direct payments made to BioCF projects in the form of advanced annual ERPA payments (Hamilton et al., 2010).

While the historical volume-weighted average price for forest carbon credits is around $6/$tCO_2e$, the State of the Forest Carbon Markets 2011 also reveals some interesting differences in prices across markets, reflecting the different nature of forest carbon assets. Average historical prices for A/R credits were reported as $4.27/ton, a similar value if compared with REDD credits ($5/ton) and credits ($6/ton) generated from Improved Forest Management projects (Peters-Stanley, M. et al., 2011).

(Dutschke, 2010).[21] Because the EU-ETS became the most important market for CERs, such exclusion resulted in a severe reduction in the demand for forestry credits during the first commitment period of the Kyoto Protocol. Even governments, which have the ability to use a limited amount of LULUCF assets, have barely acquired any of them. This is reflected in the composition of BioCF participants.[22]

3.28 The result of these linking issues is that no other crediting programs in operation use these temporary credits. In addition, concerns about permanence of reductions, accuracy of monitoring, and "flooding of the market" continue to keep LULUCF assets outside most emission trading schemes (e.g., EU-ETS and the New Zealand Emission Trading

21 In analyzing the possibility of allowing credits from forest projects into the EU-ETS, the European Commission concluded that the fact that forest projects cannot deliver permanent emission reductions could undermine the environmental integrity of the system. The commission considered that insufficient solutions have been developed to deal with uncertainties, non-permanence, and leakage arising from this type of project. The EC concluded that the temporary and reversible nature of such activities would pose considerable risks to the EU-ETS and impose greater liability risks on member states (European Commission, 2008).

22 The BioCF includes six governmental entities and 12 private companies. Five of the governments are European and the Government of Canada. Eight of the private companies are Japanese and four are global.

Scheme). All this negatively affects the attractiveness of forestry credits for buyers and reduces market liquidity (Dutschke and Schlamadinger, 2003; Lecocq and Couture 2008). The impact of the low demand in the forest carbon market is illustrated in Box 3.1. These assets might enjoy a new relevance and value should they be accepted into future emission trading schemes (World Bank, 2010a).

3.5 Other Approaches to Non-permanence

3.29 Non-permanence has been intensively debated, and the debate did not stop with the UNFCCC's decision to adopt the "expiring" credit approach. Many, for example, have argued that the emission reductions originating from some energy projects (e.g., avoidance of fossil fuel use) should also be considered temporary if the non-extracted fossil fuel were to be used in the future with subsequent GHG emissions releases (see, for example, Noble et al., 2000; Pedroni, 2005). Alternatively, to maintain consistency among all types of credits, forest carbon credits should also be considered permanent. Others recognize the temporary nature of forest carbon credits but consider that developers should be allowed to select the most suitable approach to non-permanence for their projects.

3.30 As the discussions on the rules for LULUCF activities are ongoing in the UNFCCC, negotiators from developing countries are analyzing new proposals for consideration in the negotiations of the Kyoto Protocol's next commitment period.[23] Negotiators on the Ad Hoc Working Group on further commitments for Annex B Parties under the Kyoto Protocol suggested[24] alternative approaches in 2009 that allow for the issuance of permanent carbon credits from LULUCF projects. These approaches involve the host country taking responsibility for reversals, insurance, buffers and credit reserves, exceptions for low-risk activities, and accounting for emissions from harvesting of forests. The text approved in COP16 in Cancún includes in brackets the following statement: "Alternative approaches to addressing the risk of non-permanence may apply in accordance with any further decision of the COP." The COP also requested that the Subsidiary Body for Scientific and Technological Advice initiate a work program "to consider as appropriate, develop, and recommend modalities and procedures for alternative approaches to addressing the risk of non-permanence with a view of forwarding a draft decision on this matter to the COP17."[25]

3.31 Project developers, negotiators, and organizations involved in LULUCF projects are working to improve their understanding of the implications, advantages, and disadvantages of alternative approaches to non-permanence.[26] While some of these approaches are already being tested in the voluntary carbon market (i.e., the buffer approach) and in LULUCF joint implementation projects (i.e., host party taking responsibility for reversals), others have only been mentioned in the forest carbon literature as interesting options**.** Examples of criteria often used to assess the different possible approaches are listed below:

- Scope (e.g., type of actual GHG emissions, and may include harvest wood products);
- Simplicity (e.g., simple to estimate the risk, and the resulting units can be easily transacted);
- Cost efficiency (e.g., administrative costs and risk-mitigation costs);
- Dependence on enforceability of relevant national policies (e.g., due to non-payment of risk premium);
- Type of coverage provided (e.g., ability to cover a large number of projects);
- Guarantees to sovereignty (e.g., allow host countries to develop and implement their own solutions to non-permanence);
- Consistency with the approach for managing reversals for LULUCF activities in Annex B countries and in joint implementation projects;
- Level of protection to compensate in the event of non-permanence;
- Assurance that host countries will have the financial means to compensate for eventual reversals; and
- Availability (e.g., availability of policy insurance than can be purchased by project developers).

23 FCCC/KP/AWG/2010/18/Add.1. For example, negotiators have highlighted the need to indentify approaches that simplify the accounting rules (FCCC/KP/AWG/2008/3). Others still consider that the temporary crediting approach should be an available option (FCCC/KP/AWG/2009/INF.2).

24 FCCC/KP/AWG/2009/INF.2.

25 FCCC/KP/AWG/2010/18/Add.1.

26 See for example Lecocq and Couture, 2008; Scholz and Jung, 2008.

3.6 Recommendations

3.32 Below are some recommendations that should be considered by policymakers and the CDM EB. Risk management measures and best practices to reduce the risk of reversal and project non-permanence are presented in chapter 8.

FOR THE CMP

- Allow A/R CDM projects to select from a variety of approaches to non-permanence in addition to the temporary crediting approach. Some of these are being tested in the voluntary carbon market, and lessons can be learned from this experience (see Paragraphs 3.29–3.31). The new approach(es) to non-permanence should avoid putting forestry credits at a disadvantage. They should be designed bearing in mind that complex credits that are not fungible with other carbon assets lead to a lack of demand for forestry credits (see Paragraphs 3.27–3.28) and to low prices, which negatively affects project viability, reducing the carbon finance's potential to support forest projects (see Paragraphs 3.23–3.24 and Chapter 6).
- In designing a new approach to non-permanence for forestry credits, consider flexibility in the number of verifications per commitment period and allowing projects with a high volume of credits to use shorter periods so that carbon revenues can help improve the cash flowing into projects (see Paragraphs 3.21–3.22).
- Change crediting rules to encourage long-term carbon sequestration by considering renewal of credits beyond the crediting period. This will favor projects reforesting for conservation purposes (see Paragraph 3.25).

FOR MARKET PLAYERS

- Developed countries committed to reducing emissions should support the A/R CDM by ensuring a demand for credits, recognizing that:
  - —A/R CDM projects contribute to climate mitigation as well as to improving rural livelihoods;
  - —Credits from A/R CDM project activities are produced in a rigorous manner, as they are based on conventional forest inventory techniques, which are independently audited;
  - —Projects apply safeguards to avoid, minimize, and/or mitigate potential risks to the local environments and to communities' livelihoods. Some projects go even further—certifying their project designs as a way to ensure the delivery of positive net co-benefits; and that
  - —All stakeholders continue to make efforts to improve the A/R CDM and realize the emission reduction potential of A/R projects (see Paragraphs 3.27–3.28 and Box 3.1).

4 Land-related Issues

4.1 Introduction

4.1 Land eligibility, project boundary, and land tenure rules are part of the Afforestation and Reforestation (A/R) Clean Development Mechanism CDM's regulatory framework. Overall, the BioCF experience demonstrates that the A/R CDM land-related rules need to be more pragmatic to accommodate the reality on-the-ground. The objective of this chapter is to provide insights into project developers' challenges in applying the A/R CDM land-related rules.

4.2 The project boundary and land eligibility rules have increased transaction costs and delayed project implementation. There are two main reasons for this: (i) In many developing countries, there is little or no reliable data to prove that the project land was not forested on December 31, 1989; and (ii) project developers often lack the capacity to interpret satellite imagery and delineate project boundaries. The project boundary and land eligibility rules need to be reformed. As of now, these rules exclude many areas with important carbon sequestration potential from participating in the CDM and lead to fragmented projects with lower environmental benefits, greater risks for social conflicts, and increased costs. The Executive Board (EB) of the CDM should consider changing the land eligibility and project boundary rules to address these issues while maintaining the environmental integrity of A/R projects and avoiding perverse incentives.

4.3 With the right institutional mechanisms in place, projects in areas with different land tenure situations can ensure the permanence of the forest carbon activity. There is evidence of this in some BioCF projects. The right institutional instruments are agreements that regulate land use changes and clarify land tenure rights and the legal transferability of the carbon asset. Carbon finance can therefore be an important instrument to trigger land tenure changes on the ground. This process nevertheless comes at a cost.

4.4 These findings are explained in detail in this chapter. Section 4.2 focuses on the rules for land eligibility, project boundary, and control over the land. Section 4.3 examines the CDM land tenure requirements and the BioCF experience implementing projects in areas with different land tenure circumstances. Finally, Section 4.4 offers some recommendations.

4.2 Land Eligibility and Project Boundary

4.5 The UNFCCC published definitions, modalities, rules, and guidelines relating to land use, land-use change and forestry activities under the Kyoto Protocol (UNFCCC, 2006d). The definitions relevant for land eligibility and project boundary are presented in the sections below.

4.2.1 Land Eligibility

4.6 The land eligibility and project boundary rules determine the areas where A/R projects can be implemented during the crediting period.[1] The land eligibility rule requires project developers to demonstrate that when the project start and on December 31, 1989, the project areas do not qualify as forests (UNFCCC, 2006d).[2] Project developers must assess vegetation against crown cover, tree height, and minimum area indicators according to the definition of a forest communicated by the respective DNAs[3] to the UNFCCC. They must also demonstrate that non-forest lands are not temporarily unstocked and that, without human intervention, existing young vegetation or plantations do not have the potential to become forests (UNFCCC, 2005a). The dates of the existing materials that serve as evidence of the land use and land cover in the project area depend on whether the project is planning to afforest or reforest the lands. Afforestation activities are implemented on lands that have been unstocked for at least 50 years from the project starting date, while reforestation activities are implemented on non-forested lands that did not have forests on December 31, 1989 (UNFCCC, 2006d).

4.7 The information required to demonstrate land eligibility includes aerial photography or satellite imagery complemented by ground reference data, land use or cover information from ground-based surveys (including registers), and written testimonies produced by following a participatory rural appraisal whenever remote sensing and surveys are not available or applicable (UNFCCC, 2005a).

4.2.2 Project Boundary

4.8 The project boundary rule, refers to the geographic delineation of lands controlled by the project developer. The project boundary can be one single area or the sum of several discrete areas, each of which has to have a unique identification (UNFCCC, 2006b). Verifiable boundary demarcation is used to clearly identify project sites at validation and verification. At validation, project developers have to provide delineation of the entire project area. The fact that project developers must provide evidence of their control over at least two-thirds of the afforestation/reforestation activity by the validation date is usually known as the "control over the project" rule. The term "control over the project activity" is not explicitly defined by the CDM EB, but it is usually interpreted by project developers in legal or financial terms (ITTO, 2006). Thus, at validation, project developers usually provide land-use contracts between the project entity and landowners as evidence of their right to collect the CERs from the project land areas; the contracts to prove control over the remainder of the project is provided at verification, and thus control over total project is fixed (UNFCCC, 2008a).

4.2.3 Land Eligibility and Project Boundary in the BioCF Portfolio

4.9 In the BioCF, land eligibility has been a key criterion for project selection. Project developers are required to present a first assessment of the land status and land use in the baseline. For many projects developed between 2004 and 2007, the land eligibility analysis was at first poorly done or did not reflect

1 The crediting period for A/R CDM projects can be either 30-year single or 20-year renewable twice.

2 "Forest" is a minimum area of land of 0.05–1.0 hectare with tree crown cover (or equivalent stocking level) of more than 10–30 percent with trees with the potential to reach a minimum height of 2–5 meters at maturity in situ. A forest may consist either of closed forest formations where trees of various storey and undergrowth cover a high proportion of the ground or open forest. Young natural stands and all plantations which have yet to reach a crown density of 10–30 percent or tree height of 2–5 meters are included under forest, as are areas normally forming part of the forest area which are temporarily unstocked as a result of human intervention (such as harvesting or natural causes) but which are expected to revert to forest.

3 See Chapter 2 for a description of DNAs, as well as http://cdm.unfccc.int.

Box 4.1

Project Boundary and Land Eligibility Assessment in the Moldova Soil Conservation Project

Moldsilva, the national forest agency of the Republic of Moldova, is implementing the Moldova Soil Conservation project through 23 forest enterprises. Forty percent of the land involved in this project is owned by Moldsilva; the remainder is owned by 384 local councils representing local communities. Through this project, Moldsilva has reforested around 20,000 ha of multiple-purpose forests established on degraded lands in the northern, central, and southern regions of the country.

This project addresses a severe environmental problem affecting the Republic of Moldova. Over past decades the country has undergone a severe soil erosion that has affected land productivity and caused an estimated $1.5 billion in economic losses. The project will restore the productivity of degraded lands, glades, and abandoned arable lands. By doing this, it will enhance forest product supplies to local communities, protect threatened species, improve the ecological succession, and restore the habitats of endangered flora and fauna. Most areas are planted with a mix of native and naturalized locally adaptive species.[1]

The Moldova Soil Conservation project was designed in 2002 when CDM rules did not exist. This project was part of the World Bank Prototype Carbon Fund and the BioCarbon Fund, and was one of the world's first forest carbon projects. It adopted the CDM rules in 2003 and adjusted to all rule changes up to 2008, when it was validated. In early 2009, the project became the second A/R project ever to be registered in the CDM. The project expects to sequester more than 3.5 million tCO_2e over 20 years (2002-2022).

LAND ELIGIBILITY

Compliance with the definition of A/R: The developer demonstrated that project land areas had been degraded and not planted for the past 50 years, confirming the project's compliance with the definition of afforestation.

Land cover/use assessment: Official land-use records and land administration documentation from 1989 were used to demonstrate that the degraded status of the lands prevents its vegetation from reaching the forest thresholds as defined by the Republic of Moldova.[2] This documentation was complemented with ground reference data. Land cover values for intermediate years (1995 and 2005) were provided based on analysis of land productivity. Such analysis drew from information available in land-use plans and other local registers (e.g., cadastre, land-use, or land-management registers, and so forth). The results of this analysis confirmed that the productivity of the lands had decreased over time.

PROJECT BOUNDARIES

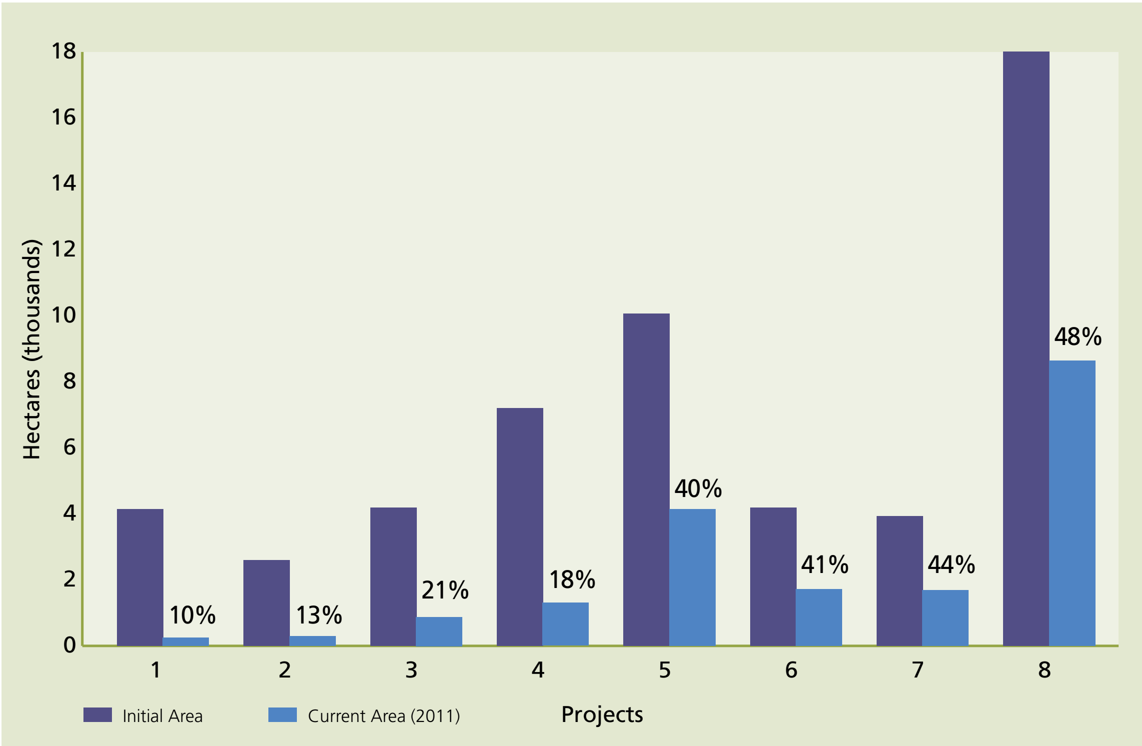
As a result of the land eligibility analysis, the project boundaries were defined to cover all the districts of the country except for the eastern region of Transnistria. It is spread over 2,421 sites with a size ranging from 0.25 to more than 50 ha. About half of the total area is represented by planting sites that are under 15 ha. The project used standard forestry practices combined with the Global Positioning System (GPS) to delineate project boundaries and to verify its planting sites. GPS coordinates were recorded and archived in a database.

1 Native species are, for example, English oak *(Quercus robur)*, European ash *(Fraxinus excelsior)*, white willow *(Salix alba)*, white poplar *(Populus alba)*, and black poplar *(Populus nigra)*, etc. Non-native species include black locust *(Robinia pseudoacacia)*, honey locust *(Gleditschia triachantos)*, Japanese pagoda trees *(Sophora japonica)*, Russian olive trees *(Elaeagnus angustifolia)*, and Austrian pine *(Pinus nigra)*, among others.

2 Minimum tree crown cover: 30 percent; minimum land area: 0.25 ha; minimum tree height: 5 m.

the most updated rules. By 2011, almost half of the projects in the BioCF portfolio had finalized their land eligibility assessments and defined the project boundary (Box 4.1). Some projects are undertaking monitoring of the project boundary, which will help project developers understand whether the project has been implemented within the projected boundaries and demonstrate control over the entire project land area (see Chapter 4).

FIGURE 4.1 CHANGE IN AREA IN EIGHT BioCF PROJECTS



4.2.4 Challenges Related to the Land Eligibility and Project Boundary Rules

4.10 Many BioCF projects have struggled with undertaking a comprehensive land eligibility analysis and determining their boundaries. As a result of these challenges, some projects have not only changed their envisioned plot locations but have also significantly reduced the total area. Figure 4.1 illustrates this situation for eight projects.

4.11 For some projects, getting land assessments approved at validation has not been a straightforward task. Project developers with projects currently under validation have had intense communications with validators around land eligibility and project boundaries. An analysis of the CARs presented by DOEs for 11 BioCF projects reveals the types of problems that developers typically face (Table 4.1).

4.12 There are three main reasons why understanding and consistently applying the land eligibility and project boundary rules have been a great challenge for project developers. First, the CDM EB has changed the rules several times over time, making it difficult for project developers to follow the modifications and to reflect the latest versions of the rules in their PDDs. Second, project developers' low local technical capacity both for gathering and analyzing satellite imagery and for reporting and following guidelines, combined with technology constraints, resulted in poor land eligibility analysis and project boundary delimitation. Third, the rules are often incompatible with the reality on the ground. These three reasons are discussed below.

Changes in Land Eligibility and Project Boundary Rules

4.13 The CDM EB has introduced several changes to the land eligibility and project boundary rules. For example, between 2005 and 2008 the CDM EB published three versions of procedures, two guidance notes, and one clarification related to the land eligibility rule (see Paragraph 2.10). The first two versions of procedures were designed in great detail, then later simplified at the request of project developers and the COP. For example, in 2006 the CDM EB requested that project developers provide evidence of land cover/use for at least four representative years to show compliance with the afforestation definition (UNFCCC, 2005a; UNFCCC, 2006e; UNFCCC, 2006g; UNFCCC, 2007i). This procedure was simplified

TABLE 4.1 FREQUENT PROBLEMS PROJECT DEVELOPERS FACE AT VALIDATION ON LAND-RELATED ISSUES

Type of Problem	Frequency (n=11)	Examples
Differences in interpretation of rules and requirements between validators and project developers	9%	The land eligibility analysis was done based on two specific time periods. This was considered insufficient evidence by the validator.
	27%	The land eligibility assessment was not done at the level of the minimum area as per the forest definition of the host country.
	100%	The process of identification of eligible areas was not documented in a transparent manner in the PDD. Some validators do not accept statements in the PDD that documentation is available upon request. Often, the validator requires that high quality maps, lists of discrete areas, and Geographic Information System (GIS) files be included in the PDD.
Inconsistencies throughout the PDD	18%	The size of discrete parcels is cited differently in the forest management plan and the GIS maps.
	27%	Areas within the project boundary were not consistent with national forest definitions.
	37%	Calculated areas in the PDD were not the same as those presented in the GIS.
Technology constraints	18%	GPS has low accuracy.
	27%	Satellite images have low resolution, which make it difficult to assess the vegetation against indicators of a particular forest definition.
Poor understanding of the rules	55%	Individual plots were not properly identified.
	18%	The developer used an outdated version of the procedure for land eligibility assessment.
	27%	No evidence was provided to demonstrate that lands were not forested on the project start date.
	27%	Temporary unstocked examination to prove that the land would not revert to forest was not done on a discrete site basis.
	9%	There was a poor description of current land use to document pressure on existing land cover.
	18%	Assessment of vegetation status between the available image date and 1990 was not provided.

in 2008 as the CDM EB revoked the requirement to differentiate between afforestation and reforestation (UNFCCC, 2008a). Similarly, changes were introduced to reduce the level of stringency required to approve the remote sensing analysis so that evidence of the consistency of the remote sensing assessment is no longer required.

4.14 An important change to the project boundary rule happened in 2008. This change was driven by requests from developers of multi-stakeholder projects who highlighted their challenges in identifying, by the validation date, the total amount of land for a viable activity. To address this issue, the CDM EB reduced the minimum area that must be geographically delineated by the time of validation to two-thirds of the project's total area (UNFCCC, 2008i). While this change to the project boundary rules is essential, it came too late for some early projects (See Paragraph 6.18).

4.15 Project development can be smoother now because the land-eligibility-related rules are simpler; BioCF projects that started their development from 2009 onward have benefited from the CDM EB improvements. Still, projects in tropical climates face challenges in demonstrating land eligibility (see Paragraphs 4.22).

Low Local Capacity and Technology Constraints

4.16 Both changes in rules and the lack of local capacity have affected project developers' ability to understand the land eligibility and project boundary procedures and resulted in discrepancies in the interpretation of the requirements. In the early days of the A/R CDM, developers struggled with understanding the concept of a project boundary. Although it was clear in the rules that the project boundary refer to the sum of discrete planting areas, project developers accounted for carbon sequestered outside of the project boundaries, thus overestimating their project's emission reductions. For many of them, the very notion of GHG accounting and discrete parcels was difficult to understand. The CDM EB had to clarify this issue in 2006 (UNFCCC, 2006g; UNFCCC, 2007c). Similarly, because of the lack of understanding of the rules, many early project developers made their land-use assessments without considering their CDM national forest definition.

4.17 The land eligibility rule also highlighted discrepancies in rule interpretation between validators and project developers. In many BioCF projects, the validators considered that the information and evidence provided by the project developers was not sufficient to satisfy the CDM project boundary and land eligibility requirements. While project developers understood that discrimination between forest and non-forest land should be done at the discrete area level, in many cases validators requested that they make their assessments according to the parameters included in the national forest definition. Similarly, project developers struggled with getting adequate information on the land-related rules at the start of validation; most of them considered that additional information could be provided at the request of the validator if needed—but validators wanted all the information included in the early stages of PDD assessment.

4.18 The lack of local technical training, combined with technology constraints, have also greatly affected project developers' ability to comply effectively with the project boundary and land eligibility rules. The CARs for some BioCF projects reported issues such as a discrepancy among areas accounted for in the GPS map, the land cadastre, the PDD, and the land management plan. Other projects faced technology problems where, for example, the GIS maps and satellite images did not line up due to differences in quality or issues of granularity (Table 4.1). This meant that the land eligibility analysis, which includes closer examination through field visits, had to be redone several times. This significantly increased transaction costs and, in some cases, reduced a project's size.

4.19 Although the A/R CDM rules also allow for the use of participatory rural appraisal techniques to report on land use/cover, project developers have found it difficult to make reliable assessments of past land uses. The land eligibility rule should be reformulated to recognize the lack of official (reliable) data on land use/cover in developing countries, GIS technology limitations, and project developers' difficulty in presenting reliable data obtained via participatory

Project boundaries in the Assisted Natural Regeneration of Degraded Lands in Albania Project.

Box 4.2

Land Eligibility Challenges in the San Nicolas Project, Colombia

The San Nicolas Carbon Sink and Arboreal Species Recovery project planned to reforest about 1,000 ha of degraded, unmanaged pasture lands. The project entity, "Corporación Mas Bosques," is a public-private nonprofit organization created specifically to manage the CDM project.

LAND ELIGIBILITY CHALLENGE: TEMPORARILY STOCKED AREAS

Because of land eligibility issues the project postponed its implementation for 2-3 years in areas where contracts had already been signed between farmers and the project entity. It was extremely difficult for Mas Bosques to find enough areas that satisfied the land eligibility rule to make the project feasible. By the time the planting activities were supposed to start, the vegetation in some of the areas that had been previously identified naturally regenerated to the extent that the areas reached the threshold of the Colombian forestry definition. Another group of farmers had to leave the project and the implementation was delayed even further.

The project area continued to change due to eligibility issues and, in 2009, after a new land eligibility study, the project entity started yet another campaign to convince potential farmers to sign up. The new areas are remotely located, which will increase implementation and supervision costs and negatively impact project feasibility. Besides incurring extra costs searching for new areas, the project spent a lot of time building capacity in areas that were later excluded from the project.

processes. These issues make the land eligibility assessment costly.

4.20 In addition, the "1989 land eligibility" rule excludes areas where deforestation has happened after 1990. In some cases, areas neighboring the projects are excluded from participating because of this rule, negatively affecting social, ecological, and financial aspects of projects. As long as safeguards are in place to ensure the ecological integrity of A/R CDM projects, efforts to reforest lands deforested after 1989 should be supported. A possible alternative to this would be to demand proof that the area has been deforested for at least 10 years before the beginning of the project, as this is already required by some standards in the voluntary carbon market. Flexibility could also be added with regards to the nature of deforestation. Lands deforested due to natural causes should be eligible for deforestation regardless the deforestation date.

Exclusion of Temporarily Stocked Areas

4.21 The land eligibility rule assumes that any vegetation that has reached the forest threshold by the validation date[4] will remain forested in the long run regardless of land-use pressures. This is not necessarily the case. This assumption has negatively affected projects on degraded agricultural areas and in tropical climates. Areas that have surpassed the forest threshold by the time of validation are sometimes in a fallow period and will, sooner or later, be used by multiple individuals to address their urgent need for fuel wood, grazing, and planting of agricultural products. The BioCF San Nicolas project in Colombia exemplifies this situation (Box 4.2).

4.22 Because of this issue, projects in tropical climates are not fully benefiting from the CDM EB simplification on project boundary introduced in 2008 (see Paragraph 4.14). Projects struggling with finding eligible lands lack the evidence of control over two-thirds of the project that has to be provided at validation, delaying project implementation. In some cases, finding eligible lands turned out to be a long journey (e.g., 2-4 years). Validation is delayed as project developers have to provide delineation of the complete project boundary. The project planning stage becomes inconsistent with participant landholders' dynamic land-use decisions; eligible landholders that have committed to the project usually cannot wait for the implementation of the A/R CDM project and use their lands for other purposes. This is especially true for projects planting in competitive lands (as opposed to projects located in severely degraded barren lands) and/or struggling with providing reliable evidence

4 Or any later date.

of clear legal land tenure, a requisite of A/R CDM projects.

4.3 Land Tenure

4.23 A/R CDM projects must provide in the PDD "a description of the legal title to the land, rights of access to the sequestered carbon, [and] current land tenure and land use" (UNFCCC, 2006b). This is commonly referred to as the "land tenure rule." The rule encompasses concerns with the integrity of the carbon asset and with the non-permanence of the emission reductions, and is often associated with lower levels of land tenure security.[5] Some experts argue that in areas with higher levels of land tenure security, farmers have more incentives to make long-term investments on land; this contributes to project success in terms of biomass growth and tree survival rates. Furthermore, clear land tenure is also often linked to clear carbon ownership, which reduces the risk that the carbon asset may be legally disputed.

4.24 Land tenure is defined by FAO as the bundle of rights over natural resources that defines the relationship among individuals and groups with respect to land (FAO, 2002). Land rights are social conventions, protected by the government (statutory rights) or the community (customary rights), that allow individuals or groups to benefit from different land revenue streams (Bruce and Migot-Adholla, 1994). There are different components of land tenure security. These include the scope of rights included in the bundle (e.g., rights to use, rent, mortgage, sell, give, exchange, modify, or bequeath the land), the legality (e.g., if customary or statutory), the robustness of the rights, and their duration. The importance given to each component varies according to local realities. In this section, the impact of forest carbon finance on land tenure security is examined in the context of changes in land ownership and land-use right in BioCF projects.

4.3.1 Land Tenure in the BioCF

4.25 BioCF participants are willing to invest in projects in areas with a lower level of land tenure security as long as adequate institutional mechanisms are put in place to ensure emission reductions permanence and legal transferability of the carbon rights. The BioCF experience shows that the integrity of the carbon asset and the permanence of the forest carbon project can also be assured by institutional and contractual instruments that clarify carbon ownership and ensure adequate project implementation. These institutional arrangements–Emission Reductions Purchase Agreements, Carbon Transfer Subsidiary Agreements, land-use agreements, and benefit-sharing arrangements–take into consideration both customary and statutory land rights. This gives the BioCF the flexibility to operate under different tenure conditions (Aquino et al., 2011). The details on how these institutional and contractual agreements are created and how they function are discussed in Chapter 7.

4.26 As a result of meeting the CDM requirements on land tenure, some BioCF projects manage to a) improve land tenure security; b) clarify carbon ownership rights; and c) ensure adequate project implementation. These three achievements are explained in the sections below.

Improved Land Tenure Security

4.27 Of the 21 BioCF projects, 11 were implemented in areas owned by the government and seven in areas owned by individuals who hold the legal titles to the land. Land ownership in most projects areas has remained the same. Four projects were implemented on a mix of lands that are owned by the government and private entities, including individually titled land and community-titled land. In these projects, individual and communities that had only the customary (if any) recognition of their user rights now have the formal recognition of their usufruct rights to these areas.

4.28 Carbon finance has prompted a positive change in land tenure security in the project areas. In some cases, these areas were traditionally used by individuals and/or communities for years without being formally recognized by the titular landowners (government and individuals). The prospect of developing a forest carbon project brought about new incentives and resources for the formal recognition of

5 Land tenure security is defined as the individual's confidence that his/her rights will be recognized by others and protected when challenged, as well as the ability of the individual to reap the benefits of labor and capital invested in that land (Bruce and Migot-Adholla, 1994; FAO, 2002). Land tenure insecurity arises from the individual's sense of "lacking" in single rights, combination of rights, duration of rights, or certainty of retaining rights, from the actual or risk of dispute over rights, or the risk of expropriation, among others (Place, 2009). The CDM requires a description of the legal title to the land, rights of access to the sequestered carbon, as well as current land tenure and land use; but it does not define land tenure.

TABLE 4.2 LAND TENURE CHANGES IN SOME BioCF PROJECTS

Project	Community Land		Titled Land—Full Ownership	Individual Land	
	Customary User Rights	Statutory Recognition of User Rights		Customary User Rights	Statutory Recognition of User Rights
1	**Before:** Government land customarily used by local communities →	**After:** Statutory recognition of communities' customary user rights	**Before:** Government **After:** Government		
2	**Before:** Public land under the control of the national forest service →	**After:** Forest licenses granted by the national forest service to community forest associations, recognizing community user rights	**Before:** Government **After:** Government		
3			**Before:** Government **After:** Government	**Before:** Untitled private land (customarily used by an individual) →	**After:** Privately titled land
4	**Before:** Vacant and classified forest lands →	**After:** Rural concessions, and statutory recognition of customary user rights	**Before:** Government **After:** Government and Individuals	**Before:** Untitled private land (customarily used by individuals) →	**After:** Privately titled land

*Note: The communities in project number two did not have customary user rights over the project areas before the project. These areas were public lands under the control and administration of the national forest service. The communities gained the statutory right to use the government land for the implementation of the BioCF project.

the customary user rights of these individuals and/or communities.

4.29 It is important to note that broad incentives for the recognition of land-use rights in project areas may also be in place in other development projects. What is unique to forest carbon projects is the introduction of a new incentive, the right to carbon, in the bundle of land rights. Rights to carbon are well defined from the beginning of the project. They also influence other user rights to the land, therefore contributing to the overall process of securing land tenure. Four BioCF projects exemplify this situation. In project number two (see Table 4.2), the government also granted user rights in the project areas to local participants but, unlike the other projects, these individuals did not customarily use the areas before the project.

4.30 Carbon finance has prompted a positive change in land tenure security in the project areas. In some cases, these areas were traditionally used by individuals and/or communities for years before the project without being formally recognized by the titular landowners (government and individuals). The prospect of developing a forest carbon project brought about new incentives and resources for the formal recognition of the customary user rights of these individuals and/or communities. Box 4.3 presents a detailed example of the BioCF project in Niger.

4.31 Securing land tenure may also be achieved through other means, including recognition of rights by the community (social recognition), the government (political recognition), and formal legal systems (such as legal titles and contracts). In BioCF projects, processes to secure land tenure are triggered by the institutional arrangements used to clarify the carbon ownership and ensure adequate project implementation.

