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Design Issues in Clean Development Mechanism Forestry Projects

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The design of an afforestation and reforestation (AR) project under the Clean Development Mechanism (CDM) of the Kyoto Protocol is a two-stage process. The first stage includes the definition of a project idea, the evaluation of its eligibility under CDM rules, and preliminary estimations of carbon removals, among other things. The second stage involves the preparation or application of a baseline and monitoring methodology and the production of a Project Design Document (PDD). This second stage must be implemented in strict compliance with the modalities and procedures (M&Ps) of the CDM and any guidance provided by the CDM Executive Board (EB).

As a consequence of the decisions on M&Ps, the design of a CDM AR project deals with several technical issues more complex than those for CDM activities in other sectors.[1] In part this is the consequence of the complex political process that produced the M&Ps. Forestry projects were debated extensively because of concerns about their real contribution to climate change mitigation and their possible negative effects on host countries' sustainable development. It was feared that too lax regulations would jeopardize the environmental integrity of the Kyoto Protocol and create negative effects on local communities or biodiversity and that too stringent regulations would discourage project development.

In this chapter we review technical, legal, and market issues that proponents of CDM AR projects have to address when they design their projects. We analyze the tasks, types of information, and capacity required to address the project

design issues, as well as the problems that project developers may face. We identify which design issues represent the most significant barriers for project proponents and propose recommendations to overcome these barriers. Our analysis is based on experience we gained during the first year of the FORMA project, which assisted in the preparation of ten CDM AR project initiatives in Latin America.[2]

In February 2006 FORMA launched a call for CDM AR project ideas and received forty-seven responses, which we refer to as the "large portfolio." These projects originated in fifteen Latin American countries. Some countries, such as Colombia and Bolivia with eight projects each, were well represented. After a first filter based on simple criteria, twenty-two projects were selected for further examination. Among them, seven were in early stages of development (substantiated by a general concept note or prefeasibility study), eleven had a Project Idea Note (PIN)—a short description that is not mandatory but has proved to be a useful marketing document—and four were already drafting PDDs. We refer to these twenty-two projects as the "small portfolio."[3] For this chapter, we performed a simple analysis on the large portfolio and a more detailed analysis on the small portfolio.

Technical Issues