Clarification of Carbon Ownership Rights

4.32 Clarifying carbon ownership rights allows buyers and sellers to trade carbon as a commodity. Since most countries currently do not have national legislation defining carbon ownership, projects rely on private contracts and other project-level mechanisms to determine ownership. Project entities make

Box 4.3

Evidence of Increased Land Tenure Security in the Niger Acacia Senegal Plantation Project

This project aims to reforest over 8,000 ha of *Acacia senegal* on communal degraded land spread throughout the country. This project is expected to produce Arabic gum, sequester carbon, and have other local environmental benefits. The initiative is led by a local private company, Achats Service International, in partnership with the Ministry of Agriculture and Livestock and with support from the Ministry of Water, the Environment, and the Fight against Desertification.

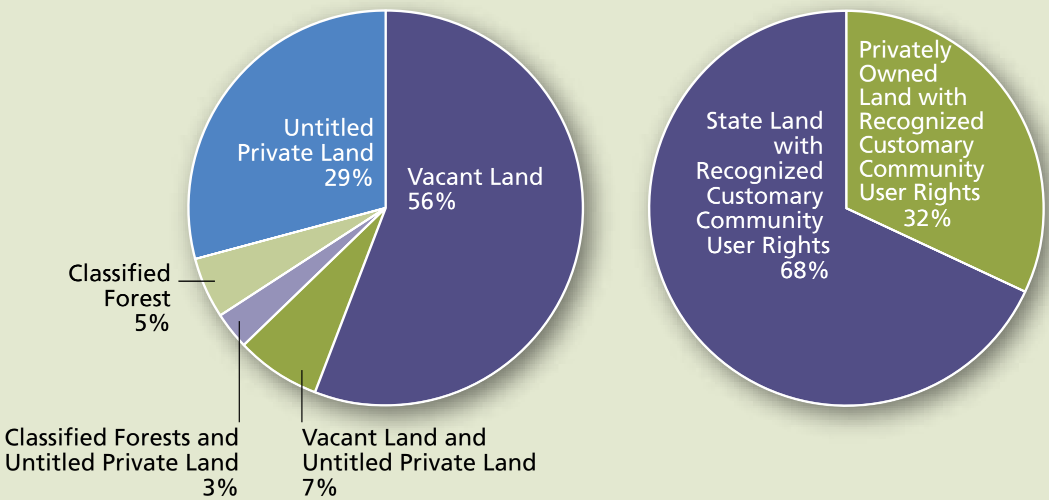
LAND TENURE IN THE PROJECT AREA

The pre- and post-project land tenure situation is presented in the charts below. Before project preparation, there were three main types of land tenure in the project area:

- Untitled private land: Individual property recognized by the customary leaders but not formally titled according to statutory law. These lands are usually used as croplands.
- Vacant land: A communal area used by local farmers and other peasants where no proof of property rights can be established. These lands belong to the government. Nobody, including the government, has exercised ownership rights.
- Classified forests: These are lands formally titled to the government and managed by the forest department. These areas are protected areas in use mainly for conservation purposes.

FIGURE 4.2 LAND TENURE SITUATION BEFORE AND AFTER PROJECT IMPLEMENTATION (26 PROJECT SITES)

Every site in the project area has gone through some level of change in its tenure status. There are two main trends:



- In untitled private lands (cropland), the process of statutory recognition of customary rights began as the individual's private property right was assigned initially by customary leaders based on customary laws.
- In vacant lands and classified forests (community and government land), contracts were issued by the government to give community groups the right to exploit the land for a given renewable period of time defined by a management plan agreed to by the parties.

Source: Adapted from Aquino et al., 2011.

a full assessment of the land tenure situation in the project areas during the design phase, gathering the legal information that is available and consulting with local individuals to identify project participants and prepare the contractual agreements. The process of discussions and negotiations around designing these contracts can create a forum where conflicts are resolved and the land tenure rights of the participants is recognized by their peers and the government (see Chapter 7 for more information).

4.33 The institutional mechanisms put in place to assert carbon ownership can support the broader process of clarifying land tenure. One project in Africa exemplifies this situation. The project entity used community participatory principles throughout project design and implementation. Individuals from local communities in the project areas came together to discuss the opportunities that forest carbon finance presented and received guidance from the project entities on how to pursue carbon rights. The project entities also facilitated the process of securing land tenure by bridging the gap between the user groups (seven cooperative societies) and the government. The direct participation of government agencies and representatives from the beginning not only ensured that there were no conflicts between the project activity and the national legislation but also provided for recognition by the national government of the land tenure changes on the ground.[6] The government designated the project areas as communal holdings and recognized the user rights–including the right to carbon–of the seven cooperative societies that participate in the project. The emphasis on participation, along with a formal process for communication among the cooperatives and with the government, have contributed to increased land tenure security and the success of the project.

Adequate Project Implementation

4.34 In forest carbon projects, adequate implementation requires measures to minimize tree mortality and maximize growth rates. These goals can be achieved by creating or strengthening local community organizations and involving the national land agencies in project implementation.

4.35 The impact of these actions can extend far. Once local people have stronger institutions to represent their interests, they can mount efforts to clarify land tenure. In addition, in many countries where BioCF projects have been implemented, the creation of community user groups and their registration with the government is a requirement for granting user rights on government land. In one project in Africa, for instance, the forest law requires individuals to organize community forest associations in order to receive user rights concessions. These associations facilitate the decision-making process among the members of the community and contribute to clarifying and securing land tenure in the project areas.

4.3.2 Challenges Related to the Land Tenure Rule

4.36 The BioCF projects have encountered three types of challenges in meeting the CDM requirements on land tenure. These issues are: a) poor registry systems to clarify the legal land tenure rights in an effective manner; b) lack of institutional capacity to put in place the institutional instruments that help increase land tenure rights security; and c) conflicts over the land tenure rights in the project area. These challenges are explained below.

Poor Registry Systems of Land Tenure Rights

4.37 Poor cadastre systems can delay the clarification of legal land tenure rights. During the preparation stage, BioCF projects go through an extensive assessment of the land tenure situation in the project area to verify and clarify land ownership and user rights. For some projects, this is a straightforward process that merely entails the prospective project participant presenting their land ownership title. In projects that involve multiple stakeholders in countries with precarious land registry systems, however, clarifying land ownership and user rights can be a challenging task. In some areas, there are either no formal land titles or the type of titles presented by prospective project participants have been insufficient to prove security of tenure.

4.38 In some cases, there have been conflicting claims and multiple legal titles to the same piece of land. In one project in Central America, for example, a poor land cadastre/registry system showed overlapping ownership in areas that were under consideration to be part of a BioCF project. To address this issue, the project developer was required to conduct an in-depth

6 LoA and approval is compensating for remaining uncertainty on carbon rights; this is an advantage compared to verified emission reductions in which there is no such endorsement.

A mosaic of land use in Ethiopia.

legal review of these titles to ensure that there was enough tenure clarity and security for project implementation. Some areas had to be excluded from the project as it was impossible to determine with certainty who was the owner and/or user of the land. This process was time-intensive, costly, and considerably reduced the project's expected emission reductions.

4.39 Problems with the land records have led to an extended clarification process and, in some cases, a search for new lands. These challenges delayed project implementation and increased preparation costs. In some projects, carbon rights claims exacerbated the conflicts between the government/jurisdiction keeping land registries and those claiming customary land tenure.

Weak Institutional Capacity

4.40 The land tenure rule can exclude farmers with no formal land title from participating in A/R CDM projects. This can happen in situations in which the project entity and farmers (if involved in projects) lack the capacity to put in place, in an effective manner, all the institutional instruments that can lead to an increased level of land tenure security. For example, small farmers in developing countries often do not hold formal title to the land and are not able to satisfy the CDM land tenure requirements.

4.41 This poor institutional capacity can reduce the potential benefit of the CDM to increase land tenure security in projects where participant farmers lack legal land tenure recognition. Complications in meeting land tenure requirements have reduced the feasibility of some projects. Delays in completing the land tenure clarification and security process have in some cases discouraged farmers from participating. Farmers with lower levels of land tenure security may in the end opt for land-use activities that provide more immediate returns. This is happening in some of the BioCF projects that are still going through user rights recognition for some of their land areas. Therefore, the full extent of this challenge remains to be determined.

4.42 Land tenure securitization also comes at a cost. It is not yet clear if investors mainly interested in carbon emission reductions will be willing to take on the risks and invest in mechanisms to increase land tenure security in project areas. For project entities with social and development objectives that go beyond carbon, developing forest carbon projects could be an opportunity to increase the land tenure security of local populations while contributing to improving their livelihoods and diversifying local sources of income. (See Chapter 1 for more information.)

Conflicts over the Land Tenure Rights

4.43 As project areas become more productive and carbon revenues starts to flow, there is a risk that forest carbon projects could lead to land speculation and conflicts over the land and its resources. Since most BioCF projects are still at an early stage of implementation, it is impossible at this point to determine the full extent of this risk. In one project in Asia – where the trees are partially grown, land is more productive, and carbon revenues has started to flow—about four percent of the total project land area became the object of land tenure disputes. During implementation, farmers in the vicinity of the project who did not express interest during preparation subsequently claimed land tenure over lands legally owned by farmers who were participating in the project. Because of these challenges, these areas were dropped from the project. It is yet to be determined whether or not other project areas in other countries will face this same problem.

4.44 To avoid this risk, the project entity for a project in Africa has actively worked to include all the members of the local communities in the project—and the benefits accrued from this initiative are shared by the community as a whole. The revenues from the project is reinvested in local development projects with widespread benefits for the whole community. In addition, all members of the community who pay a small fee for harvesting have access to fodder and grass in the project areas.

4.4 Recommendations

4.45 Below are recommendations that should be considered by the CDM EB/UNFCCC, policymakers, and climate change negotiators. Best practices for land eligibility and land tenure assessment at the due diligence and PDD preparation stages can be found in Chapter 8.

FOR THE CDM EB AND/OR THE UNFCCC

- Simplify the ¨1990 rule¨ by using more flexible criteria regarding the date and nature of deforestation. A/R CDM rules should not exclude areas where deforestation has happened after 1990 as long as safeguards are in place to ensure the integrity of these activities (see Paragraphs 4.11–4.21).
- Facilitate the development of projects on agriculture lands in tropical climates by simplifying guidance for the eligibility of temporary stocked lands facing long-term threats, such as slash-and-burn type of pattern (see Paragraphs 4.22–4.23).
- Increase the flexibility of the project boundary rule and consider accepting evidence other than contracts signed by the participating farmers in two-thirds of the project area before validation to prove that the project area is controlled by the project entity (see Paragraph 4.23 and Box 4.2).

Greenhouse Gas Accounting

5

5.1 Introduction

5.1 The methodologies and guidance approved by the CDM EB form the basis for implementing climate change mitigation projects in each of the 15 sectors. A key element of the guidance is greenhouse gas (GHG) accounting—the rules and procedures that quantify emission reductions from project activities.

5.2 Accounting for GHG emission reductions in A/R projects was extremely challenging in the early days of the CDM. The first versions of the baselines and monitoring methodologies were too detailed and cumbersome. Only a few, highly skilled consultants were able to apply them, which significantly increased project preparation costs. The CDM EB has made significant efforts to simplify the methodologies, and the most recent versions are easier to follow. The BioCF has also contributed to these improvements by developing tools and providing feedback to the CDM EB on the application of the GHG accounting rules.

5.3 Additional simplification of the rules and further capacity building is needed to promote the A/R CDM in some countries and to scale it up significantly. Early registered projects still have to cope with the time-intensive and costly procedures of the first versions of the methodologies, including accounting for insignificant sources of emissions and leakage. Furthermore, some project developers lack the capacity to apply even the most simplified versions of the methodologies and the tools developed to facilitate their application and to follow the most recent CDM EB guidelines and clarifications. Projects located in countries with weak forestry sectors also lack the data needed to fulfill the requirements of the methodologies.

5.4 This chapter provides an overview of the implementation of GHG accounting procedures in BioCF projects and presents the main challenges project developers have encountered in doing this. Section 5.2 describes the procedures for GHG accounting. Section 5.3 outlines the challenges faced by BioCF project developers when implementing the GHG accounting procedures. Section 5.4 presents the tools developed by the CDM EB, the BioCF, and others to facilitate GHG accounting. Finally, Section 5.5 offers recommendations for improvements.

5.2 GHG Accounting

5.5 The A/R CDM methodologies allow for emission reductions accounting in a wide range of situations where non-forest lands can be converted to forest lands. At the time of writing, the CDM EB had approved 14 A/R CDM methodologies for large-scale projects and generated seven methodologies for small-scale projects.[1] Most methodologies have more than one version.[2] The BioCF has experience with eight methodologies for large-scale projects and two for small-scale projects.

5.6 The methodologies provide procedures to account for GHG emissions in the baseline (*ex-ante* estimations) and in the project scenario (*ex-post*); they contain provisions for developing and implementing a monitoring plan. More specifically, the GHG accounting rules in A/R projects allow for estimating:

- Carbon stock and changes in stock in the baseline scenario;
- Carbon stock and changes in stock in the project scenario;
- GHG emissions into the atmosphere that result from activities undertaken as part of project implementation;
- Leakage, which refers to increases in GHG emissions outside the project boundary that are measurable and attributable to the project.

5.7 The "net anthropogenic greenhouse gas removals by sinks" resulting from a project are estimated by subtracting the GHG removals of the baseline and leakage emissions from the actual net GHG removals by sinks from the project.[3] The following sections present the steps required for these calculations in detail and discuss the challenges project developers have faced in addressing them. Projects that started their development recently (e.g., in the latest two years) may not face the challenges documented in this chapter. As early starters (i.e., before 2007), BioCF projects have tested the first, highly-complex versions of A/R CDM methodologies. These projects have provided feedback to the CDM EB for methodology consolidation and simplification. To stress the relevance of such improvements and make the lessons learned useful for new project developers, the simplifications done to overcome particular challenges are highlighted where applicable. In addition, a summary of CDM EB guidance, tools, and clarifications published up to August 2011 are presented in Annex 3.

5.2.1 Stratification and Sampling for GHG Estimation

5.8 Project areas are usually heterogeneous in terms of micro-climate, soil condition, and vegetation cover; they can also differ in tree species, forest age, and other characteristics. Stratification is an important procedure that supports GHG accounting by taking into account the factors that influence forest growth. Stratification is capable of improving the accuracy and precision of carbon estimations by ensuring that the areas of an A/R project with common characteristics, such as site productivity, species, land use changes, and management measures, are grouped together.

5.9 The carbon stocks for large forest areas are usually estimated from measurements in permanent sample plots. Sampling is a key procedure for cost-effective and accurate estimation of the carbon content in different strata. More sample plots are needed for projects with high variability, but the number of sample plots can potentially be reduced through stratification. Because of the lower variance within each homogeneous unit, stratification helps either increase the measuring precision with minimal cost increment or reduce the monitoring cost without reducing measuring precision. The CDM requires projects to comply with a specified precision level for carbon stocks

1 Small-scale projects are those reducing less than 16,000 tCO_2e per year. Developers are allowed to apply simplified methodologies. The CDM EB generates small-scale methodologies based on the large-scale ones, taking into account the CDM modalities and procedures for small-scale projects (see Chapter 6). The CDM EB merged three approved large-scale methodologies along with a new proposed methodology, forming two consolidated methodologies.

2 For example 11 out of the 21 approved methodologies have at least 3 versions. One methodology for small-scale projects has 6 versions. A version of a methodology expires when a new version is approved. Since projects have to be submitted for registration with a valid methodologies, developers have to be aware of changes in versions of methodologies while preparing projects.

3 "Actual net greenhouse gas removals by sinks" is the sum of the verifiable changes in the carbon pools within the project boundary, minus the increase in emissions as a result of the implementation of the project.

estimation and to provide guidance on sampling that is consistent with the Intergovernmental Panel on Climate Change's (IPCC) *Good Practice Guidance*.

5.10 Project developers may undertake *ex-ante* and *ex-post* stratification as per the methodology guidance. *Ex-ante* stratification aims to estimate the carbon stock changes that are presented in the PDD. *Ex-post* stratification allows project developers to address the possible changes in project variables in comparison to the project design and to account for likely changes in carbon stocks during project implementation. This takes into account data from the monitoring of the A/R CDM project activity and variations in carbon stock changes in each stratum from the previous monitoring event.

5.11 In May 2007, the CDM EB published the first version of the tool for calculating the number of sample plots for measurements within A/R CDM projects (UNFCCC, 2007a). In 2009, it published a second version as a way to provide guidance on location of permanent sample plots for data collection and also to clarify some formulae with respect to the first version (UNFCCC, 2009e). More recently, in 2010, the CDM EB published a third version of the tool in which a simplified method to calculate the number of sample plots is presented; this version introduces a simplified equation that applies in cases of small sampling fractions and streamlines the general presentation of the tool to be consistent with other CDM EB tools (UNFCCC, 2010e).

5.2.2 Carbon Stock Changes

5.12 Similar to the estimation of forest growth, the estimation of carbon stock changes is based on forest inventory data. Changes in carbon stocks are measured in five carbon pools: above-ground, below-ground, deadwood, litter, and soil. Methodologies specify which carbon pools need to be accounted for,[4] and project developers can choose a methodology that excludes a carbon pool that is not of interest. Neglecting a carbon pool, however, requires project developers to demonstrate that the pool in question will not become a source of GHG emissions attributed to project implementation.

Above-ground and Below-ground Biomass

5.13 The above-ground[5] carbon pool corresponds to vegetation (e.g., stems, branches, and leaves that are above the ground); the below ground carbon pool corresponds to roots. Together these pools account for more than 80 percent of total carbon in a forest and, because of their relevance, they are measured and monitored in all BioCF projects.

5.14 Procedures for estimating changes in biomass[6] are based on forestry inventory methods. For the *ex-ante* estimation of biomass prior to project implementation, project developers usually use data available on species and forest types from a proxy project or literature. The appropriateness of the estimates is reviewed as part of project validation. The *ex-post* biomass estimates are based on measurements taken from sample project plots, following the procedures of the monitoring methodology.[7] These measurements are subsequently reviewed by independent auditors as part of project verification.

5.15 The *ex-ante* estimation of changes in the above-ground and below-ground biomass can be accomplished using two methods: the biomass expansion factor method[8] and the allometric method. When the biomass expansion factor method is used, project developers use data on tree diameter and height from forestry inventory to calculate the tree volume in cubic meters or biomass in tonnes at each verification interval. The difference in the values of the two verification intervals is used to assess the mean annual increment, and appropriate expansion factors are used to extrapolate from stem volume or biomass to the biomass of branches, leaves, and roots. While some BioCF projects have access to biomass expansion factors from their national forest inventory, wood density and carbon fraction are usually taken from IPCC's *Good Practice Guidance*. When using the allometric method, project developers use growth models of species or forest stands published in the literature, or they develop their own growth models from harvesting, drying, and

4 As an example, Annex 4 of this report presents a summary of the carbon pools that must be accounted for under recent versions of the A/R methodologies.

5 The above-ground biomass involves trees and non-tree (herbaceous) vegetation.

6 Estimating changes in biomass involves assessment of biomass in tonnes based on the wood volume in cubic meters estimated from the forest inventory. The biomass estimated is converted into carbon, which varies among species and is about 50 percent of the biomass.

7 Monitoring is a central part of both a CDM methodology and a PDD.

8 The Biomass Expansion Factor is used for estimating trees' aerial part; the Root-to-Shoot Factor is used for estimating the roots.

weighing a small number of trees representing all diameter classes.

5.16 About half of the BioCF projects apply both the biomass expansion and allometric equation methods for forest growth estimation in the project scenario. This is because these projects plant some portion of their lands with commonly planted species for which allometric equations exist. Projects mainly planting native species, however, apply the biomass expansion factor method as no specific allometric equations are available. The two assisted natural regeneration BioCF projects estimate the forest growth by using published data on the particular type of forest being regenerated (e.g., from IPCC databases).[9]

5.17 The CDM EB has introduced several simplifications, clarifications, and guidance with respect to the estimation of carbon stock changes. For example, in 2009 the CDM EB published the first version of a tool that facilitate the estimation of changes in the carbon stocks of existing trees and shrubs within the project boundary (UNFCCC, 2009a). A second version of this tool was published in 2010 to incorporate several simplifications, including: (i) applicability to both the baseline and the project scenario; (ii) adoption of a default approach to estimate carbon in shrubs based on fraction of forest biomass; (iii) presentation of a streamlined mathematical notation and equations for estimations; and (v) introduction of changes in carbon stocks, rather than the carbon stocks themselves as in the first version of the tool (UNFCCC, 2010c).

5.18 More recently, in 2011, the CDM EB amended the second version of the tool to make the following changes: (i) include the estimation of the means and variances of tree biomass at stratum level and at project level; (ii) allow for tree biomass estimation on a per hectare basis, so that plotless sampling methods can be applied; (iii) add an approach for estimating changes in biomass based on a successive measurement of sample plots; (iv) update entries in data and parameter tables as a way to provide clearer guidance in commonly encountered field situations; and (iv) propose bark corrections to facilitate estimations in cases where a volume table based on under-bark volume is used in conjunction with biomass expansion factor based on over-bark volume, or vice versa (UNFCCC, 2011c).

9 To be conservative and to address lack of data issues, projects planting a group of species often estimate the biomass growth of the entire group based on some main species.

5.19 The CDM EB has also provided guidance to facilitate the conservative choice and application of default data in estimation of net GHG anthropogenic removals by sinks. In this guidance, the CDM EB provided some approaches for the conservative choice of default data. In the most recent version of this guidance, also published in 2009, the CDM EB provided two additional approaches (UNFCCC, 2009b; UNFCCC, 2009d; UNFCCC, 2009j).

5.20 In addition, the CDM EB has provided guidance to facilitate accounting of the changes in carbon stocks of existing trees. In 2009, it published both guidelines to assess whether these changes in carbon stocks may be deemed insignificant and a tool to facilitate the estimation of changes in the carbon stocks of existing trees and shrubs in case they are significant (UNFCCC, 2009c; UNFCCC, 2009h).

Minor Carbon Pools

5.21 Minor carbon pools (e.g., litter, deadwood, and soil carbon) account for about 20 percent of the carbon in a forest. Some methodologies require project developers to provide evidence of the degradation status of the project lands and demonstrate that the carbon content in the minor pools will decrease or increase less in the absence of the proposed A/R CDM project; developers applying these methodologies don't have to account for minor carbon pools. In methodologies in which the carbon content of these pools is expected to increase as a result of project implementation, project developers can decide whether or not to account for these pools.

5.22 Soil carbon can significantly increase within a few years of tree planting as a result of project implementation. The changes in soil organic carbon depend upon the type, depth, and bulk density of the soil and the type of vegetation on the site. The assessment of soil organic carbon can be done through empirical methods, based on research and published data that compares the non-forested and forested lands in the project area, or by conducting sample studies to estimate the soil organic matter in sample plots at two points in time (e.g., prior to the start of the project and subsequent to the project implementation after a 5- or 10-year interval). The CDM EB published a tool[10] in 2010, based on a method proposed by the

10 Tool for Estimation of Change in Soil Organic Carbon Stocks due to the Implementation of A/R CDM Project Activities.

IPCC, to assist project developers in applying a default method to estimate changes in soil organic carbon. By using this approach, project developers can avoid the cost of monitoring the soil carbon pool. Considering the small size of these minor pools and the transaction costs of monitoring and measuring them, only four of the 21 projects in the BioCF portfolio account for soil carbon; two account for litter and deadwood.

Photo: Abdulla Diku

Measuring the litter carbon pool during forest monitoring training in Kenya.

5.23 In addition to the guidance included in methodologies to account for minor carbon pools, the CDM EB has published tools to facilitate estimations. On deadwood, for example, in 2008 it published a tool to facilitate the estimation of carbon stocks, removals, and emissions from the dead organic matter carbon pool (UNFCCC, 2008d). A revised version of this tool was published in 2010 to incorporates several simplifications, including: (i) a streamlined tool that reflects only procedures that are relevant for the dead wood carbon pool; (ii) simplified methods to estimate carbon stocks in some components of dead wood; and (iii) the option to estimate deadwood and litter based on default factors (UNFCCC, 2010d).

5.24 With regards to the soil organic carbon pool, the CDM EB published in 2007 procedures to determine the significance of this carbon pool and to enable developers to neglect insignificant carbon pools. (UNFCCC, 2007e). In 2010, it published a tool to facilitate the estimation of changes in soil carbon stocks due to the implementation of the project. A revised version of this tool was published in 2011. This new version restricts the application of the tool to land subjected to certain land uses and management practices in the baseline and is clearer than the previous version as it introduces editorial changes and corrections in the parameters used for calculations. In addition, in the same year, the CDM EB published a spreadsheet to facilitate the calculation of changes in soil organic carbon stock (UNFCCC, 2011b).

5.2.3 Project Emissions at Implementation

5.25 Emissions of greenhouse gases into the atmosphere result from activities undertaken as part of project implementation (e.g., site preparation, biomass burning, use of nitrogenous fertilizers, and use of fossil fuels in equipment, machinery, and vehicles). Early versions of methodologies included all sources of emissions in the project implementation. In 2007 and 2008, the CDM EB approved guidance to ignore insignificant emissions. In more recent versions of the methodologies, GHG emissions associated with clearance of herbaceous vegetation, fossil fuel combustion, emissions from nitrogenous fertilizers, and emissions of nitrous oxide from decomposition of litter and fine roots of nitrogen-fixing trees are considered insignificant and can be ignored (UNFCCC, 2007b; UNFCCC, 2008e; UNFCCC, 2008g; UNFCCC, 2008h). Furthermore, small-scale A/R projects do not have to estimate and measure emissions from project implementation thanks to the simplified modalities and procedures.

5.26 The most frequent source of emissions in the BioCF portfolio is biomass burning resulting mainly from site preparation activities. More than 70 percent of the projects in the portfolio account for this source of emissions and 40 percent account for the burning of fossil fuels.

5.27 Until recently, projects registered with early versions of the methodologies had to account for sources of emissions later deemed insignificant by the CDM EB (i.e., in 2007 and 2008). Developers of these projects had to apply the CDM EB tool developed to facilitate the estimation of emissions from fossil fuels and fertilizers (UNFCCC, 2007d; UNFCCC, 2007f). In 2011, however, the CDM EB published guidelines under which recent version of methodologies can be applied at monitoring by registered projects (UNFCCC, 2011e).

5.28 Similarly, the CDM EB published a tool to facilitate the estimation of emissions from biomass burning. The first version of this tool, published in 2007, accounted for emissions from clearing, burning, and decay of existing vegetation (UNFCCC, 2007k). A revised version was published to reflect the guidance that the CDM EB previously provided regarding the insignificance of emissions from removals of herbaceous vegetation (UNFCCC, 2008f). In 2009, the CDM EB split the information provided in the second version of the tool among several documents in order to allow for their separate application. This resulted in the publication of a third version of the tool, which is the most recent at the time of writing (UNFCCC, 2009i).

5.29 In addition, in 2009, the CDM EB went further by publishing guidance to neglect emissions from the removal of existing vegetation due to site preparation (UNFCCC, 2009h). It also published a newer version (3.1.0), to provide guidance solely on estimation of non-CO_2 emissions from biomass burning (UNFCCC, 2011a).

5.2.4 Leakage

5.30 Leakage includes the use of fossil fuels in the transport of products and personnel to and from project sites, collection of wood from non-renewable sources for fencing posts, and displacement of activities that lead outside the project area to conversion of forests to land uses such as cropland, grazing, and the collection of fuel wood. The CDM EB approved guidance in 2008 to ignore certain sources of leakage, including fossil fuels used in transport and the use of wood for fencing posts (UNFCCC, 2008g; UNFCCC, 2008h).[11] As part of the applicability conditions, some methodologies do not allow for leakage caused by activity displacement, meaning that the A/R project has to ensure at least the same amount of goods and services as was produced pre-project.

5.31 The CDM EB has been very active in publishing guidance and tools to facilitate leakage estimation. For example, in 2006 the CDM EB published guidelines to neglect market leakage. In 2007, it published the first version of a tool to facilitate the estimation of emissions related to grazing displacement; this tool included very detailed and complex procedures for the calculation of leakage. The second version of this tool, published in 2008, was even more detailed, including leakage due to biomass loss resulting from livestock units and/or fodder displaced to perennial croplands.

5.32 In May 2008, the CDM EB published a tool to facilitate the calculation of leakage from increased use of non-renewable woody biomass[12] and deemed insignificant emissions from the use of fossil fuel due to transportation (outside and within the project boundary). The most recent guidance on leakage was published in 2009, covering conditions under which leakage from pre-project grazing and crop cultivation can be deemed insignificant (and therefore not counted) . It also published a tool to estimate leakage from pre-project agricultural activities, which covers both

11 Previously, in 2006, the CDM EB allowed project developers to neglect market impacts attributable to the A/R CDM project from the sources of leakage. Market leakage includes effects on the price, supply, or demand of goods. One example is the manufacture and sale of wood-based products produced from wood harvested from the CDM A/R project activity (UNFCCC, 2006f).

12 In June 2011, the CDM EB approved methodology ARAM0014, "Afforestation and Reforestation of Degraded Mangrove Habitats," which applies a simplified procedure to estimate leakage due to displacement of fuel wood collection, unless it is demonstrated that there is no fuel wood collection in pre-project conditions.

Box 5.1

GHG Accounting in the Humbo Assisted Natural Regeneration Project, Ethiopia

The Humbo project is the first large-scale A/R CDM project registered in Africa. The project is undertaken on 2,728 ha of land in the vicinity of Humbo District in southwestern Ethiopia. The project entity is World Vision Australia/Ethiopia, which works in close collaboration with local communities and the Ethiopian government's Environment Protection Authority. The project was initiated on December 1, 2006, and according to the PDD expects to sequester 880,000 metric tonnes of CO_2e over 30 years.

The project addresses the severe threat of an unsustainable use of land that would likely lead to desertification. Ethiopia has in recent decades had severe soil erosion that has affected land productivity and the livelihood of poverty-stricken rural communities. Prior to the project, the forest was in a degraded state because of unsustainable charcoal production, fuel wood collection, and grazing. The project helped to end these unsustainable land-use practices by implementing measures to assist in the natural regeneration of the degraded forest stock.

Communities were encouraged to set aside degraded lands to allow for natural regeneration. They implemented the farmer-managed natural regeneration approach to support the regeneration of more than 45 native tree species. This approach involves protecting and managing trees and shrub root stock, planting of native tree species, and establishing live fences. The project also supports surplus grass, allowing farmers to cut and carry fodder from the lands set aside; it generates fuel wood from pruning and plantations of fast-growing species.

GHG ACCOUNTING

The project applies the Afforestation/Reforestation Approved Methodology # 3 Version 4 (AR-AM0003 v4). This methodology requires developers to demonstrate that, in the baseline scenario, the project land is overgrazed and degraded as a result of clearance for fuel wood purposes. The methodology accounts for above-ground and below-ground carbon pools.

CHANGES IN ABOVE- AND BELOW-GROUND CARBON POOLS

In the absence of the project, the land and vegetation were expected to degrade under continued anthropogenic pressures. For this reason, net changes in GHG removals by sinks in the baseline are considered zero. While the project interventions led to the establishment of the forest and contribute to increasing all carbon pools, the project only accounts for changes in above-ground and below-ground carbon pools. The project does not account for increases in soil organic carbon, deadwood, and litter carbon pools. This is conservative considering that these pools would have decreased further in the absence of the project.

PROJECT EMISSIONS

The project emissions are considered zero. The reasons for this are several: (i) the project did not practice biomass burning; (ii) it used manual methods of site preparation and transport, avoiding the use of fossil fuels for machinery and transport; and (iii) its share of nitrogenous species is insignificant.

LEAKAGE

The project uses live hedges for fencing; it therefore does not require wood for fencing. The project uses manual methods to transport seedlings and therefore does not use fossil fuels for transport. The project also produces more fodder and fuel wood relative to the baseline. There is also adequate grazing land outside the project. For these reasons, leakage from displacement of grazing and fuel wood collection activities are considered zero. The project will, however, monitor grazing and fuel wood collection activities for five years until the first verification to demonstrate that leakage is not expected to occur during the project period.

pre-project grazing and crop-cultivation displacement. This last tool supersede the tool to estimate leakage from pre-project grazing displacement previously published in 2008. (UNFCCC, 2006f; UNFCCC, 2007j; UNFCCC, 2008b; UNFCCC, 2008c; UNFCCC, 2009k; UNFCCC, 2009l; UNFCCC, 2009m; UNFCCC, 2009q; UNFCCC, 2009r).

5.33 Leakage in small-scale projects receives special treatment. Estimating leakage is not required if project developers can demonstrate that their activities do not result in displacements of people or activities (i.e., agriculture, fuel wood collection, and cattle raising, among others) that generate loss of carbon outside the project boundary. Where required, project developers can apply default factors for leakage estimation. For example, if certain parameters[13] are under 10 percent, leakage can be considered insignificant. If the value of these parameters is greater than 10 percent and less than or equal to 50 percent with respect to the *ex-ante* estimation of GHG emission reductions, then the average annual leakage can be calculated as 15 percent of the annual GHG emission reductions from the project. Most of the small-scale BioCF projects applied the default method to estimate leakage as they found the value of the parameters exceeded the 10-percent threshold.

5.34 In the BioCF portfolio, projects estimate and measure the different sources of leakage. Until recently, early projects had to account for the sources of leakage that were deemed insignificant in 2007 and 2008. As stated above, in September 2011 the CDM EB allowed registered project developers to apply recent versions of methodologies at verification. For example, two early projects still measure leakage from fossil fuel displacement and four projects estimate leakage from using posts for fencing. In five projects, it is still uncertain whether leakage from transportation and use of posts must be accounted for since these source of leakage are inconsistently mentioned throughout the methodology. Other BioCF projects account for leakage from activity displacement. For example, about 70 percent of the projects account for grazing displacement, 44 percent account for agricultural displacement, and 45 percent account for displacement of fuel wood collection.

13 For example: the crop area displaced in relation to the total project area; the number of animals displaced in relation to the total average grazing capacity; and the average number of domesticated roaming animals displaced.

5.35 Box 5.1 presents an example of *ex-ante* estimation of GHG emissions in a large-scale BioCF project.

5.2.5 Monitoring

5.36 Monitoring requires collecting and archiving data needed to calculate the actual net GHG removals by sinks during the crediting period. The monitoring plan, which is part of the PDD, describes techniques and methods for sampling and measuring carbon stock changes in the carbon pools, emissions from project implementation, and leakage. These methods should reflect commonly accepted principles and criteria concerning forest inventory. Small-scale projects apply simplified procedures for monitoring. The methodologies state the level of accuracy that project developers must meet when measuring carbon pools during project monitoring, and project developers have to explain how they achieved such a level.

5.37 At verification, the project developer must submit to the DOE a monitoring report that shows the calculation of GHG removals from the project and its monitoring. The DOE will then assess the calculations and compliance of the monitoring with the monitoring plan and the applied methodology. The project developer, therefore, must ensure in the monitoring report that appropriate statistical methods were used to (i) address uncertainties in the measurements and estimates of carbon stocks and emissions in an effective manner; (ii) report on and justify changes in circumstances within the project boundary (e.g., changes in legal title to the land or rights of access to the carbon pools); and (iii) report on the procedures applied during monitoring implementation to assure the quality of the monitoring process (UNFCCC, 2006b). In one of the BioCF projects, for example, the project developer is required to report on the implementation status of its more than 250 discrete parcels by comparing among plans in the PDD, what was achieved by verification, and what remains to be finished. For each of the sites, the project developer should include in the monitoring report such information as the date of implementation, planting density, number of seedlings, species planted, survival rate of plantings, disturbances, and boundaries, as well as specific interventions and management activities (e.g. pruning, coppicing, and planting).

5.38 To assess the accuracy of the reported emission reductions, DOEs not only undertake desk reviews of the monitoring plans but also check the quality of a sample of the data collected to confirm that the reported numbers are free of errors, omissions, and misstatements. The lower the confidence of a DOE in the project monitoring system, the larger the sample they will need to take; this then increases verification costs. The DOE also requests evidence of status of project implementation and supervises all field measurement steps. While some problems and uncertainties can be addressed during the verification process, if the problems are too numerous the DOE might conclude that the reported certified emission reductions cannot be confirmed with any reasonable level of assurance. This might lead to loss of CERs or—in the worst case scenario—no request for issuance of CERs.

5.39 At verification the DOE will identify and inform the project participants of any concerns related to the deviation from the PDD at project implementation. In determining whether the changes raise concerns, the DOE shall assess whether the changes impact the additionality of the project, the scale, and the applicability and application of an approved methodology (UNFCCC, 2009f). If the identified changes are major the DOE should notify and seek guidance from the CDM EB on their acceptability. It must also submit a request for approval of the monitoring plan (UNFCCC, 2009g). The CDM EB has recently published guidelines on assessment of different types of changes as a way to assist DOEs in the identification of situations that raise concerns (UNFCCC, 2011f). It also has allowed registered projects to apply specific versions of methodologies at verification in order for them to take advantage of recent rule simplification and consolidation (UNFCCC, 2011e).

5.40 The monitoring plan also describes the Quality Assurance/Quality Control (QA/QC) process the project developer must undertake to ensure reliable field measurements. Respecting the QA/QC procedures is key to ensuring good quality project monitoring data; if these are followed, then there should not be any problem at verification. Projects differ in the type of QA/QC measures proposed. Some propose applying good practices used in traditional forest inventory; others go beyond this. Some of the measures proposed by BioCF projects are presented in Table 5.1.

5.3 Challenges

5.41 In the BioCF experience, the major challenges project developers face when applying GHG accounting methodologies are complex and unclear accounting procedures, limited data and information on forest growth parameters, and low technical capacity of implementing entities. The gap between project developers' capacity to implement GHG accounting procedures and the methodological requirements is reflected in the CARs and CLRs generated by the DOEs during validation of BioCF projects (Table 5.2).

5.42 The challenges encountered by project developers in addressing the different steps of the GHG accounting rules are presented below.

TABLE 5.1 MEASURES FOR QUALITY ASSURANCE AND QUALITY CONTROL OF THE MONITORING PROCESS PROPOSED IN BioCF PROJECTS

Steps of the Monitoring Plan	Quality Assurance and Quality Control Measures
Data collection	■ Applying standard operational procedures for each step of the field measurements ■ Training field staff on forest carbon monitoring, including data entry, analysis, and archiving ■ Re-measuring of sampling plots by external collaborators (e.g., local universities) ■ Checking that all parameters have been measured and reported with correct frequency
Data handling and storage	■ Checking some of the data in the database against raw field data ■ Observing process and quality checks to determine the possibility of errors being introduced
Calculations	■ Rechecking calculations
Preparation of the monitoring report	■ Checking completeness of the variables measured and the estimations

5.3.1 Applicability Conditions of Methodologies

5.43 As stated in Chapter 2, project developers consider methodology selection a complex task. One reason for this is that assessing some applicability conditions requires undertaking a time-and-data intensive process. For example, some methodologies are conditional on having evidence of degradation status in the baseline scenario and/or demonstrating the level of soil disturbance caused by site preparation. The challenges to apply these two applicability conditions are discussed below.

TABLE 5.2 ISSUES HIGHLIGHTED IN THE VALIDATION OF BioCF A/R CDM PROJECTS

Type of Problem	Frequency	Example
Tools not followed or incorrectly applied	81%	Tools incorrectly applied or ignored when: ■ Selecting the baseline scenario ■ Calculating emissions and leakage, including their significance ■ Calculating the number of sampling plots ■ Discarding carbon pools
Lack of appropriate evidence	64%	Lack of evidence for: ■ Justifying that a carbon pool can be neglected ■ Using default parameters instead of local data
Poor understanding of CDM requirements	55%	■ Lack of general information on the project ■ Inconsistency between the PDD and the management plan
Problems with data	55%	Lack of data for: ■ Estimating native species growth ■ Calculating emissions and leakage ■ Justifying the selection of sources of leakage ■ Justifying baseline stratification ■ Lack of parameters such as Biomass Expansion Factor, Root to Shoot, Mean Annual Increment, and Current Annual Increment for certain species included in the project
Inconsistency throughout the PDD	55%	Inconsistencies related to: ■ Species ■ Parameters used for calculations ■ Sources of leakage ■ Stratification criteria ■ Crediting period ■ Project management characteristics ■ Monitoring parameters
Lack of references	27%	Lack of references in: ■ Calculations ■ Default parameters for calculations ■ Participatory Rural Appraisal ■ Land degradation status assessment ■ Criteria applied for stratification
Weak explanation of uncertainties	27%	Weak explanations for: ■ Estimating carbon stocks and stock changes in baselines and project scenario ■ Estimating leakage ■ Calculating the number of sampling plots
Weak consideration of the conservativeness principle[a]	27%	Application of conservativeness for: ■ Selecting parameters for estimating baseline and projects carbon stock changes ■ Selecting certain species as representative of a group of species (especially in ANR projects)
Lack of transparency	27%	Issues poorly justified in the PDD: ■ Procedures for calculation of emission reductions ■ Procedures for stratification ■ Project planning, including planting schedule

a The principle of conservativeness requires developers to be cautious when using non-site specific information by applying data that usually results less favorably for projects.

Assisted Natural Regeneration of Degraded Lands in Albania Project.

5.44 Demonstrating land degradation has been a frequent challenge in the BioCF portfolio as most of the projects are on degraded lands. Project developers were not only challenged to assess the degradation status of individual parcels of lands but also to demonstrate that the lands are still degrading. Some projects managed to provide documented evidence[14] of this by using official data on soil degradation. In countries where such research has not been done, however, meeting this requirement remains a challenge.

5.45 The CDM EB published a decision tool to facilitate the identification of degrading or degraded lands. Problems arise, however, in cases where the early versions of the methodology also prescribe indicators of soil degradation[15] as it is difficult for project developers to determine which indicators have to be demonstrated. One example is the type of evidence of land degradation requested in the CDM EB's guidance on conditions under which the change in carbon stocks in existing live woody vegetation are insignificant. The guidance suggests that developers provide photographic evidence of the intensity/severity/frequency of the activities, and/or the state of existing woody vegetation resulting from such activities, at a set of randomly selected points. The CDM EB recommends sampling on a fixed grid place with a random start point, with measurement of all trees within some specified radius of a grid point. The guidance goes even further, indicating the number of trees and shrubs these measurement parcels should have.

5.46 Although such a tool allows project developers to use visual observation, through participatory rural assessment, of selected degradation indicators[16] when documented land degradation classification[17] is not available, early projects have found it challenging to apply this guidance (UNFCCC, 2008f).

14 Alternatively, project developers can demonstrate land degradation through a comparative study of the proposed project area with reference degraded lands.

15 For example, see the most recent version of methodology ARAM0004 v4.

16 For example, lands can be deemed degraded if one of the following indicators are observed: (i) reductions in topsoil depth; gully, sheet or rill erosion, landslides, or other forms of mass-movement erosion; (ii) decline in organic matter content and/or recession of vegetation cover as shown by reduction in plant cover or productivity due to overgrazing or other land management practices, thinning of topsoil organic layer, scarcity of topsoil litter and debris; (iii) presence of plant species locally known to be related to the condition of degradation of the land or field/lab tests showing nutrient depletion, salinity or alkalinity, toxic compounds, and heavy metals; and (iv) a reduction in plant cover or productivity due to overgrazing or other land management practices

17 Classification can be from a verifiable local, regional, national, or international land classification system or peer-review study, participatory rural appraisal, satellite imagery, and/or photographic evidence in the last 10 years. If the land degradation classification is older than 10 years, developers must provide evidence either that land degradation drivers are still present or that there are not sufficient management interventions to revert to degradation (UNFCCC, 2008f).

5.47 Similarly, demonstrating the level of soil disturbance caused by site preparation is difficult to do as project developers need to prove that the rate of loss of carbon stocks in mineral soils due to erosion will not permanently increase above baseline rates—thus enabling them to conservatively neglect the soil carbon pool.[18] Some methodologies require project developers to demonstrate that soil preparation will not cause long-term net decreases in soil organic carbon stocks or increase non-CO_2 emissions from soil. Some methodologies do not allow for practices that drain soils, and limit soil preparation for planting to no more than 10 percent of the project area. This applicability condition has also challenged project developers seeking to plant agricultural crops within the tree rows as a way to improve their cash flow. From an environmental point of view, this condition may also limit long-term GHG removals from projects as it prevents developers from (i) using tillage measures to break sub-surface soil pans and other site-specific factors that hinder tree growth, and (ii) applying intercropping practices, which can conserve moisture and improve long-term nutrient cycling.

5.48 Some of the applicability conditions also overlap other A/R CDM requirements, creating confusion for project developers and leading to repetition of arguments within the PDDs. For example, applying certain methodologies requires project developers to demonstrate the low natural regeneration potential of the baseline scenario because of ecological barriers, technological limitations, or anthropogenic pressure. This is also required in the land eligibility assessment, in the determination of baseline, and in the demonstration of additionality. The CDM EB, therefore, should make efforts to streamline the applicability conditions of methodologies and continue with consolidation of similar methodologies. It should, for example, engage research institutions to assess the significance of certain applicability conditions in terms of emission reductions results, to be able to neglect those that are insignificant. This would also reduce transaction costs.

5.3.2 Stratification and Sampling Design

5.49 Stratification requires efficient data collection on land use and vegetation and, therefore, a good understanding of stratification procedures. This is something that most project developers do not have. Project developers struggle with understanding the fact that A/R projects require stratification in several steps of the GHG accounting process.[19] In fact, more than half of the 11 projects reviewed received CARs and CLRs addressing (i) poor definition of critical variables determining the carbon stock changes in different strata; (ii) stratification criteria not properly applied when defining strata; (iii) stand models not clearly defined in the PDD; and (iv) project developers not following the stepwise approach to stratification suggested in the methodologies.

5.50 In addition, project developers often required assistance from the BioCF's methodology team for the *ex-ante* determination of the number of sample plots. The CDM EB published a tool in 2007 to facilitate this calculation, and a simplified procedure was published in November 2010. The BioCF, along with Winrock International, also published an Excel-based tool, *Winrock Terrestrial Sampling Calculator*, to present this procedure in a user-friendly Excel-based spreadsheet (Walker, 2007). Still, these tools are not a substitute for project developers' capacity on forest inventory. Project entities with little forest experience, in particular, are challenged in applying the CDM EB guidance on stratification and sampling design because this requires a very specific knowledge niche that cannot be easily developed.

5.3.3 Forest Growth

5.51 The data and information required for estimating biomass growth are difficult to obtain in developing country contexts, particularly for native species. For most projects, site-specific information on forest

18 Other conditions shall be met in order to demonstrate that the rate of loss of carbon stocks in mineral soils due to erosion is not permanently increased above the baseline. These are: (i) removals of existing biomass not occurring on more than 10 percent of the project area (unless it can be demonstrated that slash and burn is a common practice, and that the rate of loss of carbon stocks in mineral soils is not increased above the baseline rates for more than five years after project start), and (ii) that if ploughing/ripping/scarification is used for project preparation, it shall follow the project contour. However, there are two additional requirements that project developers must meet in order to be able to neglect the soil carbon pool: (i) soils do not include organic matter (e.g., peat lands) and are not wetlands, and (ii) fine litter shall remain onsite (UNFCCC, 2008f).

19 For example, a first stratification is required for efficient estimation of the biomass in the baseline. The *ex-ante* stratification is another layer of stratification that incorporates the variability of the baseline and the stand models of the project scenario. The *ex-post* stratification is an update of the *ex-ante* stratification to incorporate further variability in carbon stocks. Project developers have to update the stratification and sampling design before the monitoring period implementation in preparation for each verification event.

Box 5.2

Challenges to Determining Tree Biomass Stock and Increment in the Himachal Pradesh Reforestation Project—Improving Livelihoods and Watersheds

The Himachal Pradesh project in India is reforesting about 4,000 ha of degraded lands in the watersheds of the Mid-Himalayan region. The project is being developed under the framework of the World Bank Mid-Himalayan Watershed Development Project.

The objectives of the project include improving the productive potential of the project lands, improving the watershed catchment capacity, and improving local livelihoods. The project encompasses three components: restoration of highly vulnerable lands, reforestation of degraded community lands, and reforestation of private lands. The project targets about 45 native and locally preferred tree species with several growth rates, including fast, medium, and slow-growing species.

The project spent close to 15 months under validation. During this process, the DOE raised several issues in the CARs and CLRs, one of which was the inaccurate estimation of tree biomass stock and growth in both the baseline and the project scenario. As a result, the project developer had to re-estimate the biomass growth in the baseline to reflect the use of a more suitable sampling size (the project land area was reduced previously to reflect a conservative approach to the land eligibility assessment). This was challenging because the project developer faced a lack of information to estimate the mean annual increment for the vegetation in the region.

The project developer also lacked information to support the biomass growth estimates for certain tree species involved in the project scenario. Since the project is planting a large number of native species for which no allometric equations are available, the project developer used main annual increment data and applied expansion factors to complete the calculations. The project developer still faced challenges, however, in providing full references for these parameters for each species of each stand model.

Correcting this issue was a time-consuming task. The project developer ended up dropping some species for which data were unavailable. The project developer was also asked to provide current annual increment data whenever the validator thought it could be found, and to avoid using data generated in plantations as this could lead to biomass growth overestimation.

growth is scarce. This has been a frequent challenge in the BioCF portfolio, as close to 80 percent of projects plant native species. In projects where data are available, the data mostly pertain to commercial timber. This only partially represents the stem biomass, forcing project developers to use proxy regional or global values.[20] The conservative application of default data on forest growth and selection of expansion factors often results in the over-estimation of the baseline and under-estimation of the project scenario. Furthermore, when proxy and default data are not available, project proponents may change the project design to include species for which data and information are available. Such a change in project design may impact some original project objectives, including community or biodiversity benefits (Box 5.2).

5.52 Determining all components of tree and shrub biomass by constructing allometric equations can also be a challenge for developers because developing growth models of tree species requires additional resources (money) and technical expertise.

5.53 In addition to the data-related challenges, project developers' poor forestry capacity has proven to be a significant obstacle for effective GHG accounting. Sometimes, the problem is having the technical expertise to find the information and data. While in some cases a quick Internet search by the DOE reveals

20 The IPCC publishes systematized information on biomass growth for several world regions; this is one among several reliable sources of information. See, for example, the 2003 IPCC *Good Practice Guidance for Land Use, Land-Use Change, and Forestry* and the 2006 IPCC guidelines for *National Greenhouse Inventories (volume 4) for Agriculture, Forestry and Other Land Use* (http://www.ipcc-nggip.iges.or.jp/public/2006gl/vol4.html). Some data are also available in the FAO's 2010 Forest Resource Assessment and the Global Planted Forest Thematic Study (http://www.fao.org/forestry/12139-03441d093f070ea7d7c4e3ec3f306507.pdf).

the existence of relevant data, project developers often encounter challenges in searching for and applying the data to estimate forest growth. For example, frequent CARs and CLRs by DOEs address: (i) an unclear relationship between the stand models and species described in the PDD; and (ii) the fact that the allometric equations, biomass expansion factors, and wood densities provided are not specific to the species considered in the project.

5.3.4 Understanding of the Minor Carbon Pools

5.54 Most project developers neglect to account for litter and deadwood carbon pools because of their low carbon content and high monitoring costs. Providing evidence for why they are not accounting for these minor carbon pools, however, is a challenge for project developers. Often, they provide theoretical evidence from non-site-specific studies—generating CARs and CLRs from DOEs.

5.55 With respect to soil organic carbon, most developers of early BioCF projects excluded this carbon pool to avoid investing significant time and resources in field work and laboratory analysis. The recent adoption by the CDM EB of the default method to account for yearly changes is a step in the right direction that can encourage project developers to account for soil carbon. This change came late, however, and does not benefit early projects. In fact, only two of the most recent[21] BioCF projects are benefiting from the default approach to soil carbon monitoring.

5.3.5 Accounting for Project Emissions

5.56 Early projects still have to account for sources of emissions that today are considered insignificant. For example, two BioCF projects still have to account for direct nitrous oxide emissions from nitrogen fertilization. In addition, it remains unclear whether some projects need to account for fertilization as there is a lack of consistency throughout the methodology with regard to the inclusion of this source of emissions.

5.3.6 Accounting for Project Leakage

5.57 The most complex issue regarding leakage emissions is the assessment of activity displacement attributable to the project. *Ex-ante* estimation of leakage is a time-intensive effort for project developers who, at a minimum, have to demonstrate the insignificance of these sources of leakage. This minimum requirement involves collecting intensive household and field surveys to provide documentary evidence of agriculture, grazing, and fuel wood collection in the vicinity of the project. As such information is not generally documented in most developing countries, the monitoring of leakage emissions often involves significant transaction costs.

5.58 The amount and quality of data required to make these estimations can overwhelm project developers. For example, leakage assessment in a large-scale BioCF assisted natural regeneration project involved searching livestock census data, estimating available land to relocate displaced grazing, and ensuring that the identified lands would meet the required livestock consumption during the project lifetime. In another example, getting livestock census data per village turned out to be prohibitive for a project in India that involves more than 500 widely scattered villages. At validation, the project developer was asked to improve the leakage estimation by using village-level livestock census and land-use data instead of district-level data. Although using site-specific data would have increased the accuracy of the overall project emission reduction estimations, the project developer could not afford the cost and time required to complete this task. This strict requirement of *ex-ante* estimation of leakage will delay validation, registration, and verification—impacting project feasibility. In fact, because of the absence of expected carbon payments, the farmers started harvesting the trees to collect timber incomes.[22]

5.59 The amount and quality of data required for leakage estimation is expected to be a relatively minor challenge for most small-scale projects as simplified rules for these projects include the application of a discount factor if leakage is considered significant. Assessing significance, however, implies certain assessments of leakage—and this has proven to be problematic in three African small-scale BioCF projects.

5.60 Projects that started project preparation in 2009 are able to neglect leakage estimation based on an assessment of the significance of leakage in their projects. Assessing such significance, however, may be time- and-data intensive. For example, some BioCF

21 Recent projects are those that entered the portfolio in 2007 as part of the BioCF's second tranche.

22 See more discussion on this in Chapter 7.

Photo: Moldsilva

Verification of the Moldova Soil Conservation Project.

projects in tropical climates have struggled with demonstrating the land-use pattern as evidence of enough lands to accommodate the displaced crops in the project vicinity areas. Similarly, some projects have had difficulty in providing documented evidence of the animal capacity in the neighboring lands to demonstrate that additional land will not be needed to accommodate pre-project grazing activity.[23] The latest tool for leakage estimation represents a great simplification to the extent that leakage can be estimated by applying a factor that reflects the land cover in the project's surrounding areas.

5.3.7 Implementation of the Monitoring Plan

5.61 Although to date there is little experience with the actual monitoring and verification of CDM A/R projects, initial signs indicate that project developers will face challenges in implementing the monitoring plan set forth in the PDD. The most common difficulties observed have led to changes related to project boundary, planting schedule, species composition, stocking density, and biomass estimation methods. Examples of deviations are provided in the list below; these derive from the results of an initial assessment of the implementation of nine out of 13 BioCF registered projects.

- **Project boundary:** Five out of nine registered projects have changed or are anticipating changes to the project boundary due to reductions in project area. Reasons for the reductions include poor site conditions, land tenure conflicts, and withdrawal of landholders. In general, the nature of A/R CDM projects makes it very difficult to arrange for parcels of land in advance of projects being proposed.
- **Planting schedule:** Eight out of nine registered projects are behind their planting schedules. The reasons are diverse, and are usually not under the control of the project developers. Examples of the challenges include:
  - —**Technical:** lack of detailed knowledge on suitable species and their growing conditions, availability of planting stock, and the seasonal aspects of planting;
  - —**Local capacity-related:** difficulties in operating nurseries and the timely arrangement of nursery stock for planting;
  - —**Institutional-related:** constraints and delays associated with land tenure agreements;
  - —**Financial and social:** landholder withdrawing from the project; and
  - —**Natural disasters:** droughts, floods, and natural conditions in the field.
- **Species composition:** Three out of nine projects have faced the need to change the species composition. The main reasons for this are difficulties in propagation of planned species, lack of nursery stock, low survival rates of species, changes in community preferences for species, and a change in the

23 According to this guidance, project developers can consider leakage insignificant by assessing several indicators. For example, leakage can be considered insignificant if the area expected to be displaced is less than five percent of the project area or less than 50 hectare of land. If it can be demonstrated that area that will receive the crops have been cropped during one year within the latest five years (from project start), the previous thresholds can be exceeded and leakage can still be deemed insignificant.

relevance of species to a project in the face of natural events (e.g., droughts and floods).

- **Stock density:** One of the projects implemented as assisted natural regeneration required planting a higher seedling density in about 10 percent of the land parcels relative to what was proposed in the PDD. In assisted natural regeneration, however, supplemental planting is dependent upon existing natural regeneration, its distribution over project sites, and field efforts required to support regeneration on respective sites. Therefore planting density variation is not relevant for assisted natural regeneration projects. Planting density variation is also of limited relevance for plantation projects as increases in stock density are mostly intended to insure plantations against low survival rates due to adverse field conditions.
- **Biomass estimation methods:** Five out of nine projects anticipate changes with regard to the use of biomass expansion factors and/or allometric equations. The reasons for this are mostly related to availability of the latest location specific data subsequent to project registration. In addition, projects make changes to measurement approaches to suit the requirements of the growth data (e.g., volume tables/equations or allometric equations) applicable to the project. For example, in the early stages of a project, measurements may be required on collar diameters instead of measurements at diameter at breast height, to suit the requirements of location specific allometric equations (which are based on collar diameter).
- **Quality/Assurance and Quality Control:** Most projects struggle with following the QA/QC measures for data collection and archival presented in the PDD. Overly heavy QA/QC requirements in the monitoring plan can pose challenges to implementation. In one of the BioCF projects, for example, the monitoring process included provisions for having a team member not involved in the measurements cross-check a certain percentage of the sample plots by doing re-measurements and having field staff collecting data go through classroom and field training—and pass an examination to be able to collect data. Moreover, the DOE may require evidence of the implementation of these measures at verification.

5.62 Should the changes listed above be considered deviations from the PDD, the project developer would have to review the monitoring plan and submit a revised monitoring plan for CDM EB approval. This extra step would delay project verification and credit issuance, and involve higher transaction costs.

5.63 Recently in September 2011 the CDM EB published guidance that allow to identify whether any of the issues presented in the examples above will trigger either notification or revision of the monitoring plan (UNFCCC, 2011f). The following changes may be deemed minor:

- Changes in year-wise areas planted, possibly resulting in a part of the project area not being planted.
- Changes in species composition, if the changes are demonstrated at verification to be consistent with the baseline identification and additionality demonstration made at the validation stage.
- Changes in stock density, if the changes are demonstrated at verification to be consistent with the baseline identification and additionality demonstration made at the validation stage.
- Changes in timing and choice of silvicultural operations.
- Changes in timing of harvest occurring before the third verification.
- Changes related to collection of non-timber forest products.
- Changes in tree/shrubs propagation method.
- Changes in post-harvest replanting/regeneration methods.
- Changes in technology employed.
- Changes in inputs (e.g., fertilizers, certified seeds, watering).
- Changes in stratification for sampling.
- Changes in type of sample plots (e.g., temporary, permanent, point sampling plot).
- Changes in number of sampling plots and their allocation to strata.
- Changes in the project boundary (limited to reduction in project area), if the changes are demonstrated at verification to be consistent with the baseline identification and additionality demonstration made at the validation stage.

- Changes in QA/QC procedures, where it can be demonstrated that the changed QA/QC procedures are used by the National Forestry Inventory or were applied in another registered A/R CDM project activity.
- Changes in parameters, equations, or methods used in tree biomass estimation, if the applicability of the changed parameters, equations, or methods is demonstrated at verification using the Tool for Demonstration of Applicability of Allometric Equations and Volume Equations in A/R CDM Project Activities*,* or if the changed parameters, equations, or methods do not result in a decrease in precision of the estimate of tree biomass.
- Changes from provisions regarding shifting or pre-project activities, if the related emissions are estimated at verification using the tool Estimation of the Increase in GHG Emissions Attributable to Displacement of Pre-project Agricultural Activities in A/R CDM Project Activity and are accounted for as leakage.
- Changes in use of fire in site preparation, if the related emissions are estimated at verification using the tool *Estimation of Non-CO2 GHG Emissions Resulting from Burning of Biomass Attributable to an A/R CDM Project Activity* and are accounted for as project emissions.
- Changes in extent of soil disturbance in site preparation, if the related emissions are estimated at verification using Equation 2 of the Tool for Estimation of Changes in Soil Organic Carbon Stocks Due to the Implementation of A/R CDM Project Activities and are accounted for as project emissions.
- Changes in methods of estimation of changes in any carbon pool, if the method applied at verification uses the latest version of the relevant approved tool and the applicability conditions of the methodology applied are consistent with the applicability conditions of the tool.
- Re-stratification and recalculation of sample plots (including permanent vs. temporary) should not be an issue if project area is appropriately represented and the method of selection of sample plots remain the same.
- Changes in measurement approach to better match project reality (e.g., plot size, sample design method, minimum DBH, measurement of collar diameter vs. DBH, and project boundary, among others).
- Changes in planting densities and silvicultural measures, including method of establishment (e.g., planting vs. assisted natural regeneration).
- Different measurement approaches for parameters based on practices from later revisions of the methodology (e.g., tree height and preference for data sources).
- Update of data to be monitored, when better data become available (e.g., changes in default factors because of the availability of species-specific data after project implementation). In addition, the use of both biomass expansion factor and allometric equations methods depending on availability of species.
- Changes in quality assurance/quality control procedures.
- Timing of verification event.
- Changes in source of financing and revenues.

5.4 Tools to Facilitate GHG Accounting

5.64 Early projects in the BioCF were subject to long delays in project preparation because of complex and unclear rules for GHG accounting. As stated in the previous sections, the CDM EB has been developing tools, clarification to methodologies, and specific guidance to respond to project developers' requests for clarification. These actions have helped reduce the size of the methodologies from more than 100 pages to around 30, bringing them in line with methodologies applicable to other CDM sectors. In addition, the CDM EB recently published *Methodology Booklets,*[24] which summarizes the main characteristic of every methodology thus facilitating to a certain extent methodology selection.

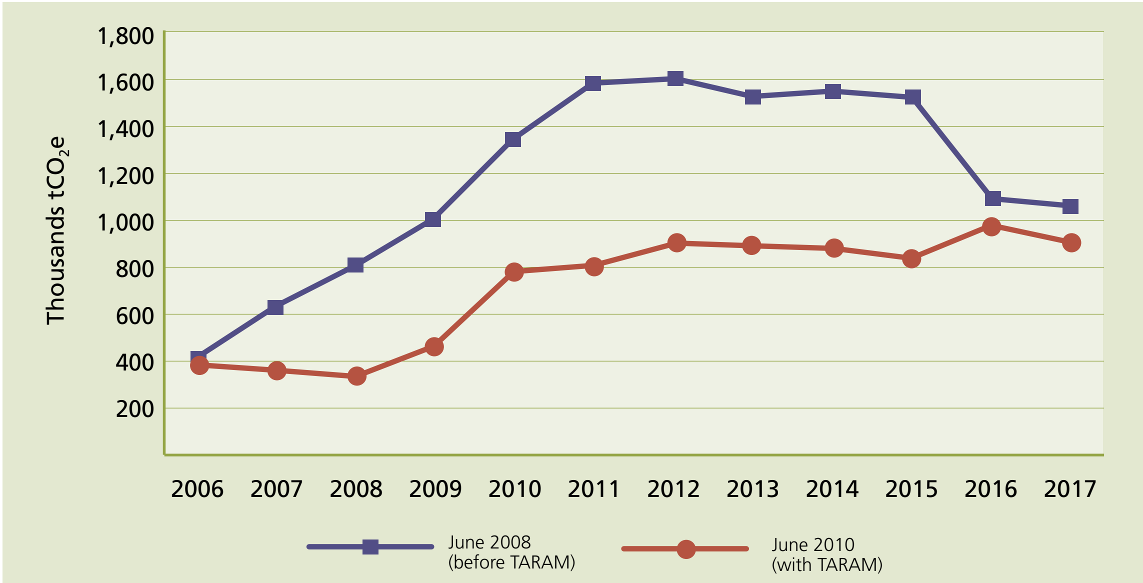
5.4.1 *Ex-ante* Estimation of GHG Emission Reductions

5.65 The BioCF, along with other partners, developed two tools to facilitate the *ex-ante* estimation of emission reductions. One is a tool for calculating the sample size to ensure reliable measurements of carbon stocks and changes in stock.[25] The second, the Tool for Afforestation/Reforestation Approved Methodologies

24 See http://cdm.unfccc.int/methodologies/documentation/meth_booklet.pdf#III.

25 See http://wbcarbonfinance.org/Router.cfm?Page=BioCF&FID=9708&ItemID=9708&ft=LULUCF. This tool was developed jointly by the BioCF and Winrock International.

FIGURE 5.1 EXPECTED EMISSION REDUCTIONS FROM SOME BioCF PROJECTS: ESTIMATIONS WITH AND WITHOUT APPLYING TARAM



(TARAM),[26] is an Excel-based spreadsheet that facilitates the estimation of *ex-ante* emission reductions (tCERs or lCERs) according to the steps prescribed in the A/R methodologies. The tool contains most of the existing large-scale and small-scale methodologies, and its reliability has been checked by an external auditor.

5.66 TARAM not only contributed to facilitating project preparation but also to increasing the certainty of emission reductions at the portfolio level (Figure 5.1). More recent projects have reduced their preparation time and have been able to produce more accurate estimations of emission reductions at the project idea note stage because of TARAM. DOEs have also taken advantage of TARAM as it allows for a consistent examination of the data used by project developers when estimating *ex-ante* emission reductions. In addition, the use of TARAM has improved local project developers' access to the A/R CDM significantly. Before TARAM, the access to methodologies was restricted to highly specialized (often non-local) consultants, which increased project transaction costs. Local project developers involvement in GHG accounting directly improves project performance as technical decisions during GHG accounting benefit from their understanding of the project context and circumstances (e.g. data availability constraints). Empowered local project developers also facilitate farmers/communities' participation in carbon accounting, which promotes a greater level of project ownership.

5.4.2 *Ex-post* Estimation of GHG Emission Reductions

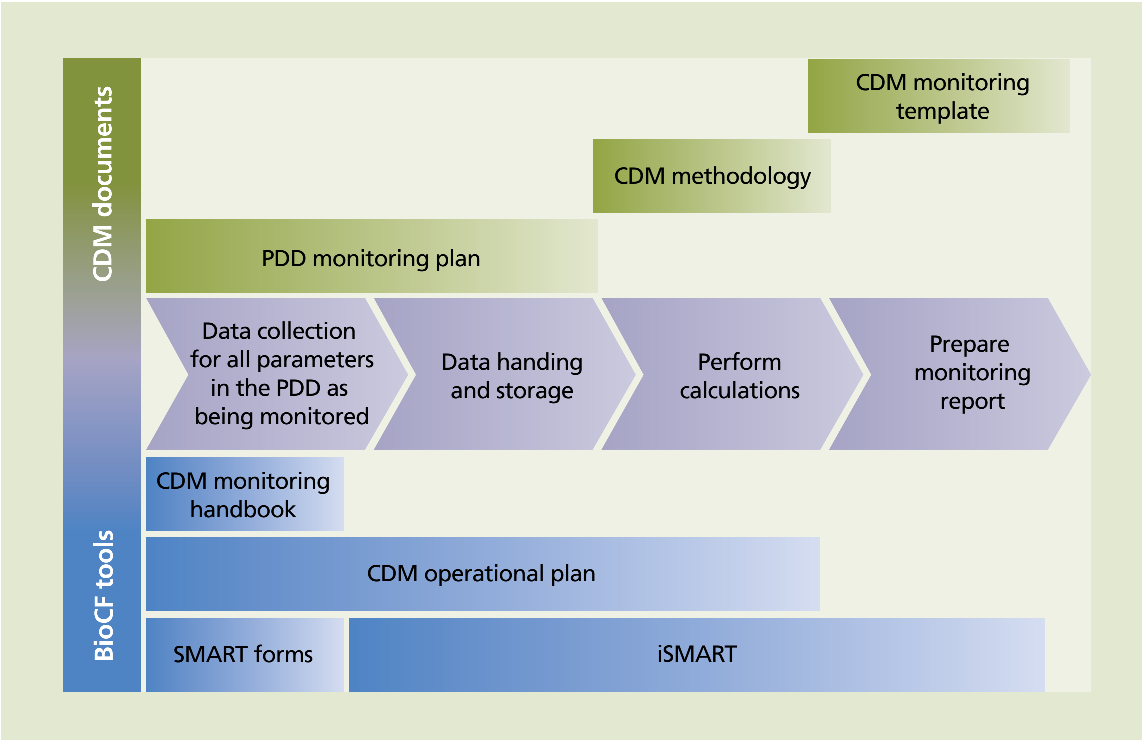
5.67 The Simplified Monitoring Afforestation/Reforestation Tool (SMART)[27] was developed by the BioCF in anticipation of the challenges projects may face in monitoring emission reductions; the aim is to ensure high quality monitoring and verification processes. SMART facilitates the application of monitoring methodologies and was developed to complement TARAM.

5.68 SMART is a tool complemented with teaching material to support project entities' monitoring capacity. For example, it provides customized formats (paper- and electronic-based) applicable to specific methodologies to ensure that the required data are collected. In addition, SMART contains the equations required to automatically calculate the actual net GHG removals from projects; it also supports information system software that facilitates geographic identification of project areas. The users of the tool

26 This tool was jointly developed by the BioCF, the Tropical Agriculture Research and Higher Education Center, CATIE in Costa Rica, and CIFOR in Indonesia.

27 The SMART tool covers methodologies used by BioCF projects.

FIGURE 5.2 CDM REQUIREMENTS ON PROJECT MONITORING AND ELEMENTS OF THE BioCF'S SMART TOOL



can also access information on project implementation and monitoring over the Internet.

5.69 Furthermore, anticipating the need to sustain project capacity on forest monitoring in the long run, SMART also includes training materials that project entities can use to train new staff. As long-term endeavors forestry projects usually face high staffing turnover and training new staff may be challenging as monitoring of emissions and leakage is quite a novel know-how that not even forestry professionals fully manage yet. SMART training materials includes PowerPoint presentations, multimedia presentations (e.g., e-Learning), and a CDM monitoring handbook for forest projects which contains easy-to-follow standard operating procedures for each of the components of the monitoring plan.

5.70 As the ERPA contracts signed by the BioCF projects contain provisions related to monitoring, developers have to design a CDM operational plan and report on its fulfillment. As seen in Figure 5.2, this instrument, along with SMART, is expected to help project developers comply with the A/R CDM monitoring requirements in an effective manner.

5.71 Important lessons regarding tools' reliability and capacity to apply them can be drawn from the BioCF experience developing tools for GHG accounting. Ensuring the reliability of tools has been challenging and costly because of the frequent and multiple changes introduced to the A/R rules by the CDM EB. Tools need to be validated several times to ensure incorporation of CDM EB changes Collecting these changes in a reliable manner is a challenge in itself as they are published in multiple documents and it is difficult to track them. For the same reason, auditors take a lot of time to assess the reliability of the tool. The experience developing and applying TARAM and SMART has also highlighted that although tools have an important role in improving the access to methodologies, they are not a substitute for capacity building. In countries with limited forestry experience, project developers may not only face information and data constraints to use a tool, but also adequate human capacity to understand its requirements.

5.5 Recommendations

5.72 Below are recommendations for the CDM EB on GHG accounting. See recommendations and best practices for project development and implementation in Chapter 8.

- Make efforts to facilitate project developers' access to A/R CDM rules and guidance. Measures may include (i) translating the CDM EB tools and guidance into more languages to promote the involvement of local consultants; (ii) illustrating existing tools with concrete and real examples and explaining the rationale behind requirements and calculations; (iii) developing tools whenever possible to facilitate GHG accounting; (iv) and carefully reviewing methodologies to ensure that they are consistent with the recent CDM EB decisions (see Paragraphs 5.42–5.49 and 5.63–5.69).
- Permit the use of growth parameters such as biomass expansion and root-to-shoot factors based on the expert opinion of the published data in scientific forestry publications (see Paragraph 5.50).
- Facilitate leakage estimates for example by adopting conservative default values as for leakage assessment (see Paragraphs 5.56–5.59).
- Lower the burden of monitoring. This can be achieved by (i) allowing for certain level of deviations from PDD at implementation, recognizing the dynamic nature of forest carbon projects; (ii) developing clear guidance for DOEs to assess projects' deviation from PDD at implementation; and (iii) simplifying monitoring methodologies by allowing a mix of measurements and defaults values on trees count, combined with some other proxy parameters (see Paragraphs 5.60-5.62).
- Promote a two-pronged approach to bridge the gap between rule complexity and low in-host-country capacity to comply with requirements: (i) establishing capacity-building programs to enhance the capacity of beneficiaries and project implementers; and (ii) continuing rule and procedure simplifications from the CDM EB (see Paragraph 5.40).

Finance

6

6.1 Introduction

6.1 Carbon finance encourages climate change mitigation by providing additional revenues to low-carbon activities in Afforestation and Reforestation (A/R) and several other Clean Development Mechanism (CDM) sectors. CDM projects produce emission reductions that can be sold in the carbon market to generate "carbon" revenues. Because of the non-permanence rule, the emission reductions achieved by A/R projects are considered temporal; consequently, these projects produce temporary Certified Emission Reductions (CERs), which in turn have consequences on projects' finance.

6.2 The BioCF experience suggests that the CDM has had little effect on overcoming the disproportionately large investment barriers A/R projects face in most developing countries. The reasons for this include: (i) as trees grow slowly, projects produce low volumes of emission reductions; (ii) the length of Emission Reductions Purchase Agreement (ERPA) contracts is usually short, reflecting the uncertainty associated with the continuation of the Kyoto Protocol; (iii) the transaction costs of meeting the CDM requirements are usually high due to local stakeholders' limited capacity for project development and implementation; (iv) the United Nations Framework Convention on Climate Change's (UNFCCC) approach to non-permanence leads to low-priced forestry credits and limits their demand; and (v) unpredictable carbon revenues due to the long approval process associated with carbon certification. Furthermore, leveraging financing has not been an easy task. Financing institutions and banks do not understand carbon finance or perceive it as highly risky; in countries with unfavorable business environments, scaling up A/R CDM is an even-greater challenge.

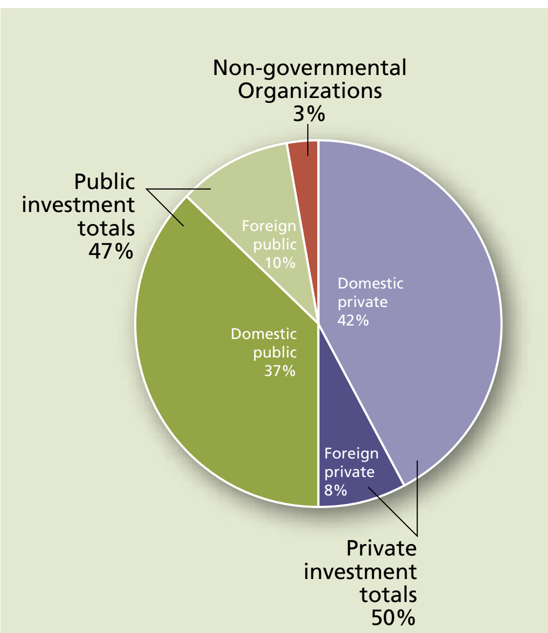
6.3 Reforms are needed to scale up the A/R CDM. From the finance perspective, urgent reforms include developing innovative approaches to non-permanence, creating rules specially tailored for developing countries (to reduce transaction costs), and increasing the limits on emission reductions for small-scale projects. In addition to changes to the rules, innovative instruments are needed to facilitate projects' access to frontloaded financing, such as policy measures (e.g., national budget allocations) and concessional finance.

6.4 This chapter presents the BioCF experience testing carbon finance in different types of forest projects. Section 6.2 explores the role of CDM in catalyzing underlying investment in projects. Section 6.3 analyzes the relevance of carbon finance in the A/R sector. Section 6.4 summarizes recommendations for improvements.

6.2 CDM Catalyzing Investment for Afforestation and Reforestation

6.5 The CDM has played a role in catalyzing underlying investment in A/R projects from different sources. In the BioCF, about $227 million of underlying investment will benefit from CDM ERPA contracts, if projects are implemented as expected. The BioCF has contracted over nine million tCO_2e from 21 A/R CDM projects since 2005 through over $30 million in contract values. The leverage factor is 1:7, reflecting the amount of investment that was catalyzed by each dollar of carbon finance in order to make projects achievable. Fifty percent of the underlying investment is from private sources, 47 percent from public sources, and three percent from nonprofit organizations (Figure 6.1).

FIGURE 6.1 SOURCES OF UNDERLYING INVESTMENT IN THE BioCF PORTFOLIO



6.2.1 Different Sources of Investment in the BioCF Portfolio

6.6 Projects across the BioCF portfolio differ according to the type of investment sources they use and this is closely related to their purpose. Projects in the BioCF portfolio fall into three broad categories according to their investment source: (i) government, public entity, and NGO-led projects, largely supported by public (domestic and foreign) financing; (ii) private sector-led projects mainly supported by domestic private investment, but with some support from foreign private capital; and (iii) public-private initiatives that combine different types and sources of investment.

6.7 Carbon finance has played a small role in catalyzing underlying investment in the first two types of projects. Most of the project entities have financed a large portion of the project costs through equity investment; carbon finance has helped them mainly overcome institutional and country risk-related barriers. For example, because of the incentive from carbon finance, some project entities have been able to establish land tenure arrangements with private landowners and communities that facilitate the creation of sound, legally-binding land-use contracts. Carbon finance has also stimulated other projects to test reforestation in countries with higher investment risk compared with business-as-usual places. However, in public-private partnerships, carbon finance has had a major catalytic role. Examples of projects within each group are presented in the sections below.

Government, Public Entity, and NGO-led Projects

6.8 These projects usually aim to enhance public goods and services[1] and have mainly catalyzed grants

1 These projects typically seek to achieve socioeconomic (e.g., improving livelihoods of small- and medium-sized farmers) and environmental (e.g., land restoration, water source protection, forest and wetland restoration, and biodiversity conservation) goals. Since many of these benefits do not have a market value, closing the investment gap is a challenge.

Box 6.1

Financing of the Moldova Soil Conservation Project

SOURCES OF FINANCING

To achieve its objectives, the project developer (Moldsilva) is blending two types of financing to cover the project costs for the first 10 years: (i) $18.74 million from Moldsilva; (ii) and $2 million from two Japanese PHRD grants. The project is expected to receive about $6 million from the sale of emission reductions to two World Bank carbon funds and to the voluntary carbon market.

FINANCING MECHANISM

Resources from Moldsilva are being used to cover the costs of forest establishment, operations, and ongoing maintenance. Resources from the Japanese grants have been used to provide alternative livelihoods, develop the capacity of communities involved in the project, help the project improve forest management, promote natural regeneration in areas that were previously destroyed by illegal logging, and improve community pastures. The project started planting in 2001, started receiving payments from the sale of emission reduction credits from the World Bank in 2005, and started receiving revenues from the sale of forest and non-timber products in 2010.

THE ROLE OF CARBON FINANCE

Carbon finance helped this project overcome initial investment barriers. Moldsilva was unable to get a loan from a local financial institution. The role of carbon finance in improving the viability of this project is clear, and the benefit is being spread out over 40 years. Without carbon finance the project was not financially viable at Moldova's 15-percent bank lending rates. Carbon finance motivated the local council to establish legally binding institutional arrangements with Moldsilva and participate in the project.

from public foreign sources.[2] The financing models of these projects are simple, with the project entities contributing a large portion of the investment (e.g., 80 percent of equity on average). A few projects in this category have also catalyzed concessional finance. Sixty-two percent of the BioCF portfolio present this type of financing model (see Annex 1). Examples are presented below:

- Projects financed largely by a national government entity using grants from international donors and carbon finance to cover project preparation, implementation, and operating costs (Box 6.1).
- Projects largely supported by a regional government, but raising funding from grants and small amounts from farmers associations and other national institutions A small variant of this model is the contribution of a small amount of equity investment by a nonprofit organization which was created to be the project entity.
- Projects mostly financed by nonprofit organizations. These projects also rely on grants and use carbon finance to cover maintenance costs and farmers' compensation for the land-use change.
- Projects relying on financing from foreign financing sources, in the form of grants and loans from multilateral development organizations. Where World Bank concessional loans are available, the carbon sequestration project is a sub-component of a wider project financed through the loan. While the carbon project benefits from the institutional arrangements implemented by the wider project, this also supports the testing of carbon finance as an instrument for improving the performance of A/R projects.

Private Sector-led Projects

6.9 The main objective of these projects is commercial (e.g., sale of timber and other products). Most of them, however, also pursue social and biodiversity-related secondary objectives. Private sector-led projects are financed mainly by equity from private forest companies. Twenty-four percent of the BioCF portfolio present this type of financing model. Three types

2 Most projects have received grants from the Government of Japan, through the Policy and Human Resources Development (PHRD), and the Government of Norway, through the Norwegian Trust Fund (NTF). These grants are administered by the World Bank and are available to projects on a competitive basis. The governments contributing to these grants do not purchase the project emission reductions to meet their compliance requirements under the Kyoto Protocol. Project developers use these resources to strengthen local managerial capacity, to conduct finance studies for project preparation, and to support leakage prevention activities (e.g., livestock improvement).

of private companies can be identified in the BioCF portfolio:

- Private companies with adequate investment capacity and timber as their main product. They plant selected species in high densities on lands with clear property rights that are close to markets. This project entity seeks to use carbon revenues to compensate for country-related risk[3] and other risks stemming from changes to their business-as-usual scenario (e.g., planting on less degraded lands in relatively more stable countries).
- Private companies with adequate investment capacity that incorporate farmers in their timber supply chain. The project entity seeks to use carbon revenues to compensate farmers for the new land use (forestry) and maintain their interest in participating in the project.
- Private companies with adequate investment capacity engaging in forest projects for conservation purposes. Such as afforestation to compensate for forest loss in flooded areas and to improve biodiversity. Carbon finance to finance project maintenance costs).
- Private companies without adequate investment capacity that have created alliances with foreign private companies to secure needed investments. In this case, the contribution from the private companies is contingent on the project achieving CDM validation, and the carbon revenues are used to cover tree maintenance and operation costs.

Public-private Initiatives

6.10 Public-private entities blend investment finance from public and private sources to achieve commercial, social, and environmental objectives. They have catalyzed investment finance from both foreign and domestic sources. There are two types of public-private initiatives in the BioCF portfolio:

- A private company and a regional government involving poor farmers in timber production and land-restoration. The government agency facilitated project financing by securing low-cost loans from commercial local banks and foreign public financing institutions (Box 6.2). In these projects, carbon finance increased the internal rate of return by 5-6 percentage points.
- A private-public project entity created for the purpose of the A/R CDM project to assure participating landholders' access to difficult-to-access subsidies for afforestation and to promote the participation of private forestry enterprises in the A/R CDM project. Through the participation of these private forest enterprises, the project entity not only ensured a market for the timber produced by the landholders but also guaranteed an attractive and flexible cash flow for farmers.

6.3 Relevance of Carbon Finance in the A/R Sector

6.11 Although some BioCF projects are replicating their first carbon finance experience,[4] the potential to scale up in the A/R CDM is limited and diminishes as 2012 approaches. Replication is happening at a slow pace and only takes place where champion[5] project entities are involved; most projects are still completing their first A/R CDM project. This is true in all CDM sectors,[6] but the A/R projects are at a distinct disadvantage due to the following limiting factors.

6.3.1 Disproportionately Large Investment Barriers

6.12 Forestry sectors in developing countries usually face strong investment barriers. About 90 percent of the BioCF projects confirmed the absence of long-term financing for forestry-type investments from financial institutions in their countries. Most projects were unattractive to private investors because of their poor rates of return on investment and a high perceived risk —particularly due to natural disasters and under-delivery risk associated with unproven technologies (e.g., slow-growing species), unproven business models (e.g., risky counterpart, and highly degraded soils).

6.13 The investment barriers affecting A/R CDM projects also reflect the fact that domestic banks are constrained by the country's sovereign risk. This limits their access to external funding and is reflected in the commercial conditions they offer to potential borrowers (e.g., high interest rates and fees, short tenors, strong guarantees, collateral requirements, and stringent covenants). Overall, the commercial banks'

3 The company started planting in a country that would not have been selected in the business-as-usual scenario.

4 See Paragraphs 1.60 to 1.63.

5 Champion project developers are those with the capacity to successfully undertake projects even in unfavorable business environments.

6 See the 2010 World Bank report 10 Years of Experience in Carbon Finance.

Box 6.2

Financing of the Reforestation on Degraded Lands in Northwest Guangxi BioCF Project

This project aims to reforest around 8,000 ha of multiple-purpose forests on degraded lands in Northwest Guangxi. Due to high precipitation, frequent storms, steep slopes, and poor watershed management, the area along the Pearl River is subject to severe soil and water erosion. The project is contributing to controlling soil and water erosion as well as to restoring degraded lands. Most tree species planted are native to the region (including a mix of birch, China fir, Chinese red pine, and sweet gum), and some area is planted with *Eucalyptus* to meet small timber and fuel wood needs. The project entity is the Guangxi Longlin Forestry Development Company Ltd. The project was registered on September 15, 2010.

SOURCES OF FINANCING

The project blends four types of financing: (i) a $5.15 million World Bank loan; (ii) $12.9 million in loans from local commercial banks; (iii) $19.1 million in equity from the Guangxi Zhuang Autonomous Region (local government) and the Guangxi Longlin Forestry Development Company, and (iv) farmers' contributions. The project has also managed to enhance its cash flow by the sale of carbon credits to the BioCF, expected at $2.2 million as emission reductions are delivered.

FINANCING MECHANISM

Project establishment costs are covered with resources from the World Bank loan and funding from the local government, while operating and maintenance costs are covered with a combination of equity, commercial bank loans, and carbon credits.

THE ROLE OF CARBON FINANCE

The revenues from carbon credits serve as a stable source of income up to 2017 that contributes to the repayment of commercial bank loans in the short-term, helping to bridge the gap before revenues from timber harvesting are produced. Carbon finance is helping improve the economic attractiveness of the project, by increasing its internal rate of return to 10.6% (from 6% without the revenues from carbon credits). By making the project more economically attractive and increasing the confidence of stakeholders for providing equity, carbon finance is promoting public-private initiatives that is still not typical in forestry—a private company and farmers, the local government, and a local commercial bank are all participating.

conditions and all-in cost of loans do not match projects' cash flows needs (Kossoy, 2010).

6.14 Project entities' capacity also plays a role in securing investment. From the financing perspective, managerial, and technical capacity are enabling conditions for securing investment. Some projects with strong potential were delayed in being accepted into the BioCF portfolio because the project entities struggled with closing the financial gap as they lacked the managerial capacity to do so.[7] These delays negatively impacted project implementation and delayed project preparation (and, therefore, credit issuance). In the BioCF experience, the reasons for these delays include low capacity of project entities to meet their financing procedures, administrative lags in disbursement of loans and grants, and political instabilities in a host country preventing timely availability of project finances.

6.3.2 CDM Not Overcoming Investment Barriers

6.15 In the BioCF experience there are three indicators of carbon finance's low capability to stimulate A/R in developing countries. First, the higher[8] leverage ratio of forest projects relative to projects in other CDM sectors reveals that the incremental carbon finance internal return rate is not substantial (World Bank, 2010a). Second, projects mainly rely on project entities' equity contribution, exposing developers'

7 A number of project idea notes have been submitted to the BioCF, but a large portion could not be considered because of a lack of a credible financing plan.

8 E.g., 1:7 in the A/R sector vs. 1:4 in other World Bank CDM projects, respectively

difficulty in mobilizing debt.[9] Third, carbon finance has removed financial barriers to investment in a few cases and carbon revenues only makes a small contribution to projects' viability. All these factors explain the difficulties of this sector to grow.

6.16 These indicators reveal structural problems with the A/R CDM. The combined effect of complex rules, project developers' low capacity for project development and implementation, and perception of high risk have led to high transaction costs, low prices of forestry credits, and a limited demand. This is compounded by the fact that these projects deliver low volumes of emission reductions per year and that most countries have unfavorable business environments that prevent projects from frontloading carbon finance to cover the required high upfront investment. In essence, while projects having commercial purposes as a main rationale struggle with complying with additionality, very few projects with environmental and social goals had internal return rates higher than 6-7 percent without carbon.[10] All these issues are discussed in the sections below.

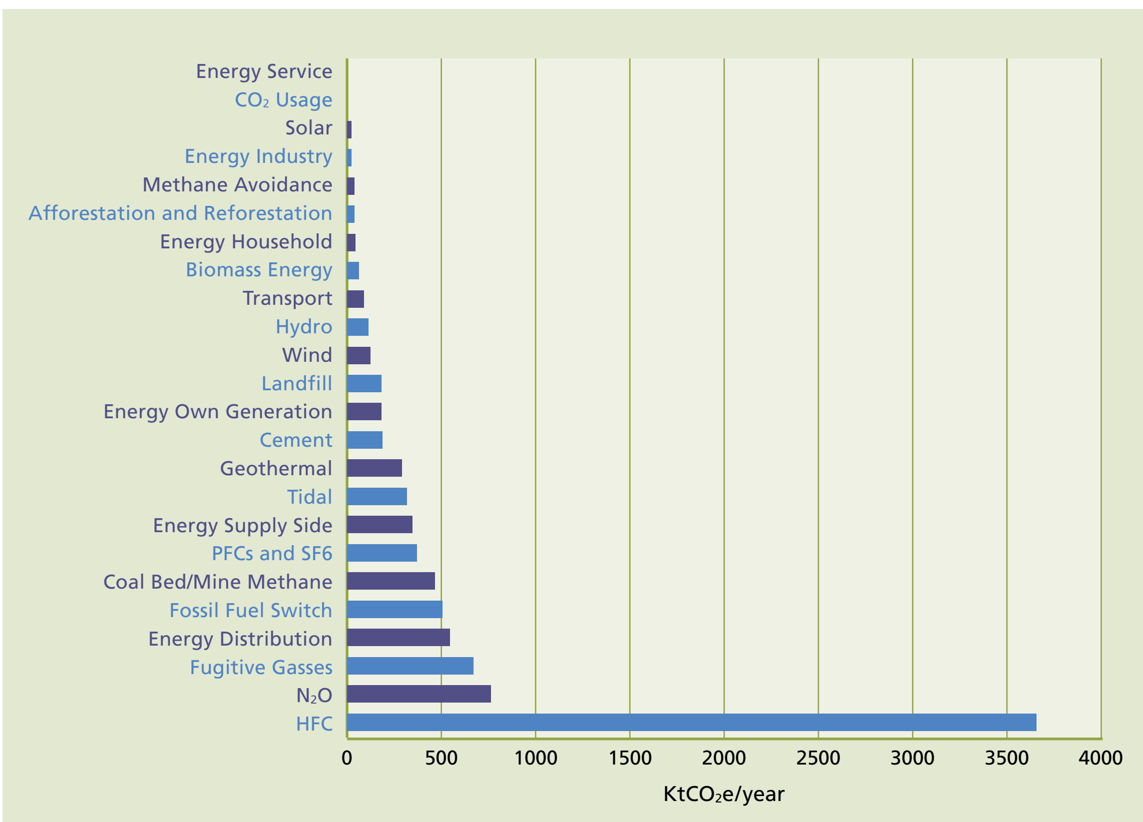
Low Volumes and Short Contracts

6.17 A/R CDM projects are highly limited by their low volume of emission reductions. Registered projects expect to reduce on average 40,000 tCO_2e/year, a low value compared with projects in other sectors. (See Figure 6.2. Also refer to Chapter 1.) This value may vary across projects, depending on site natural conditions. In the BioCF portfolio, for example, projects'

9 The equity contribution of project entities is on average 80 percent of the total investment. In government, public entities, and nongovernmental organization-led projects grants from multilateral organizations and developed countries as well as concessional loans have been the second most important source of financing for these projects. In private sector-led projects small in-kind contribution from participant farmers, if any are the most frequent source of investment. Interestingly, projects in some other sectors present a reverse split, with roughly a 20–30 percent equity and remainder 70 to 80 percent debt.

10 Carbon finance has contributed to increasing the internal return rate of some projects by 5-6 percent; in most developing countries, reforestation projects are expected to result in internal return rates from 10–12 percent. More examples of this are provided later.

FIGURE 6.2 EXPECTED AVERAGE ANNUAL EMISSION REDUCTIONS IN DIFFERENT TYPES OF REGISTERED CDM PROJECTS



Source: CD4CDM

Box 6.3

Eligibility Criteria for Applying the A/R CDM Simplified Modalities and Procedures

Small-scale projects can apply simplified baseline and monitoring methodologies and simplified procedures defined by the UNFCCC. With this, the UNFCCC aims to reduce transaction costs per unit in order to promote small-scale projects (UNFCCC, 2006c). The simplified rules and procedures applicable for A/R projects are extensive; those discussed here are only the most relevant for volume of ERs.

There are two eligibility requirements A/R projects have to fulfill to be considered small scale: (i) they must be developed or implemented by low-income communities and individuals; and (ii) they must result in greenhouse gas removals of less than 16,000 tonnes of CO_2e per year (UNFCCC, 2008j).

The UNFCCC allows project developers to bundle small-scale projects as a way to have a single validation and certification report for all the projects. The projects can be registered with single monitoring plan, which has to be implemented so as to cover all the bundled activities (UNFCCC, 2007c). In addition, a bundle of A/R CDM small-scale project activities can exceed the limit of net anthropogenic greenhouse gas removals provided in the modalities and procedures for small scale A/R projects (UNFCCC, 2006b). Therefore, a large-scale project can be a bundle of small-scale projects—provided that it complies with defined requirements.

potential for carbon sequestration ranges from 3 to 23 tCO_2e/ha/year, reflecting variances in types of ecosystems, project areas, forest management, tree species, level of soil degradation, among others. Such variances highlight the relevance of project entities' objectives in projects' emission reductions. Projects pursuing environmental purposes usually garner the lowest productivity as they plant slow-growing native species in low densities. Small-scale projects have a built-in revenues ceiling as they cannot exceed 16,000 tonnes of CO_2e per year (Box 6.3). Four out of the 21 BioCF projects are small-scale.[11]

6.18 Projects' expectations regarding emission reductions may be reduced due to several factors. Some BioCF projects, for example, have delayed their planting for 3 to 4 years because of difficulties in complying with the A/R CDM rules.[12] Land areas can also be reduced due to unforeseen factors (e.g., operational issues, adverse climate conditions). Some projects have reduced their carbon revenue expectations because of overestimation of tree growth at project planning. This problem is frequent in projects planting non-commercial native species due to a lack of information on tree growth rates. But even projects planting well-known species may face overestimation problems when planting on severely degraded lands for the first time; overestimation of carbon credits have occurred in this type of project in spite of a thorough selection of conservative tree growth rates. The BioCF constantly assesses projects' under-delivery risk and amends ERPA contracts accordingly to produce reasonable estimates of expected contract delivery. So far, a number of ERPA contracts have been amended downwards with projects' original expectations being reduced by up to 60 percent from the original contracted emission reductions.[13]

6.19 In addition to low volume of emission reductions, credit buyers are only willing to enter into short-term credit purchase agreements. This is due to the prevailing uncertainty about a second Kyoto Protocol commitment period. However, BioCF participants have contracted to purchase emission reductions from vintages up to 2017 from most of the projects. With ERPA contracts lasting about eight years, the BioCF is entirely taking on the eligibility risk of post-2012 assets. As a result, other market players less able to run such a risk may offer even shorter ERPA contracts to carbon credit sellers. Although the excess of emission

11 See Section 6.6 for more discussion of small-scale projects.

12 Projects that are seriously lagging behind their implementation schedule (e.g., 3 to 4 years) are those having poor land tenure registries and located in tropical climates and competitive lands.

13 An important reason for ERPA amendments in early projects was difficulties in getting accurate estimations of *ex-ante* emission reductions. The volume of emission reductions in many of the ERPAs were established based on a percentage of projects' preliminary emission reductions. The ERPA contracts of some projects have, however, been amended upward, reflecting over-performance and, sometimes, under-estimation of emission reductions.

TABLE 6.1 TRANSACTION COSTS IN BioCF A/R CDM PROJECTS BY STAGE

Stage of the Project Cycle	Cost US$	
	Large-scale	Small-scale
Project Preparation	170,000–400,000	150,000–300,000
Validation	16,500–45,000	16,750–28,200
Registration Fee[a]	16,500–48,000	—
Verification	14,300–53,200	—
Total[b]	**217,300–546,200**	**—**

a The registration fee for tCERs is calculated based on the difference between the tCERs for which issuance is requested for a given verification period and the highest tCERs previously issued. If this number is positive, the registration fee is $0.10 per the first 15,000 tCERs based on the annual emission reductions produced over the crediting period of a project, plus $0.20 per tCER produced in excess of 15,000 tCO_2e (UNFCCC, 2010b). Small-scale A/R CDM projects do not pay registration fees. (The CDM EB stated in 2010 that no registration fee has to be paid for proposed project activities with expected average annual emission reductions over the crediting period below 15,000 tCO_2e.)

b The total figure for small-scale projects is still incomplete as none of the four BioCF small-scale projects has gone through the verification process.

reductions[14] (i.e., emission reductions not contracted with the BioCF) may appear attractive for projects in the long run, not having a longer-term carbon contract is negatively affecting their short-term viability. Poor cash flows increase the non-permanence risk of projects, especially for those expecting to use carbon revenues to cover tree maintenance costs.

6.20 The voluntary carbon market is starting to play a role in projects' cash flows. As projects advance in the CDM project cycle (e.g., registered projects), they gain the confidence to approach other markets for the sale of future vintages of CERs. This has happened in two BioCF projects, one of which managed to contract emission reductions for a value that represents 20 percent of the funding required for effective project implementation. The voluntary forest carbon markets may open opportunities for the sale of excess emission reductions produced by A/R projects, with the market for REDD+ credits increasing in recent years.[15]

High Transaction Costs

6.21 The transaction costs of meeting the A/R CDM requirements are high. Transaction costs include PDD preparation, validation, project registration, monitoring, verification of emission reductions on the ground, and issuance of credits. Table 6.1 illustrates this for the BioCF projects, most of which have completed the first three stages of the cycle. Few projects have gone through verification.

6.22 The wide range in transaction costs mostly reflects differences in project developers' capacity to comply with the A/R CDM rules and procedures. High preparation costs are evidence of the fact that early projects incurred costs for developing new methodologies[16] and that project developers have had to outsource services to specialized international consultants to apply the complex early versions of GHG accounting methodologies. On average, transaction costs[17] for small-scale BioCF projects are 30 percent lower than for large-scale projects. This is because small-scale projects are allowed to apply simplified baseline and monitoring methodologies and procedures. The significance of such a reduction, however, has to be analyzed in light of the potential carbon revenues from these projects.[18]

6.23 Cost variations in validation and verification reflect differences in project sizes and locations, the quality of project documentation, as well as DOEs' experience in the A/R sector. Validation contracts negotiated in recent years are more costly than early contracts because DOEs have improved their estimations of the workload required for desk reviews and site visits. Cost increases also reflect the increased scrutiny by DOEs to projects since 2009 as a result of the CDM EB's

14 Depending on the starting date and length of the crediting period, emission reductions from 9 to 24 years have not been contracted in BioCF projects.

15 Many BioCF projects are contributing to reducing the pressure over primary forests through reforestation, forest restoration, and assisted natural regeneration.

16 The cost of developing a methodology for A/R projects was 15 percent higher than for projects in other CDM sectors, reflecting the need for primary data collection and the scarcity of specialized capacity for methodology development.

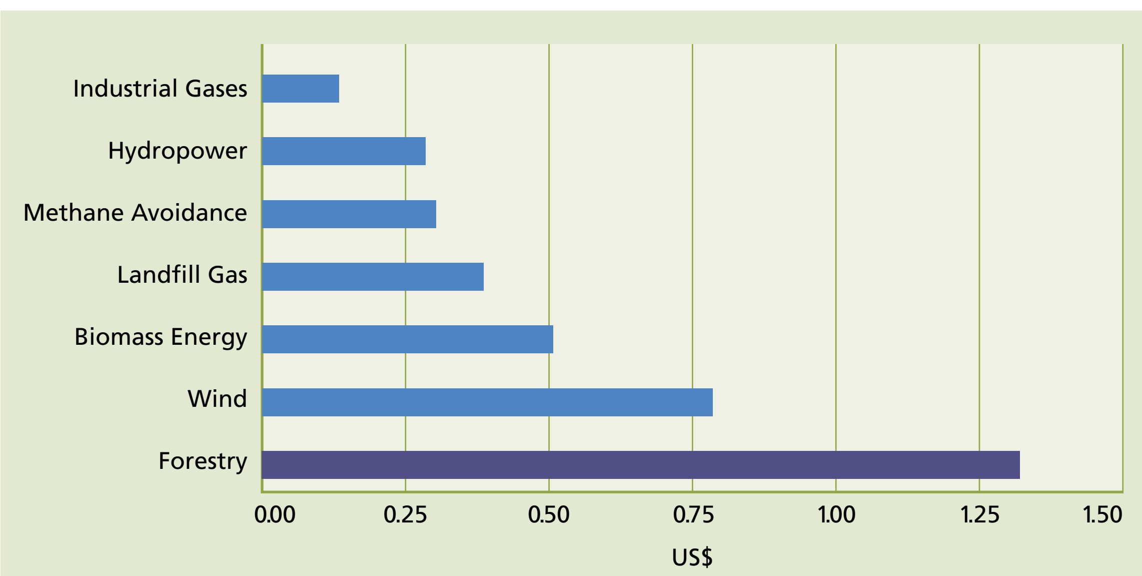
17 Including preparation, validation, and registration costs.

18 See Section 6.3.3 for more discussion on the viability of small-scale projects.

FIGURE 6.3 VARIATION OF VALIDATION COSTS IN CDM PROJECTS DEVELOPED IN THE BioCF

Note: The prices identified in the figure are validation costs incurred by some BioCF A/R CDM projects.

FIGURE 6.4 PROJECT DEVELOPMENT COST BY TECHNOLOGY ($/t$CO_2$e)—WEIGHTED AVERAGE



Note: Transaction costs included in this figure are project preparation, validation, and monitoring costs up to July 2011. The figure does not include methodology preparation costs, and it only reflects World Bank costs—excluding other transaction costs incurred by the project entity.

stricter evaluation of DOEs' assessments of projects.[19] Figure 6.3 illustrates the validation costs of projects developed in the World Bank and indicates some costs for validation of A/R projects. The trend lines for both small- and large-scale projects show that the prices for validation have moved upward over time.

6.24 Compared with other sectors, the costs of developing A/R CDM projects rank highest. As shown in Figure 6.4**,** the average cost per tCO_2e contracted in forest projects exceeds $1.00, higher than the average cost per tCO_2e of carbon for projects in other sectors. These costs could decrease marginally with improved local capacity and the availability of methodologies applicable to the project context. For example, in a second A/R project implemented in China by the same project entity, the preparation costs were about 30 percent lower.

6.25 There are differences across projects when analyzing project development costs per tCO_2e.[20] While costs range from $0.40 to $3.70, early projects with low capacity for project development have had the highest cost per tonne.[21] On the other hand, projects with the lowest cost are those that started their development more recently (e.g., 2009) and therefore are greatly benefiting from CDM EB rule simplifications. These projects also have good capacity for project development and implementation, reflecting the BioCF's improved project screening process. Projects planting on scattered and disperse areas tend to have high monitoring costs.

6.26 The significance of the transaction costs can be understood when comparing them with the total investment and the expected carbon revenues. While the transaction costs for BioCF projects are on average six percent of the total investment, this figure varies widely (from 0.5 to 20 percent) depending upon the project size and total investment. When comparing transaction costs per unit with expected carbon revenues, they are much higher (one-third of the price of emission reductions as opposed to other project types).[22]

Low Prices and Low Demand

6.27 Current prices of credits are too low to enhance A/R CDM project's cash flows. Because of the UNFCCC's approach to non-permanence, the prices of these credits are lower than prices of credits from projects in other CDM sectors. A/R CDM credits are considered temporary and have a limited useful life. Thus, Kyoto Protocol's Annex B parties using credits from A/R CDM projects to meet their emission reduction commitments have to replace them with permanent credits before their expiration.[23] Since A/R credits expire in future commitment periods,[24] their current price depends on actual and future prices of other Kyoto Protocol's assets[25] as well as on discount rates. To ensure a financially sound transaction, the price of a tCER[26] added to the price of a (forward) replacement credit[27] should be comparable to the current price of a permanent carbon credit; as a consequence, the BioCF's price range for emission reductions is $4–5 per ER.

6.28 In addition to the negative effect on prices, the UNFCCC´s approach to non-permanence negatively affects the demand for A/R CDM credits. Temporary credits are not attractive for current cap-and-trade systems because of their lack of fungibility with other Kyoto Protocol's assets. For example, A/R CDM credits have been banned under the European Union Emissions Trading Scheme (EU-ETS), so far

19 DOEs can lose their accreditation if their assessment of projects at validation and verification is not carried out according to the CDM standards.

20 Including only the costs incurred by the World Bank.

21 Projects located in tropical climates where the vegetation reach the national CDM forest definition thresholds and with weak land tenure registry systems have the highest transaction costs, reflecting the many efforts they have made to identify appropriate lands and landholders.

22 Transaction costs beyond those of meeting the CDM requirements have to be considered when estimating the cost of sequestering a tonne of CO_2e. These include business development, legal, due diligence, project planning, institutional arrangements, and project management. (See Pagiola et al., 2004, and World Bank, 2011, for more information on methods for calculating the cost of carbon sequestration.)

23 There are two types of forestry credits: temporary CERs (tCERs) and long-term CERs (lCERs). Annex B parties of the Kyoto Protocol can use them to meet their compliance for the commitment period they were issued. TCERs expire at the end of the commitment period subsequent to the commitment period they were issued; LCERs expire at the end of the project's crediting period.

24 The BioCF pays projects for their annual emission reductions upon validation, receipt of annual reports, and other conditions defined on a project-by-project basis. See Section 6.6.2 for further discussion on this topic.

25 Annex B parties can replace tCERs with assets such as AAUs, CERs, ERU, RMUs, or tCERs. They can replace lCERs with AAUs, CERs, lCERs, ERUs, or RMUs. See Chapter 5 for more discussion on non-permanence.

26 The BioCF´s project entities decided to sell tCERs instead of lCERs to the BioCarbon Fund. (see Chapter 3)

27 The BioCF´s participants decided to use only tCERs as replacement credits (See Chapter 3)

Nursery of the AES-Tietê Afforestation/Reforestation Project in the State of São Paulo in Brazil.

the most important market for CERs.[28] The persistent lack of demand is discouraging new project and making current CDM EB's efforts to facilitate project development appear to be a waste of time.

6.29 Long-term carbon price signals are fundamental to positioning A/R CDM projects in the market. New windows of opportunities could be opened for LULUCF credits, but they remain uncertain. It was clear in COP 16 that the A/R CDM will continue to be an eligible activity under an eventual Kyoto Protocol second commitment period. Furthermore, the whole LULUCF sector could be promoted as negotiations under the Ad Hoc Working Group on Further Commitments for Annex B Parties under the Kyoto Protocol broadened the scope of LULUCF activities toward a land-based approach to emission reductions. In addition, the growing voluntary carbon market for REDD+ credits also represents an opportunity to increase the demand for A/R project developers, although the role of A/R within the REDD+ framework is still unclear.

Small Contribution to Project's Underlying Cash Flow

6.30 The combined effect of the previously explained challenges (e.g., low ER volumes, short contracts, high transaction costs, and low credit prices) leads to a small contribution of carbon revenues to a project's underlying cash flow. Since carbon payments are normally made upon delivery, carbon revenues may not be adequate to meet all projects' management and/or land opportunity costs; the timing of carbon payments may also be critical for achieving expected cash flows. As explained in Chapter 3, A/R CDM projects are allowed to verify carbon credits only once every Kyoto Protocol commitment period. More flexible approaches to non-permanence, relative to temporary crediting, (e.g., a buffer approach, credit reserve, or project insurance) could allow developers to select the most convenient number of verifications for their cash flow needs. Box 6.4 illustrates the relevance of carbon revenues in the cash flow of two BioCF projects differing in their objectives and the need and size of upfront investments.

6.31 The project developers' technical and managerial capacity also plays a role in projects' viability. One-third of the BioCF projects were at risk because of issues related to technical and managerial capacity. In one case, for example, the lack of managerial capacity was reflected in the project entity's decision to hold onto the underlying investment instead of taking key early actions (e.g., hiring staff, undertaking timely planting in the rainy season). In other cases, the lack of technical capacity to prepare and implement a PDD led project entities to misinterpret the land eligibility analysis[29] and plant on ineligible lands, which led to severe reductions in project size.[30] The feasibility

28 There are other reasons (e.g., concerns about project developers' ability to produce measurable, verifiable, and reportable credits) explaining the EU-ETS's policy associated with forest temporary credits, but lack of fungibility is one of the main ones.

29 As discussed in Chapter 3, the major causes of such misinterpretation are project developers' low capacity and the ambiguity of the land-related rules.

30 In one project alone, the area was reduced by 90 percent of its original size. (See Chapter 4.)

Box 6.4

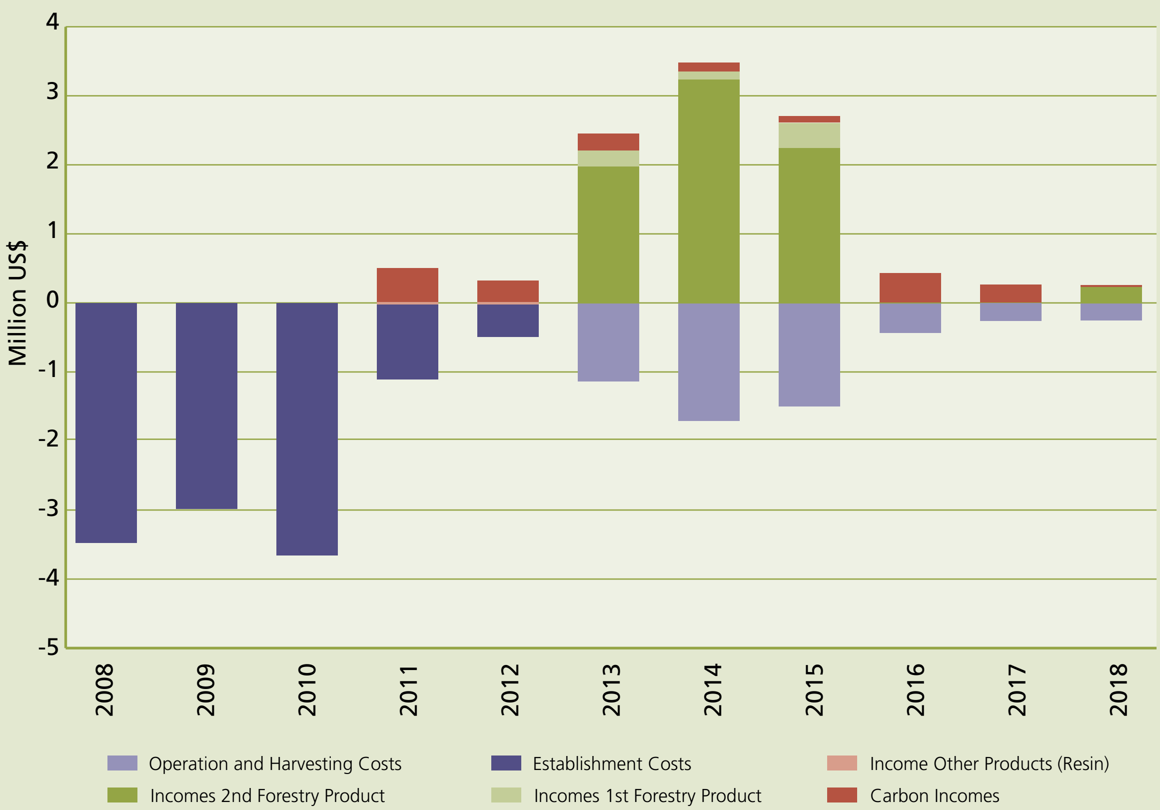
Illustration of Cash Flow up to 2018 in Two Types of BioCF Projects

The figures below illustrate the relatively marginal impact of carbon revenues in the cash flow of two BioCF projects.[1] In one of the projects, carbon is only a sub-product (Figure 6.5); in the other, carbon is the only source of revenues (Figure 6.6). Because of the BioCF business model, these projects receive annual carbon revenues, upon succesful completion of validation .

MULTIPURPOSE PROJECT

This multipurpose project plans to reforest about 9,000 ha of severely degraded lands with native and introduced species. The main rationale for the project is to achieve profitability by producing timber, resin, and carbon credits; it also aims, however, to promote biodiversity conservation as well as to improve the livehood of impoverished people that live in remote degraded lands. The potential for carbon sequestration is about 10 tCO_2e/ha/year over the first 20-year crediting period. The project has contracted with the BioCF for about 70 percent of its expected emission reductions from 2009-2017.

FIGURE 6.5 PARTIAL CASH FLOW OF A PROJECT WITH MULTIPLE PURPOSES



Carbon revenues helped the project developer increase its internal return rate by about five percentage points. The impact of carbon revenues in the cash flow is minor relative to revenues from other products (e.g., timber and resin). Carbon revenues are also low relative to the project's operational costs (e.g., about seven percent) and to the landholders' cash flows. The project entity plans to use 40 percent of the carbon credits to pay back a loan; the remaining 60 percent will be shared among the local communities and the project entity. Project

1 The relevance of the carbon revenues in projects against the cost of sequestering a tonne of carbon need to be further analyzed considering both the total ERs expected during the crediting period and all project costs.

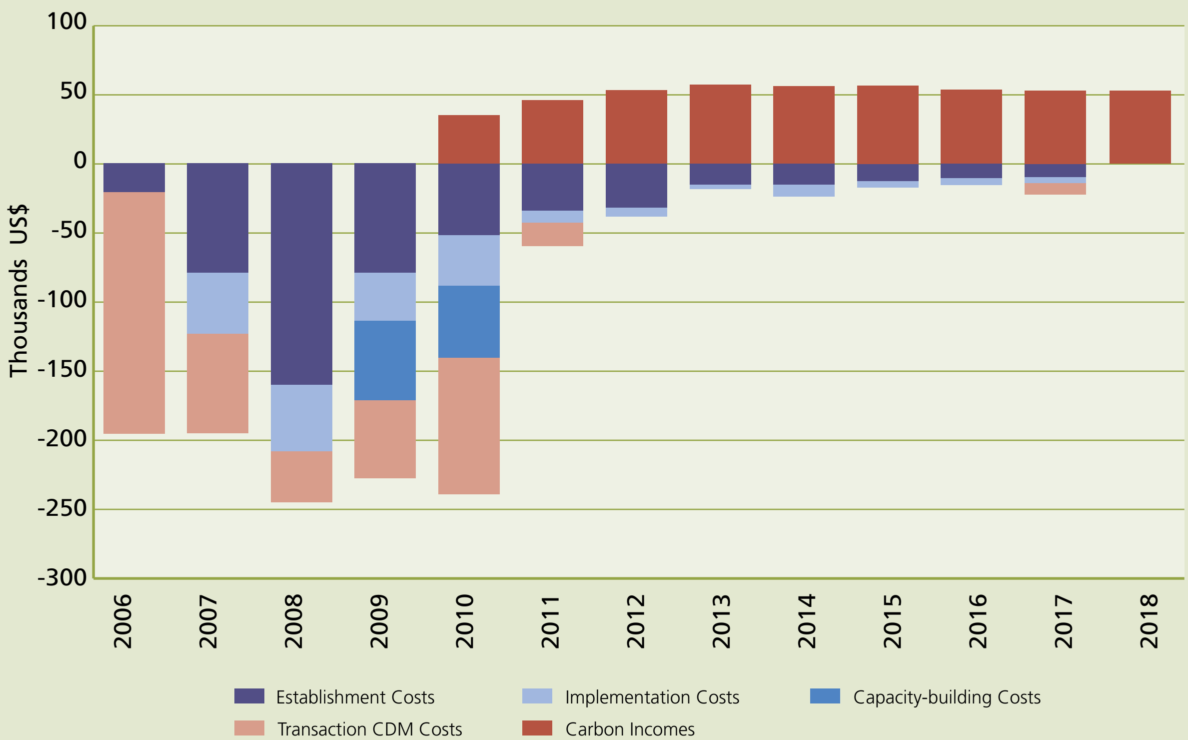
Box 6.4 (continued)

participants' share of carbon revenues is, consequently, low, but they will also share benefits from other products. (See Chapter 7 for more discussion on benefit sharing.)

ASSISTED NATURAL REGENERATION PROJECT

The carbon revenues look better in the cash flow of an assisted natural regeneration project, the main goals of which are to recover the vegetation of severely degraded lands and to promote sustainable development in local communities. The potential for carbon sequestration in this 3,000 ha assisted natural regeneration project is about 11 tCO_2e/ha/year for a 30-year crediting period. Carbon credits are the only benefits with market value in this project. With an ERPA contract that represent half of the project's expected emission reductions for 2009-2017, the carbon revenues are enough to cover the project implementation costs for the first 12 years.

FIGURE 6.6 PARTIAL CASH FLOW OF AN ASSISTED NATURAL REGENERATION PROJECT



of these projects is now at risk and is contingent on selling the carbon credits from CDM-ineligible areas in the voluntary carbon market.

6.3.3 Small-scale Projects Are Not Viable

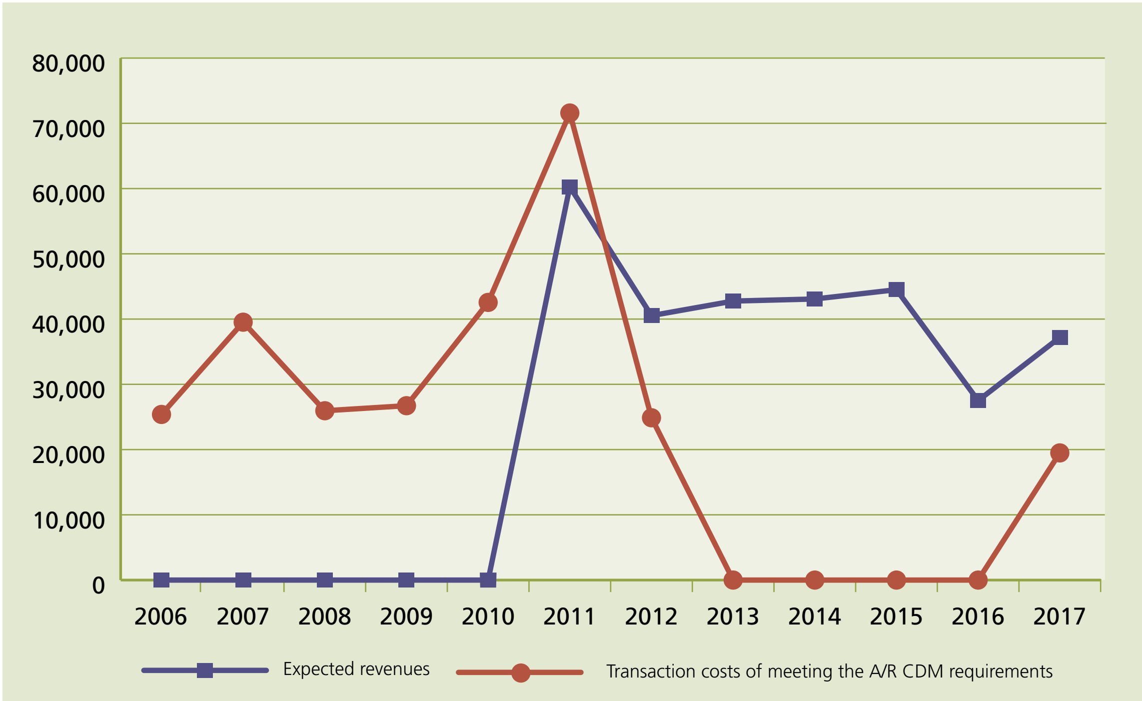
6.32 The viability of small-scale A/R CDM projects is further challenged due to the cap on emission reductions. As explained in Box 6.3, small-scale projects have a cap in annual emission reductions imposed by the UNFCCC as a way to limit the type of projects that can benefit from simplified modalities and procedures developed to reduce transaction costs. As stated before, the transaction costs for the four BioCF small-scale projects are 30-percent lower than for large-scale projects; however, World Bank project development costs in three of them are as costly as some large-scale projects—with project development costs[31] exceeding the average cost of $1.50 per tCO_2e. Therefore, with the 16,000-tonne of CO_2e per year limit and current credit prices, these projects struggle to achieve viability.

6.33 Figure 6.7 illustrates the stream of transaction costs and discounted carbon revenues for two BioCF small-scale projects. In the first project, a

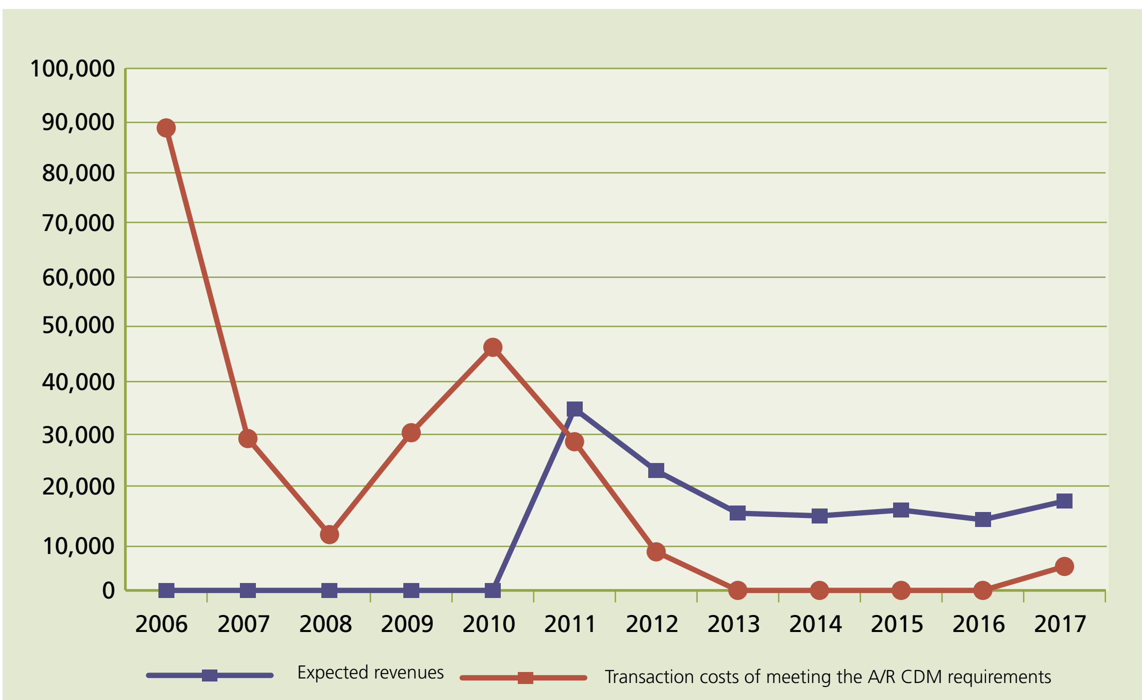
31 One out of the three projects is still under preparation.

FIGURE 6.7 TRANSACTION COSTS AND CARBON REVENUES EXPECTED IN TWO BioCF SMALL-SCALE PROJECTS

Project 1



Project 2



Note: Transaction costs include World Bank project preparation costs, validation, and verification.

governmental agency expects to bundle five small-scale projects planting introduced species on about 2,000 ha of degraded pasture lands, with a crediting period of 20 years renewable twice. The second project involves a private-company-led project with a 30-year non-renewable crediting period that planted about 800 ha of introduced and native[32] tree species.

6.34 Taking a narrow view[33] of these projects, the difference between the discounted carbon revenues and transaction costs of meeting the CDM requirements is slightly positive for project 1 and negative for project 2.[34] Viability would be less if these projects were outside of the BioCF portfolio as the carbon incomes would flow only upon credit issuance.[35] The transaction costs of meeting the CDM requirements are close to $200,000 in these projects, which is as high as the lower end of the range[36] for transaction costs in large-scale projects. Overall viability would be less favorable for the other two small-scale BioCF projects (not shown in Figure 6.7) as carbon payments are likely to be delayed longer because the projects are planting only slow-growing native species in scattered patches of land.

6.35 In addition, the effectiveness of project bundling as a strategy to promote economies of scale is also limited. Project developers struggle with securing and managing information from multiple projects. In project 1, for example, preparing the PDDs for the envisioned five projects has been a time-consuming and costly task. In fact, five years after starting project preparation, only two of the five projects have been registered under the CDM. The project entity has struggled with providing evidence of project starting dates for some of the small-scale projects and managing the validation requirements for the others. In addition, bundled projects usually entail higher monitoring costs as DOEs have to undertake field assessments in widely scattered land areas.

6.36 With transaction costs as high as those of large-scale projects, simplified modalities and procedures have little effect on improving the viability of small-scale projects. The reduction in transaction costs achieved by these projects is minimal, their potential for carbon revenues is capped, and the rule requiring the involvement of low-income communities can further increase transaction costs where capacity is low. The modalities should be further simplified and the cap on emission reductions should be increased to facilitate small-scale projects. An increase of the price of credits is also required for the simplified modalities and procedures to have an effect on small-scale participation in the A/R CDM (Locatelli and Pedroni, 2006).

6.3.4 Frontloading Future Carbon Revenues Remains a Challenge

6.37 In the early days of the carbon market, many expected that carbon finance could serve as an instrument to raise frontloaded capital and to enhance a project's cash flow. Carbon finance, however, was not fully understood and ERPAs were too new to be factored into bank financing. In addition, it has taken time in the overall CDM for some financial institutions to offer services that leverage ERPA values. The situation is less favorable now as lenders may no longer be willing to account for prospective CDM cash flows in debt sizing because of the current high eligibility risk of Kyoto Protocol assets. In addition, as the post-2012 market refocuses toward least developed countries, potential project developers and sponsors may be considered less creditworthy (World Bank, 2011).

6.38 Innovative financing is required to help projects secure debt with sufficient maturity to cover the high upfront cost of forest projects. In the BioCF experience, projects with good capacity have received the first carbon payments only three years after initial planting; therefore, developers had to provide resources to cover after-planting costs. Bridging this cash flow gap is critical to reducing the under-delivery risk of credits. The BioCF, taking on the entire risk of not getting credit certification, pays projects based upon CDM validation completion and according to the most accurate estimation of carbon sequestration.[37] Still, this measure is in most cases not enough to support projects with significant delays in preparation and a lack of financial resources to cover annual tree maintenance costs. Notwithstanding, one project developer in a country with a robust forestry sector has managed

32 Native species are planted on about six percent of the project area.

33 The analysis only considers the ERPA period and carbon revenues.

34 In p1, the difference between discounted costs and benefits is one percent of the total investment if applying a 10-percent discount rate and close to five percent if applying a 5-percent discount rate. In p2, the result is negative if applying five, eight, or 10-percent discount rates.

35 As previously stated, the BioCF pays for emission reductions achieved by projects upon validation and submission of monitoring reports.

36 See Table 6.3.

37 This may not be an option for other carbon aggregators.

Box 6.5

Innovative Financial Mechanism in a BioCF Project in Chile

The Fundación Chile's carbon sequestration project has afforested about 2,900 hectares in regions VII and VIII of Chile. The project has planted 1,300 hectares of *Radiata pine* and 1,600 hectares of *Eucalyptus globulus* on marginal agricultural lands, expecting to sequester over 1 million tCO_2e by 2020. In addition to carbon sequestration, the project will deliver additional benefits: erosion control, land regeneration, and improvements in both biodiversity and local landholders' well-being. Land regeneration is important in the project region as soils are extremely compacted, which prevents vegetation regeneration and water infiltration.

Financing limitations and other barriers had deterred small and medium farmers in these two regions from converting their land-use from marginal agriculture to higher-value forestry. To implement the project, Fundación Chile developed an innovative financial model that enabled these marginally productive lands to be afforested to produce social and environmental benefits. The project was financed through several sources of investment: (i) an initial contribution from Fundación Chile and the Ministry of Agriculture (10 percent of the total investment); (ii) the issuance of a "forest-backed" securitized instrument in the Chilean capital market that was supported by the net revenues from the harvest and the commercialization of forestry assets (28 percent); (iii) subsidies (27 percent); and carbon finance (35 percent).

The Fundación Chile project operates by entering into land-use contracts with small and medium landowners to use their land for a defined period of time. Land ownership remains with the original owner. In exchange for the use of their property, landowners receive $40/ha/year and 10 percent of the revenues at the time of harvest. The farmers do not assume the costs and risks associated with ongoing forest management, and Fundación Chile will replant the lands upon harvest. One of the major forestry companies in Chile, Forestal Mininco, participates in this project by guaranteeing minimum harvest volumes and planting maintenance in return for a fixed administrative fee and a variable incentive.

Acknowledgment: Cerda and Baldovino from Fundación Chile.

to introduce innovation into their project financing by issuing forest-backed bonds in the domestic capital market (Box 6.5). Although this experience set a good precedent for forest carbon projects, it remains to be replicated more widely.

6.39 Certain instruments and insurance initiatives are starting to become available to project entities. However, these may not be enough—and certainly there is room for more innovative finance mechanisms. Innovative instruments are vital for garnering upfront investment support, and they are likely to develop as the carbon market grows. There is also room to factor in revenues from environmental services other than carbon and official development assistance. A/R CDM projects produce several environmental and socioeconomic benefits to local communities. Some markets are emerging for environmental services (other than carbon) and synergy should be promoted.

6.40 The World Bank is also developing a structured carbon bond. This instrument utilizes the World Bank's AAA status to raise funds and is targeted at investors interested in the potential upside of carbon credits without risking their principal. The bond principal is not used to support the underlying forest carbon project; rather, it is used in regular World Bank lending operations and is essentially guaranteed to be returned to the investor. The cash flows arising from interest payments over time from the underlying World Bank lending operation which ordinarily funds the bond coupon are instead swapped for the present value. This provides a lump sum which can be invested in a project in return for a share of the carbon credits generated by the project. These carbon credits are then sold into the market and generate a variable financial return or coupon for the bond investor.

6.41 There are many variations on this theme but, essentially, for a 10-year bond life, about 20 percent of the bond principal value can be made available as a lump sum from the swap transaction, depending on prevailing market rates. This approach could work well for A/R projects, as the upfront investment costs are typically lower than for an energy-related project.

6.4 Recommendations

6.42 Some recommendation are presented below for the UNFCCC, CDM EB and CMP. Best practices collected based on the BioCF experience regarding project financing can be found in Chapter 8.

FOR THE UNFCCC AND THE CDM EB AND CMP

- Streamline the CDM procedures to improve the predictability of carbon revenues (see Paragraphs 6.2, 6.21 and 6.37, and Chapter 2).
- Simplify the A/R CDM requirements to reduce transaction costs. Simplified modalities and procedures should be even further simplified (see Paragraphs 6.21-6.26 and 6.28, and Chapter 5); and similarly, non-permanence should be approached through options that allow more flexibility in terms of number of verifications per commitment period to improve a projects' cash flows.
- Increase the current threshold of 16,000 tCO_2e annually for small-scale projects and revisit the requirement that low-income communities should develop or be involved in these projects. In line with regulations for projects in other CDM sectors, participation of low-income communities in A/R CDM projects should be promoted, but not required (see Paragraphs 6.32–6.36).

7 Institutions

Photo: HP Mid-Himalayan Watershed Development Project

7.1 Introduction

7.1 Good governance is essential for the development of effective forest carbon initiatives. Governance is a broad concept that encompasses the mechanisms, processes, and institutions through which individuals and organizations articulate their interests, exercise their legal rights, meet their obligations, and mediate their differences (UNDP, 2005). This chapter focuses on one key aspect of governance: the set of rules, procedures, and instruments used to strengthen forest carbon initiatives.

7.2 The design and implementation of forest carbon projects are complex endeavors that require a wide range of local expertise and the long-term commitment of all parties involved. The analysis of the BioCF portfolio shows that effective institutional arrangements are essential to defining the rights and responsibilities of all project participants clearly. The effectiveness of these arrangements, however, depends on the process through which they are created as well as their perceived legitimacy. This chapter examines these institutional issues with a special focus on projects involving collaborative partnerships.

7.3 The majority of the BioCF portfolio's projects involve multiple partners. In such projects, it is important that there be a lead entity among the partners. One of the insights from the BioCF experience is that the leading entity's technical expertise is not as important as its capacity to coordinate, lead, and anticipate potential risks and challenges. This entity must also ensure the flow of capital throughout the project cycle to cover both operational and maintenance costs and payments to participating local communities.

7.4 In projects involving local communities and individual farmers, it is essential that project entities invest in strengthening local institutions and fostering local stakeholders' participation throughout the process. This will enable local communities to take over the project in the future and continue the sustainable forestry activities in the long run.

7.5 This chapter is divided into three main sections. Section 7.2 describes the legal and institutional framework in place for the development of BioCF projects, the partners involved, the structure of the partnerships, and the institutional arrangements in place to ensure effective implementation. Section 7.3 examines institutional challenges. Finally, Section 7.4 contains recommendations for project developers and national governments.

7.2 Legal and Institutional Framework

7.6 Institutional issues are a key factor in the success or failure of forest carbon projects. A supportive national framework and effective legal and institutional arrangements at the project level often enable projects to overcome many of the technical and regulatory challenges faced by CDM forest initiatives.

7.2.1 National and Local Circumstances

7.7 Projects must rely on a supportive national framework to achieve their goals. Even when the government is not directly involved in forest carbon initiatives, government support is crucial for the development of A/R projects. This is true not only because the CDM requires the approval of the DNA but also due to the broad interaction between activities developed locally and national policies and regulations. On the one hand, these interactions can facilitate the implementation of forest carbon projects. For example, in BioCF projects that went through a process of securing land tenure, the active engagement of national land agencies in project preparation increased the certainty of the statutory recognition of local farmers' user rights to the land (see Chapter 4 for more details). On the other hand, potential incompatibilities with some national policies, and limited governmental capacity and resources, can delay the development of A/R projects.

7.8 The context in which forest carbon projects are developed is crucial to the success of these initiatives. Context influences institutional arrangements, risks, transaction costs, feasibility, and durability (World Bank, 2009). In the BioCF portfolio, 30 percent of the projects were developed as added components to larger projects. These projects had not intended to invest in carbon sequestration; they were motivated to do so, however, by the potential additional income from carbon revenues. In most of these projects, the existing institutional framework served as the basis for the development of the forest carbon project. This reduced the upfront costs. In addition, project entities' backgrounds in the area and established legitimacy with local communities helped to optimize the implementation of the forest carbon projects.

7.2.2 Structure of Partnerships

7.9 Project participants have different incentives for getting involved in forest carbon projects. Some are attracted mainly by the potential revenues from the sale of carbon credits. Others expect benefits like those of traditional forestry projects, including improvement of local livelihoods, increases in land productivity, and jobs (World Bank, 2009). Participants in BioCF projects include governmental entities, NGOs, research centers, private companies, local organizations and communities, and individual farmers. In the majority of the projects, the project entity is either the government or a private sector company. In the BioCF, project ideas are generally conceptualized by the same project entity that is responsible for managing the project (Table 7.1).

7.10 Forest carbon projects may be developed by a single project entity or by multiple partners. In the BioCF portfolio, fewer than 20 percent of the projects were developed by a single project entity and without the direct participation of local farmers. When multiple project entities and farmers are involved, it is common for projects to form partnerships. To be considered a partner, one must be actively involved in project design, implementation, management, funding, and/or decision making (Harvey et al., 2010).

7.11 Partnerships in BioCF projects adopt a wide range of institutional structures with varying degrees of complexity. Figure 7.1 describes the Costa Rica project, which is an example of a simple partnership with only a few partners and layers of interactions. Figure 7.2 describes the Caribbean Savannah project in Colombia. It shows the structure of a more complex

TABLE 7.1 EXAMPLES OF TYPES OF PARTNERSHIPS IN THE BioCF PORTFOLIO

Number of Projects	Project Entities					Landholders			Other Partners[a]			
	Government	Private Company	NGO	Public-Private Corporation	Research Institution	Communities	Individual Landholders	Farmers Association	Government	Research Institutions	NGO	Private Company
4		■										
4	■					■						
2		■				■	■					
1		■					■					
1	■					■	■					
1	■						■	■				
1			■			■			■			
1		■				■			■			
1				■			■		■			
1				■			■					■
1	■				■	■						
1	■						■			■	■	
1	■				■	■	■					

a Other partners are organizations and/or associations that are actively involved in design, implementation, management, and/or decision making but are not a core project partner. The core partners are the project entities listed in the PDD and the local participants (communities and/or individual landholders).

FIGURE 7.1 SIMPLE PARTNERSHIP STRUCTURE—COOPEAGRI PROJECT IN COSTA RICA

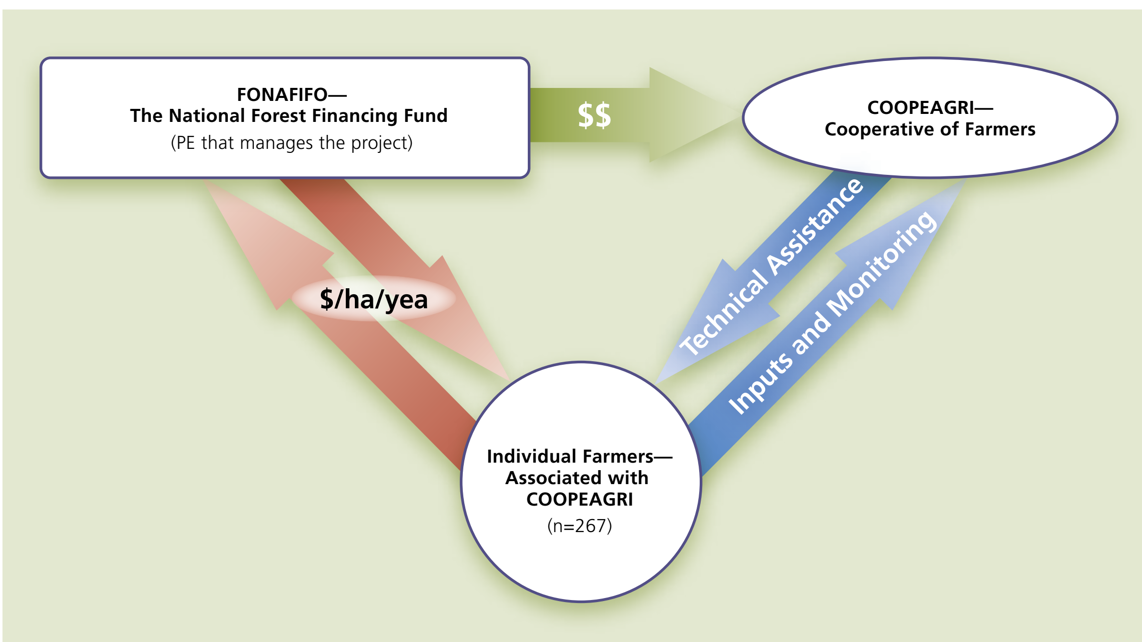
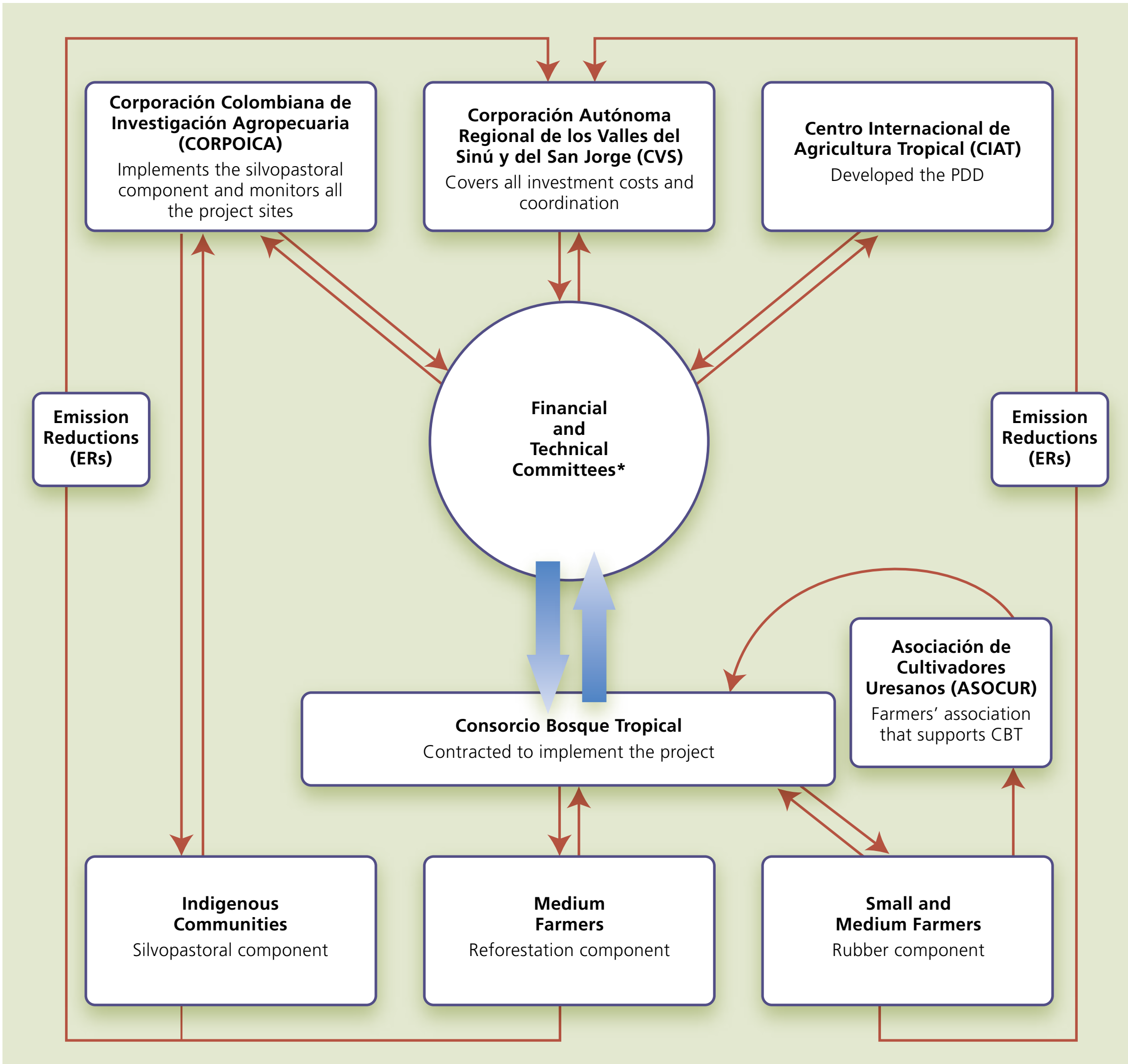


FIGURE 7.2 COMPLEX PARTNERSHIP STRUCTURE—CARIBBEAN SAVANNAH PROJECT IN COLOMBIA



*There are three committees that oversee the activities within this partnership. A financial committee monitors project spending, a technical committee supervises project implementation, and an operational committee oversees the relationship between CORPOICA and CVS with respect to the silvopastoral component. These committees include members from the three project entities, representatives from the local communities, and outside forestry engineers and university experts.

partnership, where different project entities interact with multiple farmers and communities across different components of the project.

7.12 All BioCF project entities have some experience in the project areas. Most have worked locally for years and have strong relationships with the communities in these areas. In over 70 percent of the BioCF projects, either local communities or farmers are a primary partner. In 13 of the 18 projects where local farmers participate as partners, they are organized in communities or cooperatives regulated by bylaws and recognized by the national government. These groups are the legal entities that obtain user rights, implement the project, and, in some cases, receive the proceeds from the sale of the emission reductions.

7.13 In one of the projects, for example, the establishment of a Community Forest Association is a requirement for receiving forest licenses from the National Forest Service. There is also a requirement to prepare a governing agreement of the associations and a site management plan. Even when not required by national legislation, local community groups usually create their own bylaws with the active participation of all members in order to avoid potential conflicts and to facilitate the successful implementation of the project. The project entity often provides assistance in this process through investments in capacity building and legal advisors.

7.14 Where local communities are not partners in forest carbon initiatives, they can still benefit both directly and indirectly from the development of these projects. In one BioCF project, for example, local communities from outside the project boundary will benefit indirectly from the carbon revenues via investments made by the project entity in local infrastructure. This project has agreed in the ERPA contract to invest 12 percent of the carbon revenues in community development; this investment is monitored by the BioCF.

7.2.3 Project Legal and Institutional Arrangements

7.15 The agreements that form forest carbon projects' legal and institutional frameworks include the contracts signed by the participants, management plans, certifications, community groups' bylaws, benefit-sharing agreements, and other instruments used to record governing rules. Forest carbon project agreements must observe host countries' national laws and policies, satisfy CDM requirements, accommodate the needs of project participants, and have the ultimate objective of delivering carbon sequestration.

7.16 In projects with a large number of participants, creating tailored agreements can be costly and time intensive and lead to high transaction costs (Gong et al., 2010). Using a standardized agreement can be a solution—as long as the agreement follows good governance principles (including participation, equity, transparency, accountability, and fairness).[1] These framework agreements must be well understood by all the parties, including local farmers and communities, and must include fair grievance mechanisms. Forest carbon project agreements should also be flexible enough to accommodate projects' changing circumstances, and they should include strategic actions plans for dealing with foreseeable risks (World Bank, 2009).

7.17 The main agreements that form the institutional framework for the development of BioCF projects define (i) carbon ownership, (ii) land use in project areas, and (iii) benefit sharing. All BioCF projects have instruments that define land use and carbon ownership; benefit-sharing agreements are only signed in cases where local farmers and/or communities participate as project partners or beneficiaries.

Carbon Ownership Agreements

7.18 Carbon ownership is a key element of all carbon finance transactions. Investors in forest carbon projects need the assurance that the emission reductions they are purchasing can be legally transferred to them without restrictions. To address this issue, BioCF projects go through a legal due diligence process during project appraisal to determine who owns the land, the trees, and the carbon. This process includes an assessment of the host country's national legal framework and the project's land tenure situation.

7.19 Carbon is considered a natural resource in some countries and the property of the government. In other countries, carbon is considered a part of the tree and the property of the person who owns or is entitled to harvest the trees. Most countries, however, do not to date have national legislation that defines carbon ownership. As a result, forest carbon projects rely on project-level institutional arrangements. Carbon rights agreements are important instruments for reducing the delivery risks for outside buyers by clarifying carbon ownership rights in forest carbon projects. In projects that involve local farmers and communities, the definition of carbon ownership is done at two levels.

EMISSION REDUCTIONS PURCHASE AGREEMENTS

7.20 An ERPA is a special form of purchase and sale agreement for the acquisition of emission reductions (Carr and Rosembuj, 2007). This legally binding contract includes among its terms the volume of emission reductions being transacted, the price, and the delivery schedule of emission reductions and payments. The contract also includes terms related to land use and permanence of the planted trees for the duration of the contract. The ERPA also describes remedies in the case of project failure.

7.21 ERPAs are created between project entities and the BioCF, and they set forth the rights and responsibilities of the parties to the carbon transaction. When a project has multiple partners, the project

1 In some cases, projects have found it convenient to sign individual contracts with landholders. These easy-to-follow and short contracts are part of a larger framework contract.

TABLE 7.2 EXAMPLES OF PROJECT BENEFIT DISTRIBUTION SCHEMES IN THE BioCF PORTFOLIO

Number of Projects	Farmer or Community Benefits			Project Entity Benefits	
	Carbon	Timber	Non-Timber Forest Products	Carbon	Other Forest Goods
3	■	■	■	■	■
3	■		■	■	
2	■	■	■	■	
2	■		■	■	■
2		■	■	■	
1	■			■	■
1		■		■	■
1		■		■	
1	■	■			
1			■	■	

entity represents the partnership as the carbon aggregator and the BioCF represents its participants.

CARBON TRANSFER SUBSIDIARY AGREEMENTS

7.22 Most projects that have local communities or farmers as partners sign a subsidiary agreement transferring to a carbon aggregator the legal right to transact emission reductions on their behalf. Carbon transfer subsidiary agreements were signed in approximately 80 percent of the BioCF projects that have local communities or farmers as partners. In most of the cases where farmers signed carbon transfer subsidiary agreements, they will receive all or part of the carbon revenues in exchange for their participation in the project. In one BioCF project in Africa, for example, community associations that are part of the partnership have the license to use public forest land—which includes entitlement to the carbon. The NGO that is the project entity and the carbon aggregator has the tradable rights to the carbon asserted through the subsidiary agreement. The communities will receive part of the carbon revenues and revenues from non-timber forest products through a benefit-sharing mechanism that also includes compensation per surviving tree planted.

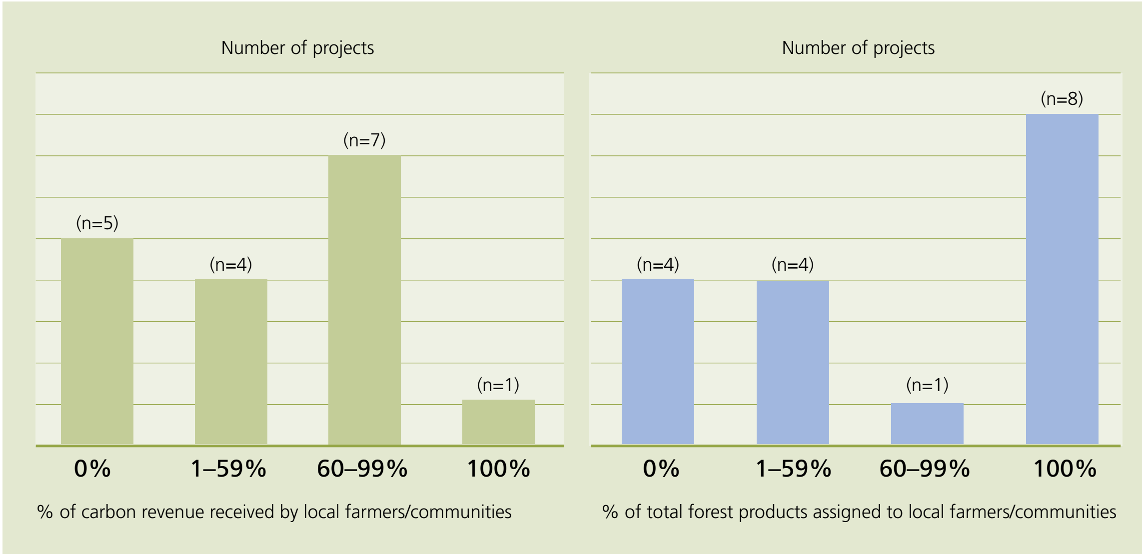
7.23 Carbon transfer subsidiary agreements also include various land-use terms and conditions, such as protection of the project area from illegal logging and fire. The forest management plan is a separate document in some BioCF projects, but it is still considered an integral and legally binding part of the subsidiary agreement.

Defining Land Use in Project Areas

7.24 Allowable land uses are specified in many BioCF project agreements, including in forest management plans, contracts, subsidiary agreements, and carbon ownership agreements. In projects with multiple partners, agreements that clearly determine all partners' land-use rights and obligations are essential to avoid conflicts over resources and to ensure the sustainability of the forest carbon initiative. Agreements defining land tenure often also determine land use in the project area.

7.25 In many BioCF projects, the land itself is part of farmers' equity contribution to forest carbon initiatives, and farmers who dedicate part of their land to the project in exchange receive revenues from the sale of carbon and/or other forest products. In other BioCF projects, land-use rights in project areas are defined by leasing agreements. In one Latin American project, the project entity signed leasing contracts with private landowners to rent their land for the duration of the project in exchange for annual payments per forested hectare. During the contract term, participating landowners voluntarily restrict their land use to the development of the project. After the project, the land is returned to them reforested.

FIGURE 7.3 CARBON REVENUES AND FOREST PRODUCTS DISTRIBUTION IN BioCF PROJECTS



Note: Both figures include projects where the benefit-sharing arrangements are still under discussion. As a result, these numbers could change. The forest products represented in the figure are timber, rubber, and Arabic gum. Forest products with low or no commercial value are not part of this analysis.

Benefit-sharing Mechanisms

7.26 BioCF benefit-sharing agreements define the flow of monetary and non-monetary benefits from emission reduction transactions and other forest products to local participants (Table 7.2). Issues to be agreed upon include what benefits farmers and communities will receive, with what frequency, how (through the local community or directly to individual farmers), and by what payment method (in-kind or cash). Most BioCF projects use participatory methods to identify local beneficiaries and to define the right incentives to ensure their commitment to the project.

7.27 All BioCF projects that involve local communities or farmers have defined at least part of their benefit-sharing agreements. ERPA payments are not triggered until the projects both define and formalize their benefit-sharing arrangements and go through validation.

7.28 The share of emission reductions and forest products (timber and non-timber) that local beneficiaries are entitled to has been defined in 17 BioCF projects (Figure 7.3). In some projects, the benefit-sharing arrangement reflects a tradeoff between carbon revenues and timber. For example, when the project entity uses 100 percent of the carbon revenues to cover its upfront investments, the farmers are entitled to 100 percent of the revenues from timber and other forest products. In one project, the farmers are entitled to 100 percent of both emission reductions and timber because the project entity's main goal is to improve local livelihoods.

7.29 The benefit-sharing arrangements incorporated into BioCF projects are designed on a project-by-project basis based on discussions with local partners and the financial structure of the project. Risks associated with these are discussed in Chapter 8.The diverse nature of benefit-sharing arrangements is exemplified by the first three projects in the BioCF portfolio where carbon payments were made. In one project, the carbon revenues are being used to cover project costs, and the communities are entitled to all the revenues from forest products; in another, the revenues from carbon are being reinvested in infrastructure and development projects identified as priority areas by the local communities. The third project, meanwhile, makes cash payments to participating farmers.

7.30 Creating benefit-sharing plans can increase the social capital of communities as it requires community members to work together to define a strategy for distributing resources (see Annex 4 for details on creating a benefit-sharing arrangement). The increase in social capital contributes to resolving past disputes and to strengthening local organizations that, in many

Box 7.1

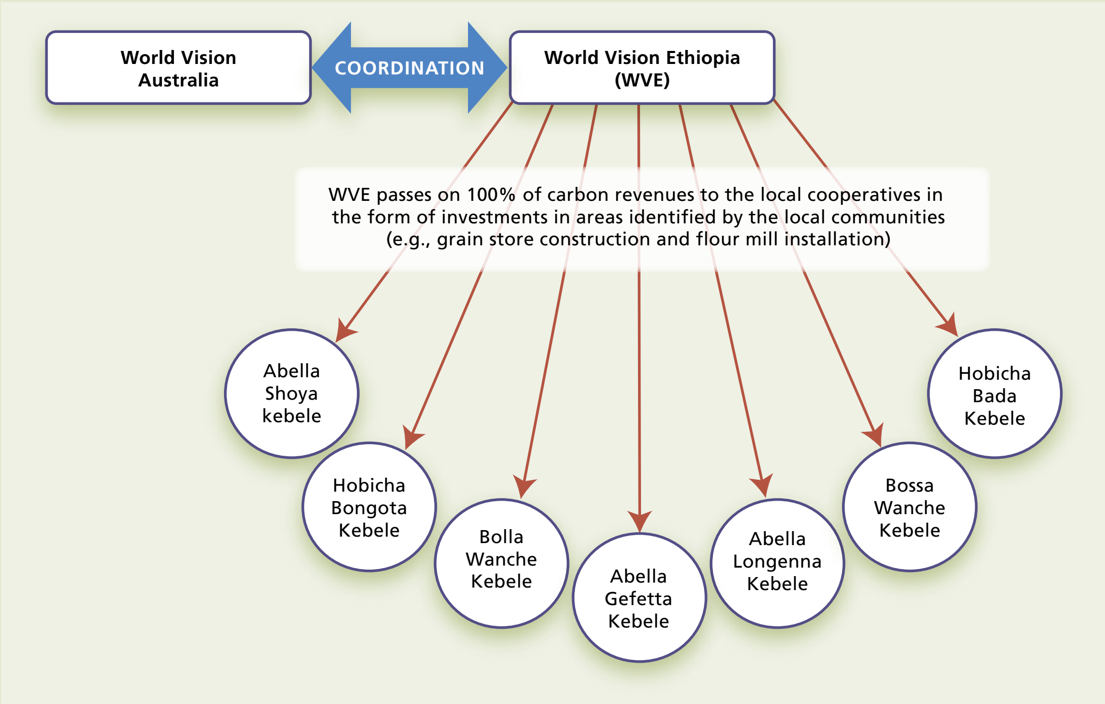
Benefit-sharing Mechanism in the Humbo Assisted Natural Regeneration Project in Ethiopia

INSTITUTIONAL ARRANGEMENTS

Seven cooperative societies have been created in the Humbo area for the development of this project, and participation in a cooperative is open to all interested community members. Before establishing the cooperatives, there were consultations with the government and community members.

The majority of local farmers are part of a cooperative, and membership continues to grow. The cooperatives were recognized under Ethiopian law and granted land-use rights in the project areas. These groups are responsible for managing the project area with the technical assistance of World Vision Ethiopia. Subsidiary agreements between World Vision Australia, World Vision Ethiopia, and all the cooperatives have been signed to transfer the carbon trading rights from the cooperatives to the project entities. This allowed World Vision Australia and World Vision Ethiopia to enter into an ERPA with the BioCarbon Fund to sell part of the expected carbon emission reductions, therefore ensuring some upfront financing for the project.

FIGURE 7.4 BENEFIT-SHARING ARRANGEMENT IN THE ETHIOPIA HUMBO ASSISTED NATURAL REGENERATION PROJECT



BENEFIT SHARING

Carbon revenues started flowing to this project in 2010.

Decisions regarding the use of carbon revenues were made by the cooperatives. They prioritized several areas for investment: the construction of a grain store, installation of a flour mill, and creation of microcredit for livestock and trade.

A series of financial safeguards was put in place to ensure that the cooperatives receive the revenues assigned to them, including external auditing of the bank accounts through which the carbon revenues flow. The cooperatives are also entitled to all forest products, including timber.

(Source: Tefera, H.. et al., 2010.)

cases, will be the lead entities managing the projects in the long run. In the case of one project in Africa, the very process of defining the benefit-sharing agreement was crucial to improving social cohesion within the community since it gave local farmers the chance to reflect collectively on how to use the carbon revenues and the income from the sale of Arabic gum.

7.31 Benefit-sharing arrangements in BioCF projects often include financial and social measures to ensure that there is no elite capture and that the investments made by user groups do in fact reflect the needs of local participants. Mitigation measures include actively involving local communities in the discussions and making user groups accountable for the investments. It is often important for the project entity, as in the Ethiopia project (Box 7.1), to play an advisory role in assisting user groups in making their decisions.

7.32 When payments are made in cash, financial measures are put in place to promote transparency. One project in Asia created a monitoring committee, composed of representatives from the two project entities, to ensure that a share of the benefits from the sale of carbon credits goes to the farmers. This project also opened a joint escrow account for the carbon revenues that contains instructions that dictate how, when, and to whom payments will be made.

7.3 Challenges

7.33 BioCF projects that involve numerous partners have faced more institutional challenges than those implemented by a single project entity. These challenges arise from the constraints placed on partnerships by the complexity of the A/R CDM rules and procedures, the lack of resources, and low local capacity (Table 7.3). Some of these BioCF projects have overcome these challenges to become success stories. Other projects are still in the process of addressing these issues.

7.3.1 Actively Involving Local Partners

7.34 Actively involving local participants in project design and implementation was a challenge in 20 percent of the BioCF projects. This challenge stemmed from difficulties in identifying local participants, getting them to commit to the project, and keeping a constant flow of communication. At least seven BioCF projects have over 1,000 local individuals or communities participating in the project. Getting local commitment for these projects was a major challenge, although it was eased somewhat in cases where the project entity was trusted by local farmers.

7.35 The long-term success of these multi-stakeholder projects relies on local partners' incentives to stay committed. Local farmers, however, often do not have enough information about the schedule of carbon payments—and thus expect early payments. In some BioCF projects, where the benefit-sharing plan is not yet fully defined, ensuring an optimal cash flow at the project level to keep participants incentivized is a challenge. Some projects have overcome this challenge by creating other short-term incentives for farmers, such as labor opportunities and providing access to other forest products (see Chapter 1).

7.3.2 Weak Local Capacity

7.36 When these projects were initiated, only 30 percent of the project entities in the BioCF portfolio had technical expertise in forestry; none had experience developing forest carbon projects. The gap in technical expertise was in most cases overcome by contracting with consulting companies to develop the carbon component of the project. The BioCF also provided extensive guidance in this area, including developing methodologies and assisting project entities and other partners with the completion of project documents (see Chapter 5).

7.37 Poor capacity leads to poor project documentation, which in turn affects the management of the project and the ability of the project to achieve validation in an effective manner. Weak local capacity also affects project entities' ability to staff their management teams and to hire the right individuals to assist with the implementation and monitoring of the project. The lack of local capacity when a project was initiated was often aggravated by low or no investments in capacity building. At least 20 percent of the projects faced difficulties in fulfilling the requirements for procuring a grant for capacity building; in other cases, even after the project entity received this money they did not disburse it at the early stages of the project. In some projects, there were no significant investments in capacity building at the preparation phase because of a lack of resources and/or difficulties in identifying local participants.

TABLE 7.3 INSTITUTIONAL CHALLENGES IN THE BioCF PORTFOLIO

Type of Problems	Frequency in the BioCF Portfolio (n = 19)	Examples
Involving Local Participants	21%	■ Too much time spent preparing beneficiaries who, in the end, were not eligible to participate in the project because their lands did not satisfy the CDM requirements ■ Difficulty in getting individuals to commit to the project at the preparation stage since many prospective participants did not fully grasp the concept of carbon and the potential benefits of the initiative ■ Project delays due to the lack of a defined benefit-sharing plan ■ Payment delays removed incentives for farmers to participate
Weak Local Capacity	42%	■ Lack of investment in capacity building ■ Difficulties in identifying project participants delayed training ■ Poor capacity meant poor documentation of project activities, which in turn affected the validation process ■ Weak local human capacity affected the ability to put a management team together
Lack of Management Capacity	31%	■ Inability to manage risks and react accordingly ■ Lack of responsibility for the project ■ No project "champion" to lead the project ■ Lack of planning ahead and building local capacity to support multiple activities and multiple sites ■ Lack of accountability and transparency in reporting financial flows ■ Reluctance to make early investments in the project ■ Inability to oversee and monitor the performance of technical consultants
Staffing Issues	31%	■ The management team had to be changed ■ Staff turnover and challenges in replacing them was a time-consuming process ■ High turnover of the monitoring field team
Lack of Clear Roles and Responsibilities	21%	■ Lack of clarity on the lead entity led to conflicts over project ownership ■ Lack of agreement on management set up ■ Overlapping roles resulted in no action as each partner expected the other one to act ■ The project entity wasn't accepted by the participants
Communication/ Coordination Issues	21%	■ Disagreement at the local level over the objectives of the project ■ Disagreement at the local level over how to implement the project ■ Communication and coordination difficulties attributed to the remoteness of some project areas as project entity personnel reached out to some participants only once a year ■ Each partner was in a different part of the country or in different countries, making coordination among partners difficult
Context	16%	■ Political instability in the host country ■ Delay in the process of getting DNA approval ■ Institutional weaknesses at the national level ■ Lack of capacity of governmental officials involved in the project

Note: The categories of institutional challenges represented in Table 7.3 are outlined for presentation purposes. These challenges are interdependent, with crosscutting issues which make them difficult to separate out.

7.3.3 Staffing Issues

7.38 Finding individuals at the local level with the capacity to develop these projects is not the only staffing challenge that the BioCF projects face. Timing is another big problem. Governmental project entities, in particular, may need months to bring new hires on board due to bureaucratic processes and politics. In addition, maintaining staff over the long run and replacing key staffers were challenges in approximately 30 percent of the BioCF projects. In one case, the project stagnated after the project coordinator left. In another case, the project was on hold after a key staff member from the management team took a leave of absence.

Training on project monitoring in the Democratic Republic of Congo.

7.3.4 Lack of Clear Roles and Responsibilities

7.39 The lack of clarity over the roles and responsibilities of various partners has impacted 20 percent of the BioCF projects. These challenges have included a lack of leadership from the core project entity; overlapping partners' roles from the inception of the partnership; no management or investment responsibilities assigned to the project entity; the core partner was identified but did not act as a project leader; two project entities disagreed over the ownership of the project; and the lack of legitimacy of the project entity with local partners resulting in the rejection of the partner as the project leader.

7.3.5 Communication/Coordination Issues

7.40 Communication and coordination can be a challenge, especially in partnerships with multiple participants from different sectors and various layers of interactions from the management to the field level. Having a lead partner responsible for coordinating with participants and ensuring an open channel of communication with all partners is crucial.

7.41 Communication and coordination challenges in some BioCF projects can be attributed to the distance between the project areas and the headquarters of project entities. This challenge was overcome in one project by setting up a technical group with representatives from each entity to meet regularly to discuss issues related to the project.

7.3.6 National and Local Circumstances

7.42 Some projects with strong institutional frameworks have been negatively affected by changes in policy at the national level. Other projects, however, have been positively affected by the national and local circumstances in which they were developed. Projects with complex partnerships implemented in countries with a background in centralized governance had good rates of success. Possible explanations include bottom-up management experience and the sense of working for the common good.

7.43 National political instability has affected four BioCF projects developed in countries that went through a *coup d'état* during the project preparation and/or implementation phases. Even though this is a situation that project entities cannot control, it can have an effect on project risks and influence investors' and potential buyers' decisions with respect to the project.

7.4 Recommendations

7.44 Below are recommendations for project developers and national governments.

FOR PROJECT DEVELOPERS

- When implementing projects in partnership with local communities or farmers, it is important for project entities to invest in building a trusting relationship from the beginning. When the project entity does not have expertise in social issues, establishing partnerships with local organizations trusted by local farmers may facilitate the process. The costs for this work should be fully budgeted along with other project costs (see Paragraphs 7.12, 7.34, and 7.35).
- Whenever possible, project developers should try to keep partnerships and institutional arrangements for project design and implementation as simple as possible. The contracts signed with local participants should use plain language. This is especially important to ensure that the roles and responsibilities of all participants are well understood (see Paragraphs 7.11 and 7.39–7.41).
- Project developers should consider getting the government involved in the implementation of the project to avoid potential conflicts between the project's institutional agreements and national legislation. At a minimum, national governments should be continuously updated (see Paragraphs 7.7–7.8 and 7.42–7.43).
- In larger and more scattered projects, project developers should consider investing in training materials to build capacity. These materials may consist of videos in the local language that include training on implementation and monitoring. Project entities should also invest in strategies to keep in constant communication with participating communities (see Paragraphs 7.36–7.38).

FOR GOVERNMENTS

- Governments should consider investing in legislative reforms to create a supportive legal framework for the development of forest carbon projects. Having a national legal framework that supports the granting of user rights to project participants could reduce the risks of non-permanence and create more incentives for participation. Countries should also consider legislation to clarify carbon ownership at the national level. This would also reduce project transaction costs and generate incentives for more participation by farmers. This framework should also include incentives for private-sector investments in reforestation and forest restoration activities (see Paragraphs 7.7–7.8 and 7.42–7.43).

8

Measuring Under-delivery Risk

8.1 Introduction

8.1 Creating carbon credits from A/R projects involves risks. These risks can be put into two categories: (i) those stemming from the physical implementation of the A/R project activity (similar to a traditional project), and (ii) the risks pertaining to the creation of the carbon asset under the CDM's regulatory framework.

8.2 Since inception, the BioCF has been monitoring the performance of its forest carbon projects. The BioCF must manage the risks of not achieving the expected emission reductions contracted in the ERPAs as the Fund´s participants rely on these credits to partially comply with their Kyoto Protocol commitments. Through the continuous assessment of under-delivery risk, the BioCF has found that: (i) risks can be measured, managed, minimized, and mitigated; (ii) risks can be reduced with increased experience; and (iii) risks are closely related to project developers' forestry and CDM capacity.

8.3 This chapter briefly describes the methodology applied by the BioCF to measure the under-delivery risk of getting carbon credits. Section 8.2 describes the methodology and goes through all the categories of risk assessed. When describing the more frequent risks in the BioCF portfolio, this section makes reference to the challenges presented in previous chapters. Section 8.3 summarizes the measures taken at the portfolio level to manage the under-delivery risk. Finally, Section 8.4 lists good practices for reducing the under-delivery risk of carbon credits.

8.2 Methodology for Assessing the Under-delivery Risk

8.4 The BioCF has been monitoring the under-delivery risk of its projects since 2007. In 2010, with increasing data, an update of the first risk assessment methodology was done to incorporate both

TABLE 8.1 CYCLES OF RISK ASSESSMENT UNDERTAKEN IN THE BioCF PORTFOLIO

<table>
<tr><th>Cycle</th><th>Risk Category</th><th>Assessments During the Cycle</th></tr>
<tr><td>Operational</td><td>Social and Environmental</td><td>■ Before due diligence
■ After due diligence and before planting
■ After planting and before the first issuance of emission reductions
■ After the first issuance of emission reductions</td></tr>
<tr><td>Financing</td><td>Financing</td><td>■ Before ERPA signature
■ After ERPA signature</td></tr>
<tr><td rowspan="2">Operational</td><td>Operational</td><td rowspan="2">■ Before due diligence
■ After due diligence and before project commissioning
■ After planting and before the first issuance of emission reductions
■ After the first issuance of emission reductions</td></tr>
<tr><td>Host Country Political</td></tr>
<tr><td rowspan="3">Regulatory</td><td>Methodology, Monitoring, and Verification</td><td rowspan="3">■ Before due diligence
■ After due diligence and before the PDD is sent to the validator
■ After the PDD has been sent to the validator but before validation is complete
■ After validation has been completed but before registration
■ After registration has been completed but before the first issuance of emission reductions
■ After the first emission reductions have been issued but before the project is near to the renewal of the first crediting period
■ Near the first crediting period</td></tr>
<tr><td>Additionality</td></tr>
<tr><td>Host Country Regulatory</td></tr>
</table>

the BioCF experience accompanying project developers and existing knowledge on credit issuance in different CDM technologies.[1] The new methodology contains simplified risk categories and allows the BioCF's operational team to register the progress of projects before and after the critical stages of the financing, operational, and regulatory cycles (Table 8.1).

8.5 As a result of the risk assessment, BioCF project managers score projects as having low, medium, high, or no risk. They also identify bottlenecks, and then analyze them with the project entities to design appropriate corrective actions. These actions are incorporated into project supervision plans, which are monitored on a monthly basis by the BioCF's management. The main risk categories monitored in BioCF projects are explained below.

8.2.1 Environmental and Social Risks

8.6 One of the first due diligence assessments undertaken in every BioCF project is the project's potential to cause social and environmental risk to local people and their environment. This is assessed prior to acceptance into the BioCF portfolio and is monitored throughout project implementation.[2] Several situations can trigger the World Bank´s environmental safeguard policies. On the environmental side these include (i) neglecting best forest operational practices; (ii) stressing water resources in the project region; and (iii) negatively impacting natural habitats. Examples of measures implemented by some BioCF projects to avoid or mitigate environmental risks include:

- Ensuring the implementation of a comprehensive forest management plan that includes provisions to protect and enhance local and regional environmental quality;
- Monitoring indicators related to groundwater availability, especially in projects planting for fast-growing species;
- Elaborating a water resources management plan, in line with national legislation, for projects involving irrigation practices; and
- Undertaking ecological monitoring to track endangered species and species that are indicators of high conservation value criteria, especially for projects in biodiversity hotspots.

1 The delivery risk includes the probability that projects using certain technologies will gain certification. It uses a proxy of what can be expected from different types of projects, based on data on issuance success collected in the carbon market.

2 Potential impacts from projects on local communities and their environment are assessed according to the World Bank's environmental and social safeguard policies. See http://www.worldbank.org/ for more information.

8.7 Several situations can also trigger the World Bank´s social safeguard policies. These include (i) threatening the rights of indigenous people; (ii) causing social conflicts as a result of involuntary resettlement practices; and (iii) promoting unequal distribution of benefits. If safeguards are triggered, projects have to propose mitigation measures. Examples of measures proposed by BioCF projects to avoid social risks include:

- Ensuring that local communities, including indigenous peoples, are voluntarily participating in projects and that people´s rights are fully respected;
- Establishing a participatory plan to anticipate and manage land-use conflicts;
- Establishing institutional instruments, including subsidiary agreements and locally developed frameworks, to govern the proposed land-use agreements; and
- Carrying out a socially respectful and adaptive project planning process.

8.8 BioCF projects planting fast-growing species usually guarantee the sustainability of their forest management, including the adoption of best social and environmental practices. Some projects have achieved Forest Stewardship Council certification.

RISKS RELATED TO UNEQUAL BENEFIT SHARING

8.9 Unequal distribution of project benefits is a concern of forest carbon projects' stakeholders and observers. To address this, subsidiary agreements in most BioCF projects have been elaborated in the project preparation stage; they will be subsequently refined to take into account a project's final design. These agreements include clear benefit-sharing arrangements and avoid false expectations with respect to carbon revenues. Project entities are responsible for ensuring a fair distribution of carbon revenues among partners throughout the project lifetime. To be effective, subsidiary agreements should follow best practices (see Chapter 7 and Annex 4).

8.10 Recognizing that both the quality and appropriate implementation of subsidiary agreements can impact the under-delivery of projects, and that all forest carbon project stakeholders are on a learning curve with regards to benefit sharing, the BioCF has been providing social and legal expertise to improve the quality of subsidiary agreements. Most BioCF projects are in early stages of subsidiary agreement refinement (see Chapter 7), and some are in the process of strengthening the general terms of their original proposals.

8.11 There are two early lessons from the BioCF projects with regards to benefit sharing. First, in line with the dynamic nature of forest carbon projects and evolving stakeholder needs, the designing effective subsidiary agreements is an adaptive process. Corrective actions to subsidiary agreements may be required during the project lifetime; effective communication between partners is therefore a must to avoid social conflicts. Second, appropriate grievance mechanisms may be required to facilitate farmers'/communities' effective communication of their views and concerns regarding the implementation of the benefit-sharing agreement. The BioCF will continue to monitor and document emerging issues associated with benefit-sharing agreements and the measures designed to avoid or mitigate them in different project contexts.

BEYOND WORLD BANK SAFEGUARDS

8.12 In addition to applying the World Bank's environmental and social safeguard policies, BioCF projects have to meet the CDM requirements on socioeconomic[3] and environmental impact assessments.[4] A/R CDM projects must carry out appropriate analyses and public consultations with involved stakeholders to identify any negative impacts inside and outside the project boundary that may be attributable to the proposed project. Where significant negative impacts are identified, developers have to undertake an impact assessment and propose a monitoring plan with relevant risk mitigation measures. At verification, third-party auditors check the elements of the monitoring plan related to socioeconomic and environmental impacts, including the implementation of proposed risk mitigation measures (UNFCCC, 2006b).

8.13 Designated National Authorities assess the projects to determine whether they contribute to furthering the country's sustainable development goals.[5] Each country applies its own criteria for determining

3 Socioeconomic impacts may include impacts on local communities, indigenous peoples, land tenure, local employment, food production, cultural and religious sites, and access to fuel wood and other forest products (UNFCCC, 2006b).

4 Environmental impacts include impacts on biodiversity and natural ecosystems inside and outside the project boundary (UNFCCC, 2006b).

5 The UNFCCC does not provide a definition of sustainable development in the context of the CDM. Sustainable development is defined in general terms as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (Brundtland, 1987).

if a project contributes to sustainable development. In doing such an assessment, some DNAs focus on projects' risks to the local communities and their environment. DNAs have to provide letters of approval to project participants, which is a requisite for validation. As explained in Chapter 1, some projects go further by voluntarily certifying their project design to assure that risks to the local communities and their environment are avoided and that the project will lead to net positive benefits. Challenges exist, however, to monitoring net-positive projects' associated benefits.[6]

8.2.2 Financing Risk

8.14 A project is not accepted into the BioCF portfolio unless a large portion of the needed capital has been secured. This is the main risk category that project managers assess during the commercial project cycle.[7] Project managers assess issues such as credit from multilateral institutions and funds, equity from the project entity, loan agreements, commitments from financial institutions to fill any gaps in financing, as well as projects' cash flow through implementation and operation stages. The most frequent sources of financing risk identified in BioCF projects relate to such issues as developers' inability to secure investment financing, delays in disbursement, and developers' poor managerial capacity (see Chapter 6).

8.2.3 Operational Risk

8.15 Risks related to carbon sequestration technology and project implementation are assessed at three stages: (i) after and before due diligence, (ii) after planting, and (iii) after the issuance of first emission reductions (Table 8.1). When assessing this risk, BioCF project managers analyze several characteristics of projects, including the tree planting scheme, the implementation plan, the project developer's capacity, project entities' commitment, available resources to implement the plan, and the non-permanence risk.

8.16 The project characteristics assessed vary at each stage of the operational cycle. In early stages of project development (i.e., before and after due diligence) project managers assess the planting scheme, the implementation plan, and the project entity's experience and commitment to implementing the project. At advanced stages (i.e., after planting) they assess overall project performance, survival planting rates, non-permanence risk, and the project entities' capacity to continue implementing the forest management plan.

8.17 Some of the more frequent operational risks identified in the BioCF portfolio relate to the use of lesser-known tree species. Over 80 percent of the project areas in the BioCF portfolio are planted with lesser-known native species or with a mix of native and exotic species (see Chapter 1). Another frequent source of risk involves project developers' weak forestry experience, poor management and coordinating capacity, high staff turnover, and project developers' weak capacity to address non-permanence (see Chapter 7). The lack of coordinating capacity triggers operational risk in multi-stakeholder projects and in projects having complex partnerships (see Chapter 7).

8.18 A frequent source of risk in projects is the delay of implementation due to developers' difficulty in finding eligible lands (see Chapter 4). This is often related to changes in land opportunity costs and compounded by unclear land tenure rights. Achieving clarity on land tenure rights may be time and resource intensive where land rights registry systems are poor, institutional capacity within the project is weak, and there are conflicts over land tenure rights.

8.2.4 Methodology, Monitoring, and Verification Risks

8.19 The risks related to methodology, monitoring, and verification refer to the probability of not complying with these stages of the CDM project cycle. BioCF project managers assess the evolution of projects around six stages of the project cycle (Table 8.1). A large number of the regulatory risks have been described in previous chapters. These include selection of a valid methodology and issues at validation (see Chapters 1 and 2); national forest definition and land issues (see Chapter 4); as well as estimation of emission reductions, project developers' limited capacity for project monitoring, and deviation from the PDD at implementation (see Chapter 5).

8.2.5 Additionality Risk

8.20 The additionality risk in the BioCF portfolio is assessed at two stages of the project CDM cycle

6 Projects usually get overwhelmed with the *ex-ante* and *ex-post* GHG accounting, and this reduces their willingness to engage in monitoring of associated benefits. It is necessary to develop simple yet reliable methodologies for monitoring the co-benefits of A/R projects.

7 Legal due diligence on carbon, land, and tree ownership, and World Bank Safeguard Policies, are undertaken by different Bank units to avoid conflicts of interest.

(Table 8.1). As explained in Chapter 2, in order to comply with the CDM additionality requirement project developers have to demonstrate that projects would not have happened without carbon finance. However, since changes in a project may impact additionality, the BioCF monitors the risk that a project may become non-additional across the project crediting period. In addition, in addressing projects' deviations from the PDD at implementation, the CDM EB has published guidelines that require project developers to assess the impact of some of the possible changes in projects' additionality at verification (see Chapter 5). To avoid this risk, project developers should properly implement the monitoring plan, identify and communicate deviations from the PDD, and design and implement timely corrective actions (see Chapter 2).

8.2.6 Host Country Regulatory Risk

8.21 This risk category reflects challenges in obtaining the country approvals needed to complete the CDM cycle as well as changes in governments that affect the project delivery of tCERs. This risk is assessed at all stages of the project cycle (Table 8.1).

8.22 The problems encountered in the BioCF portfolio in relation to host country risk are twofold. First, getting approval letters issued has been time consuming[8], delaying the final validation report. Second, some host countries have experienced political instability, causing delays in project implementation and problems in attracting investment. In some cases, projects have had to remove certain land areas that became inaccessible due to armed conflicts (see Chapter 7).

8.3 BioCF Risk Mitigation Measures at the Portfolio Level

8.23 The BioCF seeks to allocate the resources of its investors to projects with manageable under-delivery risk. By monitoring and understanding project risks, the BioCF can free capital in a timely manner to reallocate it to projects with a higher probability of ER delivery. The BioCF applies risk mitigation measures both at the project and portfolio level. Through these measures, the BioCF helps project developers address financial, technical, and managerial challenges.

8.3.1 Capacity Building

8.24 The BioCF has undertaken several measures to support not only the capacity of the projects within its portfolio but also the land-based mitigation sector (e.g., soil carbon and REDD+ projects). At the project level, for example, the BioCF has mobilized grant resources to support government- and NGO-led projects with little capacity to develop their PDDs. Through these grants, projects have improved their capacity to solve technical issues and increased their managerial skills (see Chapter 6). Some projects are also enhancing their organizational skills and reinforcing their social capacity to ensure the design and implementation of appropriate benefit-sharing agreements. The BioCF has also developed training materials and held training sessions on PDD development and forest carbon monitoring. In addition, it has organized international workshops with LULUCF negotiators to try to increase their awareness and help them understand the issues affecting land-based carbon mitigation options (see Chapters 1 and 5).

8.3.2 Enhancing Communication Among A/R CDM Stakeholders

8.25 Having witnessed the bottlenecks caused by lack of communication between the A/R Working Group, DOEs, and project developers at validation, the BioCF has organized some roundtables to discuss the issues at validation and verification. These meetings have proven efficient ways to provide feedback to the A/R

8 In some cases the letters were incorrectly issued due to spelling mistakes in the project name.

Working Group on the application of the rules. For example, one of the more recent roundtables resulted in A/R Working Group suggestions to the CDM EB to approve a number of guidelines that will facilitate the assessment of projects' deviations from PDDs.

8.3.3 Tools for GHG Accounting

8.26 The BioCF has contributed to overcoming technical barriers for GHG accounting by creating tools to facilitate the *ex-ante* estimation of emission reductions (e.g., TARAM), the calculation of the sample size needed for carbon estimation, and the *ex-post* estimation of emission reductions (e.g., SMART). These tools have removed a stumbling block affecting the A/R CDM in its early years. The positive experience with these tools reflects project developers' appreciation of easy-to-apply methodologies.

8.3.4 Financing Measures

8.27 Although the BioCF cannot provide project entities with assistance in meeting their underlying investment needs, it does provide validated projects with advance annual payments based on their reports on carbon sequestration achieved in projects. The BioCF also advances resources to cover PDD development costs.

8.3.5 Close Supervision of Projects

8.28 The overall under-delivery risk at the portfolio level is regularly updated via the regular supervision of projects. This process serves to alert the project developer and BioCF team to problems and the need to put in place appropriate corrective actions. In addition, this information is used by BioCF participants to decide how to allocate their resources efficiently.

8.4 Good Practices for Reducing the Under-delivery Risk of Carbon Credits

8.29 A summary of good practices for effective project development and implementation of A/R CDM projects is presented below. This is a compilation of the recommendations for project developers presented in individual chapters of this document.

8.4.1 Initial Due Diligence and Project Design

- Undertake comprehensive due diligence to ensure that projects' **financial risks** are minimal and manageable. Ensure sufficient secure sources of investment, taking into consideration the time these projects take to mature. Plan ahead for all budgetary requirements to ensure effective project implementation. Consider alliances with relevant organizations to develop and implement financing measures, including facilitating the frontloading of investment finance to cover project upfront investment needs.
- Undertake a comprehensive legal assessment of **land tenure and carbon rights**. Analyze the workload and time required for securing land titles.
- Build multi-landholder projects upon strong and **longstanding relationships** between landholders and project entities/coordinators.
- Be aware of the wide range of **capacity** required to develop an A/R CDM project and assess the need to outsource services.
- Developers of multi-stakeholder projects should carefully design **financial incentives** that accommodate landholders' short-term needs. In addition, ensure a participatory project planning process to reduce the risk of raising false expectations with regards to carbon revenues among participant landholders. Make it clear that programs/projects also produce other benefits.
- Make a **conservative *ex-ante* estimation** of the emission reductions achievable in the project. Be aware that the project's main objective (e.g., timber, fuel wood, or environmental restoration) strongly determines the amount of emission reductions achieved and the degree to which the project can rely on carbon revenues to cover project maintenance costs. In addition, be aware of data availability for the selected tree species.
- Keep informed about the evolution of **forest carbon markets** as well as markets for environmental services other than carbon.
- Consider **applying standards that reflect projects' co-benefits (e.g., CCBA and others)** to show that the project will deliver the expected co-benefits.

8.4.2 Project Design Document Development

- Be aware of the potential challenges in applying the **land eligibility** and project boundary rules, including the availability of evidence of land use/cover for the dates indicated in the A/R CDM rules and evidence of control over the project.

- Select the baseline and monitoring methodology that fits the project context and circumstances, including data availability constraints. In selecting a methodology, assess the applicability condition of all the existing methodologies approved by the CDM EB. Be aware that methodologies evolve as a result of revisions and simplification; new versions are published and similar methodologies may be merged. CDM EB decisions regarding retroactive application of guidance to early versions of methodologies may apply.
- **Reassess project expectations in terms of emission reductions due to changes in the area planted.** The area planted may change due to difficulties in applying the land eligibility rule or for unforeseen reasons (e.g., adverse soil conditions and land tenure claims). Communicate clearly the changes to the involved landholders to manage their carbon revenue expectations.
- When designing a project, take into consideration that **leakage** may create a significant discount in emission reductions achieved by the project. Plan to establish activities to prevent leakage and, whenever possible, establish alliances with other projects promoting activities that could serve the purpose of leakage prevention in the surrounding project region.
- Undertake **realistic *ex-ante*** estimation of the emission reductions to be achieved by the project.
- Be **consistent** with the data and information presented throughout the PDD.
- Consider alliances with universities and research institutions to **generate and collect the data** required for A/R CDM project design.
- Be aware that rules evolve and keep up-to-date with **changes** approved by the **CDM EB**. Also note the changes in versions of CDM EB methodologies, tools, and document formats (e.g., PDD) and ensure that you use the latest versions when submitting your documents for approvals, as per CDM EB requirements.

8.4.3 Validation and Registration

- Project developers should contact the **Designated National Authority** upfront to understand their requirements when assessing the project's contribution to the country's sustainable development goals.
- **DNAs** should understand their role in the approval cycle and that projects benefit from a supportive environment. DNAs should facilitate the assessment of projects' contribution to national development goals by establishing clear and easy-to-assess criteria as well as clear and less burdensome procedures.
- Project developers should contact **Designated Operative Entities** in a timely manner to conduct validation and verification of projects. Approach several DOEs for quotes on their services.

8.4.4 Project Implementation, Monitoring, and Verification

- Be aware of the need to **implement the project according to the PDD registered under the CDM rules**. Deviations from the PDD can increase the number of regulatory procedures before credit issuance.
- Put in place a **solid framework for project monitoring and supervision.** In addition, plan ahead to **anticipate staff turnover** and to sustain the project's forest monitoring capacity.
- Collaborate **with universities**, research centers, and other entities that are developing land-use-related projects in order to collect growth data for the tree species planted in the project and to generate new information to be used in future projects.
- Keep in mind that project **delays at implementation** can negatively impact the transaction costs of meeting the CDM requirements, cash flow, and project feasibility. Avoid delays by hiring a knowledgeable project manager who understands both forestry and CDM requirements.

Conclusions and Looking Ahead

9

9.1 The BioCF experience shows that A/R CDM projects can produce high-quality measurable, reportable, and verifiable carbon credits. The rigor of the CDM process promotes a significant discipline in entities undertaking these projects. The result-based approach underlying carbon projects has the potential of improving considerably the performance of forestry projects. Forest carbon projects also deliver significant environment and socioeconomic benefits to local communities; contribute to building the resilience of local communities to the adverse impacts of climate change; and provide opportunities for landscape management.

9.2 One of the main lessons learned from the BioCF experience is that some enabling conditions have to be in place for forest projects to be able to benefit from carbon finance through A/R CDM. The minimal conditions are adequate local governance, access to financing, availability of required information, and strong capacity for effective project preparation, management, and implementation. The BioCF experience shows that even projects with complex designs (e.g., involving multiple farmers, planting several species on degraded lands, and with unclear land tenure situations at the project start) can succeed in the CDM when these factors are in place. In their absence, however, a champion project entity becomes a critical factor for success.

9.3 The combination of complex rules and a project developers' low capacity to apply these results in high transaction costs and discourages project developers and investors from participating in A/R CDM projects. The CDM EB's efforts to simplify the early complex rules and procedures enabled some replication of projects. Scaling up the A/R CDM to a significant scale, however, requires regulators to remove still-existing barriers while maintaining environmental integrity. The non-permanence-related rules act

Use of fuel wood in Madagascar.

as such a barrier as they put A/R projects at a disadvantage, resulting in limited and delayed carbon revenues, low prices for forestry credits, and a limited demand for credits, and negatively impacting revenue contribution and, possibly, projects' viability. These restrictions are exacerbated in small-scale projects, which are further disadvantaged by low caps on their carbon sequestration potential.

9.4 Some rules highlight the lack of readiness of some countries for developing A/R CDM carbon projects. The rules associated with baseline determination and additionality demonstration are an example. Justifying the barriers that prevent projects from happening is a complex exercise requiring considerable capacity and know-how. Similarly, land-related rules (e.g., land eligibility, project boundary, and land tenure) are difficult to implement in the absence of high-quality official data on land use/land cover and in situations of unclear legal land rights. Likewise, even with less complex methodologies, developers may struggle with GHG accounting because of data availability restrictions.

9.5 The A/R CDM rules and procedures need to be simplified for four key reasons: (i) the A/R sector strongly supports the sustainable development of impoverished rural areas; (ii) the rules are excessively complex relative to those for projects in other sectors; (iii) it is necessary to recognize that the capacity of poor rural peoples (to whom these projects are geared) is usually limited; and (iv) projects in low-income countries with great potential for carbon sequestration and subsequent poverty alleviation face fundamental challenges to success in the CDM. Based on the lessons drawn from the BioCF portfolio, the following actions are recommended.

REGULATORY IMPROVEMENTS

- **Remove regulatory uncertainty.** Much has been invested in building the institutional framework to support A/R projects, and project developers are still interested in undertaking and developing projects in many poor countries where these activities can make a difference in living conditions. The uncertain regulatory environment, however, is creating a dampening effect.
- **Make the regulatory process more accessible and predictable by streamlining procedures and following strict timelines.** Finding the CDM EB's latest decisions, guidelines, and versions of tools, as well as PDDs and methodology formats, is challenging for most developers and favors specialized professionals. Following strict timelines for registration and issuance will help increase the predictability of credit issuance. In addition, simplifying the A/R CDM requirements to reduce transaction costs will enhance a projects' viability.
- **Further simplify the rules and procedures for baseline determination and additionality demonstration.** This could include allowing developers to use standardized baselines established at the national or sub-national level. Simplifying additionality requirements without compromising environmental integrity is also important. Additionality could be demonstrated at the sectoral level by taking into account national circumstances as well as country or region-wide afforestation/reforestation goals. Projects in countries with weak business environments and facing disproportionately large investment barriers should be automatically additional until certain reforestation goals are met. Projects involving low-income communities with

minimal capacity will greatly benefit from such a simplification.

- **Improve the fungibility of forest project credits by addressing the non-permanence of forest carbon in a broader way and allowing A/R projects to use alternative approaches to temporary crediting.** This has already been recognized by UNFCCC negotiators proposing alternatives alongside current tCERs and lCERs. A decision on this issue is urgently needed. Allow A/R CDM projects to select from a variety of approaches to non-permanence in addition to the temporary crediting approach. The approach(es) to non-permanence should avoid putting forestry projects at a disadvantage. In designing new approaches, also consider flexibility in the number of verifications permitted per commitment period so that periodic carbon revenues during the commitment period can improve the cash flow to projects.
- **Simplify the land eligibility requirements by using more flexible criteria to eliminate incentives for deforesting and subsequently reforesting lands.** As the BioCF experience has shown, the current land eligibility requirements in the CDM tend to be socially impractical and can create tensions in regions where neighboring farmers may be excluded. This rule also leads to fragmented CDM project areas, which are impractical from both a project development and an ecological standpoint. In addition, it would help to facilitate the development of projects on agriculture lands in tropical climates by simplifying guidance for accepting the eligibility of lands with temporary stocking and long-term threats, if the project region is under a slash-and-burn type of pattern. Similarly, increasing the flexibility of the project boundary rule and considering accepting evidence other than contracts signed by the participating farmers in two-thirds of the project area before validation to prove that the project area is controlled by the project entity would be helpful.
- **Continue the simplification and consolidation of large-scale methodologies,** including allowing project developers to use default values for estimation of leakage (in line with the simplifications recently made for soil organic carbon) and facilitating the project monitoring process. Appropriate discounting should be allowed at the project level for project developers with less access to sophisticated technology and/or lower institutional capacity.
- **Increase the current threshold of 16,000 tCO_2e annually for small-scale projects and revisit the rule that limits the type of people that must be involved in small-scale A/R CDM projects.** Since projects involving low-income communities usually have limited capacity to develop and implement A/R CDM projects, their transaction costs in meeting the CDM requirements are high and their emission reductions volume low, making the projects unviable. Similarly, developers of these projects usually lack the managerial capacity required to bundle projects, making it difficult to benefit from economies of scale. The above mentioned threshold must be increased for these types of projects to be viable and benefit low-income communities. In addition, to be consistent with the CDM rules for projects in other sectors, the low-income requirement for small-scale A/R CDM projects should be removed.
- **Recognize the contribution of A/R CDM projects to the dual objectives of the UNFCCC: sustainable development and climate change mitigation.** Policymakers should consider increasing the eligible land activities to cover croplands, grasslands, wetlands, and sustainable forest management given their roles in environmental restoration and poverty alleviation.

ACCESS TO FINANCE

- **Innovative ways to finance activities are needed.** Carbon finance is a payment on delivery, and yet the upfront investments needed for A/R projects are significant and economies of scale are not easily attained. Forestry investments are long term and deemed high-risk in many developing countries. Institutional arrangements for financial intermediation, an understanding by financial institutions of the role of carbon credits in financing agriculture and rural development, and some up-front payments based on meeting performance benchmarks are needed.
- **Financial compensation for other benefits should be considered.** The BioCarbon Fund experience has shown that A/R projects encompass both mitigation, through removal of CO_2 from the atmosphere, and adaptation as they build up the resilience of the environment and communities to

harsh environmental conditions. Projects improve living conditions, but the significant additional environmental and social benefits (besides carbon) are not rewarded. In addition, given that co-benefits are a strong incentive for local participation and for improving projects' performance, alternative non-permanence approaches that factor in the role of co-benefits in ensuring the permanence of forest carbon should be explored.

STRENGTHEN CAPACITY

- **Building and strengthening capacity at the local level is critically needed to ensure successful forest carbon initiatives.** The fact that A/R projects are useful tools for promoting both adaptation and mitigation should be harnessed by building up capacity and strengthening programs in an integrated manner. Local capacity to monitor, verify, and report the project emission reductions are successful factors for credit issuance. There is a need to use official development assistance for projects to build and strengthen such capacity where needed.
- **Strengthen the capacity of DNAs and DOEs to ensure a smooth validation process.** Understanding the rules for A/R CDM projects is not an easy task for a newcomer, and the challenge is compounded by the fact that the CDM EB changes the rules quite frequently to allow for their improvement and simplification. Since these changes are not retroactive for registered projects, DOEs and DNAs need to be aware of the different sets of rules governing different projects in order to support each one effectively. There is a need for an easy-to-follow manual for A/R CDM to be published periodically, in line with the Institute for Global Environmental Strategies' publication, *CDM in Charts*.
- **Developed countries committed to reducing emissions should continue to support developing countries in removing the capacity-related barriers hindering A/R CDM.** Several capacity-related constrains prevent developing countries from tapping into the opportunities that come with A/R CDM. A wide range of actors need to be involved in A/R CDM project development and implementation, but they usually lack the capacity to support projects effectively. For example, Designated National Authorities' role in approving projects is usually week due to bureaucratic procedures and unclear project approval criteria. Similarly, many Designated Operational Entities lack the necessary expertise for an effective assessment of projects at validation and verification and few of these are based in developing countries. Local companies could be trained to provide this expertise. In addition, research institutions are not fully playing their role in helping projects overcome data- and-information availability constraints for effective project preparation and monitoring. All these actors not only need to strengthen their individual capacity, but also need to come together along with regulators to ensure both a common understanding of the A/R CDM requirements and a timely provision of feedback from the ground on the application of the rules. Furthermore, the land-use sector of developing countries need support in strengthening negotiators' capacity on forestry and carbon to be able to influence the rules for land-based projects and programs being proposed under UNFCCC. Developed countries can play a role in helping developing countries fill these capacity-related gaps.

INCREASE DEMAND

- **Developed countries committed to reducing GHG emissions should stop banning credits from A/R CDM projects in their bilateral/multilateral emission trading schemes.** Where market signals have been given for post-2012 (as from the EU ETS), A/R credits from the CDM remain disadvantaged. Market players should recognize the substantial efforts the CDM's stakeholders have taken to demonstrate that credits from A/R projects are measurable, verifiable, and reportable. In addition, they should recognize that projects apply several safeguard instruments to avoid, minimize, and/or mitigate any potential risk to the local communities' livelihood and environment, as well as the under-delivery risk of emission reductions. It is also worth noting that some projects go even further in guaranteeing the significant delivery of positive net co-benefits by attaining additional certification of their project design. Moreover some A/R CDM's stakeholders are proposing changes to the non-permanence rules so that forestry projects deliver credits fungible with other carbon assets generated in the market. Strengthening the overall supply of forest carbon credits may be fruitless without a significant demand for these credits from developed countries.

Box 9.1

Regulatory Lessons for Other Land-based Climate Change Market Mitigation Mechanisms

The main BioCF lessons learned for other land-based climate mitigation mechanism are summarized below in the form of recommendations. These recommendations should be considered by parties when discussing a potential work programme for SBSTA on possible additional LULUCF activities under the CDM.

- **Ensure simple and clear procedures and predictable timelines to achieve credit certification.** Lack of predictable carbon revenues deters the carbon finance potential to leverage investment financing from private investors and to significantly impact projects' cash flow.
- **Define a simple approach to non-permanence that ensures the fungibility of LULUCF credits with other credits in the market.** Lack of fungibility has limited the demand for A/R CDM credits. The temporary credit approach produces less-favorable assets difficult to understand and handle by both buyers and sellers. This approach has also led to a reduced price, which severely limits the impact of carbon revenues in projects' cash flows. Several other options to address non-permanence exist and developers of LULUCF activities should be allowed to choose the most convenient option.
- **Simplify additionality demonstration and baseline determination as much as possible.** Modalities and procedures should provide for additionality to be shown at the sector level to diminish the burden on individual projects. Existing unenforced national forestry development plans could be considered sufficient evidence of barriers limiting forest activity at a relevant scale. Similarly, a country's forest conservation, protection, and revegetation goals could serve as a basis for setting a threshold over which individual initiatives may be considered automatically additional. An expanded LULUCF mechanism should avoid disincentives to early movers on payments for environmental services, who have struggled to demonstrate additionality in the A/R CDM context.
- **Develop easy-to-follow rules for ex-ante estimation of GHG accounting and allow for progressive adoption of detailed methodologies.** Complex methodologies are time- and- resource intensive, cause confusion, and discourage project developers and investors from participating in LULUCF initiatives. Excessively detailed and complex methodologies should be avoided at least at the onset of the mechanism as developers usually lack the capacity to apply them. Carbon accounting in LULUCF projects should progressively move from simple to refined rules. One alternative could be to allow projects to apply a tiered approach to GHG accounting—in line with IPCC's *Good Practice Guidance for National Inventory of Greenhouse Gases*. More detailed methodologies should be developed based on experience from the ground and countries' advancements in removing data availability and human capacity constraints. Nevertheless, easy-to-follow tools (e.g., Excel-based tools) should be published to facilitate the application of methodologies.
- **Develop easy to follow monitoring methodologies.** Local stakeholders' involvement in carbon monitoring tends to increase project/program ownership, an important under-delivery risk mitigation measure. However, too complex methodologies usually prevent local stakeholders from participating in these tasks. There is room to develop simple yet rigorous monitoring methodologies. In addition, it is important to bear in mind that because of their dynamic nature, land-use-based carbon initiatives may deviate from the original design at implementation. Modalities and procedures should therefore allow for certain level of changes, and easy-to-assess thresholds should be developed to account for permissible changes at implementation.
- **Avoid restricting the type of people that must be involved in small-scale projects and carefully decide the cap in emission reductions imposed on this type of project.** The participation of low-income people must be promoted through measures such as simple GHG accounting and by removing regulatory and financial barriers rather than enforcing through rules the involvement of low-income communities. This would bring land-based carbon projects/programs into alignment with other CDM sectors. In addition, define a relevant cap for small-scale projects based on technical, social, and financial studies of existing land- based projects, to ensure their viability.

LOOKING AHEAD

9.6 In this section the A/R CDM experience is analyzed in light of three ongoing policy developments: (i) land-based climate change mitigation mechanisms being discussed under CDM; (ii) REDD+; and (iii) the landscape management approach to climate change mitigation in rural areas.

9.7 As the UNFCCC negotiations evolve, parties to the UNFCCC negotiations are currently discussing further commitments for Annex B parties under the Kyoto Protocol. One of the activities being discussed as part of this is to request that the Subsidiary Body for Scientific and Technological Advice (SBSTA) initiate a work programme to consider and, as appropriate, develop and recommend modalities and procedures for possible additional land use, land-use change and forestry (LULUCF) activities under the CDM. **To make such a potential expansion of LULUCF under the CDM successful, the early lessons from the A/R CDM should be incorporated in order to avoid some of the obstacles that have hindered the A/R CDM** (See Box 9.1). In addition, because of the many interactions between different land uses, policymakers will need to address the interface of all land-use activities in an integrated manner. The application of a landscape approach that integrates the land-use and rural energy sectors on the ground would be more practical and cost-effective.

9.8 **Lessons for REDD+ are difficult to draw from a project-based mechanism such as the A/R CDM.** Only if REDD+ evolved in the direction of a project-based mechanism would the lessons learned presented in this document be applicable. The following are some general lessons that may be useful for consideration in the current REDD+ discussions.

9.9 One relevant lesson is that resources should be devoted from the onset to addressing any existing gap between rigorousness of rules/procedures and local developers' capacity to follow them. Regulators should also avoid applying approaches to non-permanence that, compounded with other factors, translate into weak incentives for landholders to adopt sustainable land uses (such as temporary crediting as defined in existing A/R CDM modalities and procedures).

9.10 With regards to institutions, considering that forest carbon projects are usually multi-partner endeavors, implementers of REDD+ strategies should consider both the relevance of establishing agreements that clarify roles, rights, responsibilities, and benefit sharing and the need for sustained capacity to achieve effective stakeholder participation in the design, implementation, and adaptation of these agreements. Managing expectations is a continuous task in forest carbon initiatives and all partners should be aware of this. REDD+ regulators, implementers, and other practitioners should interact to advance practical and effective rules and financing mechanisms that facilitate developers' efforts to secure underlying investment and carbon finance to contribute significantly to covering the costs of REDD+.

9.11 Important lessons have also been drawn from the A/R CDM experience with regards to negative impacts from projects on local communities and their environment, a major concern of forest carbon's stakeholders. REDD+ stakeholders should be underpinned by thorough assessments of the impacts of REDD+ interventions to avoid and/or mitigate risk. It is worth noting, however, that some developers of forest carbon initiatives go beyond the requirements of carbon standards and certify projects' positive net contribution to local communities and their environment. The unique co-benefits forest carbon initiatives produce are, frequently, an incentive for developers to undertake them. Many developers also recognize that avoiding social and environmental impacts is a smart strategy to reduce the under-delivery risk of emission reductions.

9.12 **The BioCarbon Fund will continue to support land-use interventions and is planning to build on the experience to date in A/R through scaled-up programs.** The BioCF will work on areas not yet fully explored (e.g., croplands). Such pilots are invaluable for showing the opportunities and challenges that can arise in the application of regulatory rules for climate change projects. The BioCF is also examining where improvements to existing methodologies can be made and is developing new methodologies in areas not yet developed. The latter includes undertaking methodologies and pilots in landscapes where various sectors (e.g., land use, energy) should be considered as a whole. All of this is in line with the World Bank's triple-win strategy in which the forestry, agriculture, and rural energy sectors are treated in an integrated way to increase food security, improve the rural poor's resilience to cope with the impacts of climate change, and to mitigate climate change.

BioCF A/R CDM Active Projects

ANNEX 1

TABLE A BioCF GOVERNMENT AND NONPROFIT-LED PROJECTS

Country	Name / Main Purpose	Area (ha)*
Albania	**Assisted Natural Regeneration of Degraded Lands in Albania** ■ Restoration of severely degraded forest through assisted natural regeneration involving multiple farmers	6,300
Colombia	**San Nicolas CDM Reforestation Project** ■ Establishment of agroforestry systems on degraded pasture lands involving multiple farmers	1,100
Colombia	**Reforestation of Degraded/Degrading Land in the Caribbean Savannah of Colombia** ■ Establishment of silvopastoral systems, and production of rubber and timber on degraded pasture lands involving multiple farmers	2,200
Costa Rica	**Carbon Sequestration in Small and Medium Farms in the Brunca Region (Coopeagri)** ■ Improvement of environmental services on agricultural lands involving multiple farmers	900
Ethiopia	**Humbo Ethiopia Assisted Natural Regeneration Project** ■ Assisted natural regeneration on severely degraded lands involving multiple farmers	2,700
India	**Himachal Pradesh Reforestation Project—Improving Livelihoods and Watersheds** ■ Watershed protection on degraded forest and community lands	4,000
Kenya	**Aberdare Range/Mt. Kenya Small-Scale Reforestation** ■ Restoration of degraded forest and community lands through community involvement.	1,600
Madagascar**	**The Vohidrazana-Mantadia Corridor Restoration and Conservation Carbon Project** ■ Biodiversity conservation on degraded lands subject to shifting cultivation, involving multiple farmers	400
Niger	**Niger Acacia senegalensis Plantation Project** ■ Restoration of vegetative cover and production of Arabic gum involving multiple farmers	8,000
Moldova	**Moldova Soil Conservation Project** ■ Restoration of severely degraded public lands	20,300
Moldova	**Moldova Community Forestry Development Project** ■ Restoration of severely degraded public lands	10,600
Trinidad and Tobago	**Nariva Wetland Reforestation Project** ■ Restoration of wetlands through community involvement	1,200
Uganda	**Uganda Nile Basin Reforestation Project** ■ Timber production on degraded lands involving multiple farmers	2,000

Note: Twenty-five projects entered the BioCF portfolio. Four faced prohibitive barriers and discontinued project development.

*Areas are rounded up, and this table only reflects CDM eligible land areas. Any ineligible areas planted by the project entity are not included here.

**Because of its small size, the Madagascar project may decide not to pursue CDM certification. The project, however, may pursue certification through other standards (for which CDM-ineligible lands are eligible).

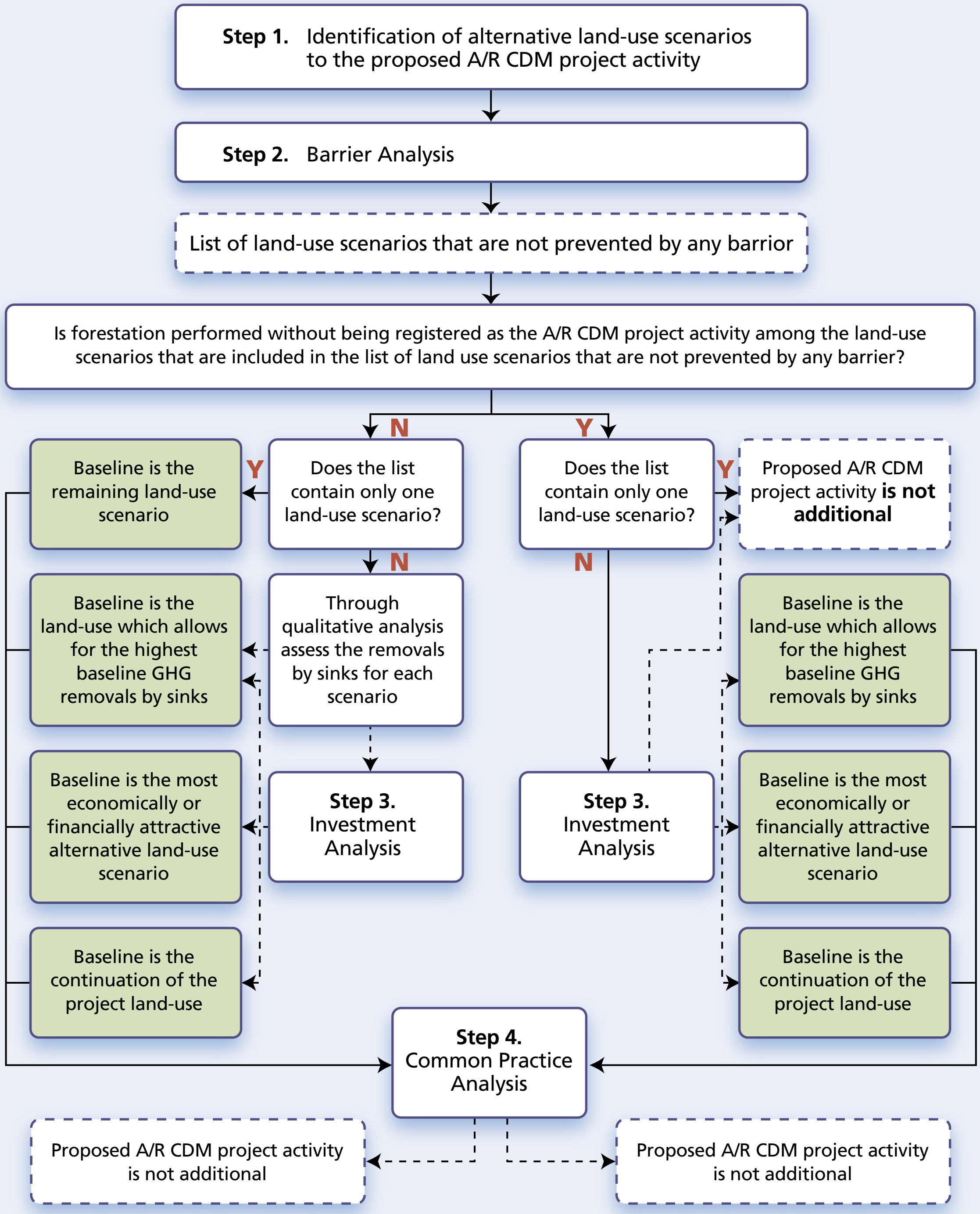
TABLE B BioCF PRIVATE-SECTOR-LED PROJECTS

Country	Name / Main Purpose	Area (ha)*
Brazil	**Reforestation as Renewable Source of Wood Supplies for Industrial Use in Brazil** ■ Biomass production as a substitute for fossil fuel in the iron industry on degraded pasture lands	11,700
Brazil	**AES Tiete Afforestation/Reforestation Project in the State of Sao Paulo** ■ Forest restoration on degraded pasture lands	13,900
China	**Facilitating Reforestation for Guangxi Watershed Management in the Pearl River Basin** ■ Timber production and land restoration on severely degraded lands involving multiple farmers	4,000
China	**Reforestation on Degraded Lands in Northwest Guangxi** ■ Timber production and land restoration on severely degraded lands involving multiple farmers	8,000
Chile	**Afforestation and Reforestation in Central Chile** ■ Timber production on severely degraded lands involving small- and medium-holding farmers	2,900
Democratic Republic of Congo	**Ibi Batéké Degraded Savannah Afforestation Project for Fuel Wood Production** ■ Charcoal production to decrease the pressure on native forests on degraded savannahs	4,200
India	**Improving Rural Livelihoods Through Carbon Sequestration by Adopting Environmentally Friendly Technology-based Agroforestry Practices** ■ Timber production on degraded agricultural lands involving small- and medium-holding farmers	1,600
Nicaragua	**Southern Nicaragua Reforestation Project** ■ Timber production on degraded pasture lands	813

*Areas are rounded up, and this table only reflects CDM eligible land areas. Any ineligible areas planted by the project entity are not included here.

Indicative Flowchart of the Combined Tool to Identify the Baseline Scenario and Demonstrate Additionality in A/R CDM Project Activities

ANNEX 2



ANNEX

3

Simplification of the A/R CDM Rules for GHG Accounting (as of November 2011)

Below guidance, clarification, and tools in various topics published by the CDM EB to facilitate the application of A/R CDM methodologies.

Year	CDM EB Meeting	Simplification
		Project Start
2005	EB 21, Paragraph 64	Projects Starting After 1 January 2000 (prompt start). http://cdm.unfccc.int/EB/021/eb21rep.pdf
		Methodologies
2005	EB 21, Annex 20	Clarification on Ex-ante Estimation of Actual Net GHG Removals by Sinks and Identification of Most Likely Scenario. http://cdm.unfccc.int/EB/021/eb21repan20.pdf
2005	EB 22, Annex 15	Clarification Regarding Methodologies for A/R CDM Projects. http://cdm.unfccc.int/EB/022/eb22_repan15.pdf
2007	EB 31, Paragraph 43	Clarification on when to Request Revision, Clarification to an Approved Methodology, or a Deviation for Project Participants. http://cdm.unfccc.int/EB/031/eb31rep.pdf
		Applicability Conditions
2008	EB 41, Annex 15	Tool to Identify Degraded Lands for Consideration in Implementing a Project. http://cdm.unfccc.int/EB/041/eb41_repan15.pdf
		Baseline Determination
2006	EB 23, Annex 19	Guidance on National and or Sectoral Policies and Circumstances in the Baseline Scenario. http://cdm.unfccc.int/EB/023/eb23_repan19.pdf
2006	EB 24, Annex 19	Clarification on A/R in the baseline of a project. http://cdm.unfccc.int/EB/024/eb24_repan19.pdf
		Sampling and Survey
2007	EB 31, Annex 15	Tool for the Calculation of the Number of Sample Plots for Measurements Within A/R CDM Projects. Version 1. http://cdm.unfccc.int/EB/031/eb31_repan15.pdf
2009	EB 46, Annex 19	Tool for the Calculation of the Number of Sample Plots for Measurements Within A/R CDM Projects. Version 2. http://cdm.unfccc.int/EB/046/eb46_repan19.pdf
2009	EB 50, Annex 30	Guidelines for Sampling and Survey for Small-Scale CDM Project Activities. Version 01. http://cdm.unfccc.int/EB/050/eb50_repan30.pdf
2010	EB 59, Annex 15	Tool for the Calculation of the Number of Sample Plots for Measurements Within A/R CDM Projects. Version 3. http://cdm.unfccc.int/UserManagement/FileStorage/W7Y3MRFZ6DP51OQSEXH9KJVIGL0BNT
		Estimation of Carbon Stocks
2005	EB 20, Annex 8	Clarification on the Definition of Biomass and Consideration of Changes in Carbon Pools. http://cdm.unfccc.int/EB/020/eb20repan08.pdf
2006	EB 24 Paragraph 56	Guidelines on Size of Losses of Carbon due to the Construction of Access Roads. http://cdm.unfccc.int/EB/024/eb24rep.pdf
2007	EB 31 Paragraph 45	Clarification on the Application of the A/R CDM Definition of Forest to Stands with Several Stores of Tees Differing in Height. http://cdm.unfccc.int/EB/031/eb31rep.pdf
2007	EB 32 Paragraph 44	Further Clarification on Application of the A/R CDM Forest Definition of Forest to Stands with Several Stores of Trees Differing in Height. http://cdm.unfccc.int/EB/032/eb32rep.pdf

Note: To avoid presenting long Web links that usually do not work, some documents in the tables above are linked to the corresponding CDM EB meeting instead of to the pdf document directly. Using the link provided, the documents can then be tracked using the number of the annex or paragraph indicated in the second column.

Year	CDM EB Meeting	Simplification
2007	EB 33, Annex 15	Tool: Procedures to Determine When Accounting for the Soil Organic Carbon May Be Neglected http://cdm.unfccc.int/EB/033/eb33_repan15.pdf
2008	EB 41, Annex 14	Tool for the Estimation of Carbon Stocks, Removals, and Emissions from the Dead Organic Matter Pools. Version 1. http://cdm.unfccc.int/EB/041/eb41_repan14.pdf
2009	EB 46, Annex 18	Tool for the Estimation of Changes in the Carbon Stocks of Existing Trees and Shrubs Within the Project Boundary. Version 01. http://cdm.unfccc.int/methodologies/ARmethodologies/tools/ar-am-tool-03-v2.1.0.pdf
2009	EB 46, Annex 17	Guidance on the Conservative Choice and Application of Default Data in Estimation of Net GHG Anthropogenic Removals by Sinks. V1. http://cdm.unfccc.int/EB/046/eb46_repan17.pdf
2009	EB 46, Annex 16	Guidance on Conditions Under which the Changes in Carbon Stocks in Existing Live Woody Vegetation are Insignificant. Version 1. http://cdm.unfccc.int/EB/046/eb46_repan16.pdf
2009	EB 48, Annex 66	Guidance on Procedures for Notifying and Requesting Approval of Changes from the Project Activity as Described in the Registered Project Design Document. http://cdm.unfccc.int/EB/048/eb48_repan66.pdf
2009	EB 48, Annex 67	Procedures for Notifying and Requesting Approval of Changes from the Project Activity as Described in the Registered Project Design Document. http://cdm.unfccc.int/EB/048/eb48_repan67.pdf
2009	EB 50, Annex 23	Guidance for the Conservative Choice and Application of Default Data in Estimation of Net GHG Anthropogenic Removals by Sinks. V 2. http://cdm.unfccc.int/EB/050/eb50_repan23.pdf
2010	EB 55, Annex 21	Tool for the Estimation of Changes in Soil Organic Carbon Stocks due to the Implementation of Projects. Version 1.1.1. http://cdm.unfccc.int/Meetings/MeetingInfo/DB/N6H2D51YTQSVOAP/view.
2010	EB 56, Annex 13	Tool for the Estimation of Carbon Stocks and Changes in Carbon Stocks of Trees and Shrubs. Version 2. http://cdm.unfccc.int/Meetings/MeetingInfo/DB/TEF0GPX12MLY7RQ/view.
2010	EB 58, Annex 14	Tool for the Estimation of Carbon Stocks and Changes in Carbon Stocks in Deadwood and Litter. Version 1.1.0. http://cdm.unfccc.int/Meetings/MeetingInfo/DB/K592CXOW1YI3F4U/view.
2011	EB 60, Annex 13	Tool for the Estimation of Carbon Stocks and Changes in Carbon Stocks of Trees and Shrubs. Version 2.1.0. http://cdm.unfccc.int/Meetings/MeetingInfo/DB/AGMVUQ5YSJ41X93/view.
2011	EB 60, Annex 12	Tool for the Estimation of Changes in Soil Organic Carbon Stocks due to the Implementation of Projects. Version 1. http://cdm.unfccc.int/Meetings/MeetingInfo/DB/AGMVUQ5YSJ41X93/view.
2011	EB 60, Annex 12	The Approved Spreadsheet to Facilitate the Calculation of Changes in Soil Organic Carbon Stocks.
		Emissions
2006	EB 23, Annex 18	Clarification on the Definition of Renewable Biomass. http://cdm.unfccc.int/EB/023/eb23_repan18.pdf
2006	EB 25, Paragraph 38	Guidance on Avoiding Double Counting of Emission Sources. http://cdm.unfccc.int/EB/025/eb25rep.pdf
2006	EB 28, Paragraphs 31 and 32	Guidance on Pre-project Emissions in Methodologies that Apply Baseline Scenarios Corresponding to the Approach 22(b). http://cdm.unfccc.int/Reference/Guidclarif/ar/methAR_guid13_v01.pdf
2007	EB 31, Annex 16	Tool for Testing Significance of GHG Emissions in A/R CDM Project Activities. Version 1. http://cdm.unfccc.int/EB/031/eb31_repan16.pdf
2007	EB 33, Annex 14	Tool for the Estimation of Fossil Fuel Emissions. Version 1. http://cdm.unfccc.int/EB/033/eb33_repan14.pdf

Note: To avoid presenting long Web links that usually do not work, some documents in the tables above are linked to the corresponding CDM EB meeting instead of to the pdf document directly. Using the link provided, the documents can then be tracked using the number of the annex or paragraph indicated in the second column.

Year	CDM EB Meeting	Simplification
2007	EB 33, Annex 16	Tool for the Estimation of Direct Nitrous Oxide Emissions from Nitrogen Fertilization. Version 1. http://cdm.unfccc.int/EB/033/eb33_repan16.pdf
2008	EB 42, Paragraph 35	Tool for the Estimation of GHG Emissions from Clearing, Burning, and Decay of Existing Vegetation. Version 2. http://cdm.unfccc.int/EB/042/eb42rep.pdf
2008	EB 42, Paragraph 35	Guidance on Accounting for GHG Emissions in A/R CDM Project Activities. Part I. http://cdm.unfccc.int/Reference/Guidclarif/ar/methAR_guid21.pdf
2008	EB 44, Paragraph 37	Guidance on Accounting for GHG Emissions in A/R CDM Project Activities. Part II. http://cdm.unfccc.int/Reference/Guidclarif/ar/methAR_guid23.pdf
2009	EB 50, Annex 22	Tool for the Estimation of GHG Emissions from Clearing, Burning, and Decay of Existing Vegetation. Version 3. http://cdm.unfccc.int/EB/050/eb50_repan22.pdf
2009	EB 50, Annex 21	Guidance on Conditions under which Increases in GHG Emissions from Removal of Existing Vegetation due to Site Preparation are Insignificant. Version 01. http://cdm.unfccc.int/EB/050/eb50_repan21.pdf
2011	EB 60, Annex 11	Tool for the Estimation of Non-CO_2 Emissions from Burning of Biomass. Version 3.1.0. http://cdm.unfccc.int/Meetings/MeetingInfo/DB/AGMVUQ5YSJ41X93/view.
		Leakage
2006	EB 28, Paragraph 33	Guidance on Market Leakage. http://cdm.unfccc.int/EB/028/eb28rep.pdf
2007	EB 36, Annex 19	Tool for the Estimation of GHG Emissions Related to Displacement of Grazing Activities in A/R CDM Project Activity. http://cdm.unfccc.int/EB/036/eb36_repan19.pdf
2008	EB 39, Annex 12	Tool for the Estimation of GHG emissions Related to Displacement of Grazing Activities in A/R CDM Project Activity. Version 02. http://cdm.unfccc.int/EB/039/index.html.
2008	EB 39, Annex 11	Tool for the Calculation of GHG Emissions due to Leakage from Increased Use of Non-renewable Woody Biomass Attributable to an A/R CDM Project Activity. http://cdm.unfccc.int/EB/039/eb39_repan11.pdf
2009	EB 51, Annex 15	Tool for the Estimation of the Increase in GHG Emissions Attributable to Displacement of Pre-project Agricultural Activities. http://cdm.unfccc.int/EB/051/eb51_repan15.pdf
2009	EB 51, Annex 14	Guidance on conditions under which the increase in GHG emissions attributable to displacement of pre-project cultivation is insignificant. Version 1. http://cdm.unfccc.int/EB/051/eb51_repan14.pdf
2009	EB 51, Annex 13	Guidance on conditions under which the increase in GHG emissions attributable to displacement of pre-project grazing activity is insignificant. Version 1. http://cdm.unfccc.int/EB/051/eb51_repan13.pdf
		Verification
2011	EB 63, Annex 26	Guidelines on Application of Specified Versions of A/R CDM Methodologies in Verification of Registered A/R CDM Project Activities. Version 01.0. http://cdm.unfccc.int/EB/archives/meetings_10.html#62.
2011	EB 63, Annex 27	Guidelines on Accounting of Specified Types of Changes in A/R CDM Project Activities from the Description in Registered Project Design Documents. (Version 01.0). http://cdm.unfccc.int/EB/archives/meetings_10.html#62.

Note: To avoid presenting long Web links that usually do not work, some documents in the tables above are linked to the corresponding CDM EB meeting instead of to the pdf document directly. Using the link provided, the documents can then be tracked using the number of the annex or paragraph indicated in the second column.

Steps for Setting Up a Benefit-sharing Plan

ANNEX 4

PREPARATION PHASE

- Start this process at the early stages of the project.
- Identify beneficiaries using participatory methods (e.g., Participatory Rural Appraisal).
- Identify and/or create user groups and cooperatives to represent potential participants.
- Assess local needs and expectations.
- Learn the history of the community and consult with participants to determine what type of payments for environmental services are appropriate (i.e., in some cases it may be better to have in-kind payments rather than cash payments).
- Build trust relationships with local farmers and community organizations.

DESIGN PHASE

- Decide, in a participatory fashion, the best way to distribute project revenues and outcomes (e.g., direct payment, setting up a community fund to foster more investments in the area).
- Enable the communities to discuss project terms by managing, as much as possible, the power relationships within the community (e.g., providing women with a separate discussion forum).
- Identify, if necessary, an institution to provide the promised services.
- Design a flexible agreement to establish the benefit-sharing plan. Use plain language and make sure all the terms and conditions are clearly understood by the communities and the farmers.

IMPLEMENTATION PHASE

- Implement a pilot phase to test the plan through the distribution of early benefits. This will at the same time provide incentives for the community to commit to the project and serve as a test for the plan.
- Ensure that the plan is flexible enough to accommodate changes.
- Ensure that the efficiency of the plan is continuously evaluated.
- Make changes along the way if necessary.

Sources: World Bank (2009) *Rethinking Forest Partnerships and Benefit Sharing* (http://go.worldbank.org/4V8KFNXZ51) and interviews with BioCF project managers.

Glossary

ANNEX 5

Adaptation: The Intergovernmental Panel on Climate Change (2002) defines adaptation as the adjustment in natural or human systems, in response to actual or expected climatic stimuli and their impacts on natural and socioeconomic systems, which moderates harm or exploits beneficial opportunities.

Additionality: A project activity is additional if anthropogenic greenhouse gas emissions are lower than those that would have occurred in the absence of the project activity.

Actual Net Greenhouse Gas Removals by Sinks: The sum of the verifiable changes in carbon stocks in the carbon pools within the project boundary, minus the increase in emissions of the greenhouse gas that are increased as a result of the implementation of the A/R project, while avoiding double counting.

Afforestation: The process of establishing and growing forest on lands which have not been forested in the last fifty years.

Agriculture, Forestry, and Other Land Use (AFOLU): The 1996 IPCC guidelines for National Greenhouse Inventories evolved in 2003 from Land Use Change and Forestry into the Good Practice Guidance on Land Use, Land-use Change and Forestry. It further evolved into AFOLU in 2006. AFOLU integrates agriculture as a way to resolve inconsistencies, avoid double counting, remove arbitrary distinctions between previously considered land-use categories, and ensure a consistent treatment of greenhouse gases in all land uses.

Annex I Parties: The Annex I parties include the industrialized countries that were members of the Organization for Economic Co-operation and Development in 1992, plus countries with economies in transition. Current Annex I parties include Australia, Austria, Belarus, Belgium, Bulgaria, Canada, Croatia, Czech Republic, Denmark, Estonia, European Union, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Latvia, Liechtenstein, Lithuania, Luxemburg, Monaco, the Netherlands, New Zealand, Norway, Poland, Portugal, Romania, Russian Federation, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, Ukraine, United Kingdom of Great Britain and Northern Ireland, and the United States of America. All but Turkey are listed in Annex B of the Kyoto Protocol.

Annex B (Parties): The 39 industrialized countries (including the European Union) listed in Annex B to the Kyoto Protocol have committed to country-specific targets to collectively reduce their greenhouse gas emissions by at least 5.2 percent below 1990 levels from 2008–2012.

Assigned Amount Unit (AAU): One AAU represents the right to emit one tCO2e. Annex I parties are issued AAUs up to the level of their assigned amount. The number of AAUs issued corresponds to the quantity of greenhouse gases they can release in accordance with the Kyoto Protocol during the first commitment period (2008–2012).

Baseline Net Greenhouse Gas Removals by Sinks: The sum of the verifiable changes in carbon stocks in the carbon pools within the project boundary that would have occurred in the absence of the A/R CDM project.

BioCarbon Fund Participants: BioCF participants in this report refers to the six governmental entities and 12 private companies taking part in Tranche 1 (Windows 1 and 2) and Tranche 2 (Windows 1 and 2). The BioCarbon Fund participants provide funds for both Afforestation and Reforestation (A/R) Clean Development Mechanism (CDM) projects and for other land-based projects currently excluded from the CDM (e.g., Reducing Emissions from Deforestation and Forest Degradation-Plus (REDD+) and sustainable agricultural land management). Most of the BioCF resources (about 80 percent) have been earmarked to A/R CDM projects (first windows of each tranche); the remainder has been allocated to REDD+ and sustainable land management projects (second windows). The emission reductions generated by these projects are purchased by the BioCF on behalf of its participants and are subsequently transferred to them pro rata their financial participation in the Fund.

Biodiversity: The variability among living organisms and the ecological complexes of which they are part, including the diversity within species, between species, and of ecosystems (UNCBD, 1992).

Carbon Asset: The potential greenhouse gas emission reductions that a project is able to generate and sell.

Carbon Finance: Resources provided to activities generating (or expected to generate) GHG emission reductions.

Carbon Dioxide Equivalent (CO_2e): The universal unit of measurement used to indicate the global warming potential of each of the six greenhouse gases regulated under the Kyoto Protocol. Carbon dioxide—a naturally occurring gas that is a byproduct of burning fossil fuels and biomass, land-use changes, and other industrial processes—is the reference gas against which the other greenhouse gases are measured.

Carbon Pools: The carbon reservoirs that are formally recognized by the A/R CDM. These include aboveground biomass, below-ground biomass, litter, deadwood, and soil organic carbon. Different methodologies account for different carbon pools.

Certified Emission Reductions (CERs): A unit of GHG emission reductions issued pursuant to the CDM and measured in metric tonnes of carbon dioxide equivalent. One CER represents one tCO2e reduction in GHG emissions.

Clean Development Mechanism (CDM): A mechanism provided for under Article 12 of the Kyoto Protocol, the CDM is designed to assist developing countries in achieving sustainable development by allowing countries taking part in Annex B of the protocol to participate in low carbon projects in developing countries and obtain CERs in return.

CDM Executive Board (CDM EB): A 10-member panel, elected at the Conference of the Parties, which supervises the CDM.

Conference of the Parties (COP): The supreme body of the UNFCCC, the COP meets annually to review the progress of the parties in meeting their treaty obligations and to assess progress in meeting the goals of the convention.

Crediting Period: The duration of time during which a registered project can generate emission reductions. The crediting period for A/R CDM projects can be 20 years renewable twice or 30 years non-renewable.

Designated National Authority (DNA): An office, ministry, or other official entity appointed by a party to the Kyoto Protocol to review and give national approval to projects proposed under the CDM.

Designated Operational Entity (DOE): Independent auditors that assess whether a potential project meets all the eligibility requirements of the CDM (validation) and whether the project has achieved GHG reductions (verification and certification).

Emission Reductions (ERs): The measurable removal, limitation, reduction, avoidance, sequestration, or limitation of GHG emissions from a specified activity in a specified period of time.

Emission Reductions Purchase Agreement (ERPA): A purchase and sale agreement for the acquisition of emission reductions.

Emission Reduction Units (ERUs): A unit of emission reductions issued pursuant to Joint Implementation (one of the flexible mechanisms of the Kyoto Protocol). One ERU represents a reduction of one metric tonne of carbon dioxide equivalent.

European Union Allowances (EUAs): Allowances used under the EU-ETS. An EUA unit is equal to one tCO2e.

European Union Emission Trading Scheme (EU-ETS): The EU-ETS was launched in January 2005 as a cornerstone of the EU's climate policy toward meeting its Kyoto commitments. Through the EU-ETS, member states allocate part of the efforts toward their Kyoto targets to private sector emission sources (mostly utilities). During 2008-2012, emissions from mandated installations (about 40 percent of all EU emissions) are capped on average at six percent below 2005 levels. Participants can reduce emissions, purchase EUAs, or acquire CERs and ERUs. Temporary CERs are excluded. The EU-ETS will continue beyond 2012 to promote further cuts in emissions.

First Commitment Period: The five-year period, from 2008–2012, during which industrialized countries committed under the Kyoto Protocol to collectively reduce their greenhouse gas emissions by an average of 5.2 percent from 1990 levels.

Flexible Mechanisms: Three procedures (the CDM, International Emissions Trading, and Joint Implementation) were established under the Kyoto Protocol to increase the flexibility to make and reduce the cost of making cuts in greenhouse gas emissions.

Greenhouse Gases (GHGs): Gases that absorb and emit radiation within the infrared range, trapping heat in the atmosphere and therefore contributing to maintaining the Earth surface's temperature at a level that can sustain life. The main greenhouse gases are water vapor (H2O), carbon dioxide (CO2), nitrous oxide (N2O), methane (CH_4), and ozone (O_3). Greenhouse gases are emitted from both natural and anthropogenic sources. According to the IPCC, the increase in global average temperatures since the mid-20th century is very likely due to the increase in anthropogenic GHG emissions from such activities as burning fossil fuels and deforestation. The Kyoto Protocol regulates six greenhouse gases: carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydro fluorocarbons (HFCs), per fluorocarbons (PCFs), and sulfur hexafluoride (SF_6).

Global Warming Potential: An index representing the combined effect of the differing times greenhouse gases remain in the atmosphere and their relative effectiveness in absorbing outgoing infrared radiation.

Internal Rate of Return: The annual return that makes the present value of future cash flows from an investment (including its residual market value) equal to the current market price of the investment. In other words, the discount rate at which an investment has zero net present value.

Joint Implementation: A market-based implementation mechanism, defined in Article 6 of the Kyoto Protocol, which allows Annex I countries and/or companies from these countries to implement projects jointly to limit or reduce emissions or enhance sinks—and to share the emission reduction units.

Kyoto Protocol: Adopted at the Third Conference of the Parties to the United Nations Convention on Climate Change in Kyoto, Japan, in December 1997, the Kyoto Protocol commits industrialized country signatories to collectively reduce their greenhouse gas emissions by at least 5.2 percent below 1990 levels on average from 2008-2012. Developing country signatories can participate voluntarily in emissions trading through the CDM. The Kyoto Protocol entered into force in February 2005.

Land Degradation: Reduction or loss of the biological or economic productivity of land as a result of anthropogenic and natural causes (Convention to Combat Desertification).

Land Use, Land-Use Change and Forestry (LULUCF): A set of activities, including human-induced land use, land-use change and forestry activities, which lead to both emissions and removals of greenhouse gases from the atmosphere. LULUCF is a category used in reporting greenhouse gas inventories.

Landscape: A mosaic where a cluster of local ecosystems is repeated in similar form over a kilometers-wide area. A landscape is characterized by a particular configuration of topography, vegetation, land use, and settlement pattern that delimits some coherence of natural, historical, and cultural processes and activities.

Landscape Management Approach: A strategy for the integrated management of land, water, and living resources that promotes conservation and sustainable use in an equitable way. This approach recognizes that humans, with their cultural diversity, are an integral component of many ecosystems (UNCBD, 1998).

Leakage: The increase in greenhouse gas emissions by sources outside the boundary of an A/R CDM project which is measurable and attributable to the A/R project.

Livelihood: The livelihood of an individual or household comprises the assets (natural, physical, human, financial, and social capital), and the access to these assets (mediated by institutional and social relations). Together these elements determine the living gained by the individual or household (Sunderlin et al., 2005).

Long-term CER (lCER): A CER issued for an A/R CDM project which expires at the end of the crediting period for which it was issued.

Monitoring Plan: A set of requirements for monitoring and verification of the emission reductions achieved by a project.

Net Anthropogenic Greenhouse Gas Removals by Sinks: The actual net greenhouse gas removals minus both the baseline net greenhouse gas removals and leakage.

Project Boundary: The geographic delineation of the A/R project activity. The project boundary encompasses the discrete areas of land where carbon storage is expected and managed during the project crediting period. The project developer has control over the lands within the project boundary.

Project Design Document (PDD): The PDD details the project activity (including environmental impacts and stakeholder consultations), the baseline methodology, project additionality, and the monitoring plan.

Project Developer: The project developer is usually an external PDD writing consultant. In cases in which no consultant is hired, the project entity is the project developer. This report refers to project developers in the chapters related to PDD preparation and to project entities in chapters related to project management, representation of the project before the UNFCCC, and the entity that aggregates landowners in a multi-farmer project.

Project Entity: The entity that represents the project before the UNFCCC and that usually aggregates landowners in a multi-farmer project. In many cases the project entity is also the project manager.

Project Idea Note: A note prepared by a project proponent that briefly outlines the project activity (e.g., sector, location, financials, and estimated levels of ERs).

REDD-plus (REDD+): All activities that reduce emissions from deforestation and forest degradation, and contribute to conservation, sustainable forest management, and the enhancement of forest carbon stocks.

Reforestation: The process of increasing the capacity of the land to sequester carbon by replanting forest biomass in areas where forests were previously harvested.

Registration: The formal acceptance by the CDM EB of a validated project as a CDM project activity.

Removal Unit (RMU): Issued by parties to the Kyoto Protocol to account for net removals by sinks from activities in the Land Use, Land-Use Change and Forestry sector in accordance with Articles 3(3) and 3(4) of the Kyoto Protocol.

Sequestration: The capture of carbon dioxide, for a specified period of time, in a manner that prevents it from being released into the atmosphere.

Small-scale A/R CDM Projects: Projects expected to result in net anthropogenic greenhouse gas removals by sinks of less than 16 kilotonnes of CO2 per year and developed or implemented by low-income communities and individuals as determined by the host country. If a small-scale project results in greenhouse gas removals by sinks greater than 16 kilotonnes of CO2 per year, the excess removals will not be eligible for tCERs or lCERs.

Temporary CER (tCER): A CER issued for an A/R CDM project which expires at the end of the commitment period following the one during which it was issued.

United Nations Framework Convention on Climate Change (UNFCCC): The international legal framework adopted in June 1992 at the Rio Earth Summit to address climate change. Parties to the Convention commit to stabilizing human-induced greenhouse gas emissions at levels that would prevent dangerous interference in the climate system following "common but differentiated responsibilities" based on "respective capabilities."

Validation: The process of independent evaluation of a project activity by a DOE against the requirements of the CDM.

Verified Emission Reductions: A unit of greenhouse gas emission reductions that has been verified by an independent auditor. VERs are typically traded on the voluntary carbon market.

Verification: The review and ex-post determination by an independent third party of the monitored reductions in emissions generated by a registered CDM project during the verification period.

Voluntary Carbon Market: The voluntary market caters to the needs of those entities that voluntarily decide to reduce their carbon footprint using offsets. The regulatory vacuum in some countries, and the anticipation of imminent legislation on greenhouse gas emissions, also motivates some pre-compliance activity.

Watershed: An area that supplies water by surface or sub-surface flow to a given drainage system or body of water, be it a stream, river, wetland, lake, or ocean. The terms watershed, basin, and catchment are often used interchangeably in the literature.

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ANNEX 6

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JUNE 2007

With the Moldova Soil Conservation and the Moldova Community Forestry Development Projects the land has started to recover its productivity and erosion has diminished.

Images courtesy of Moldsilva

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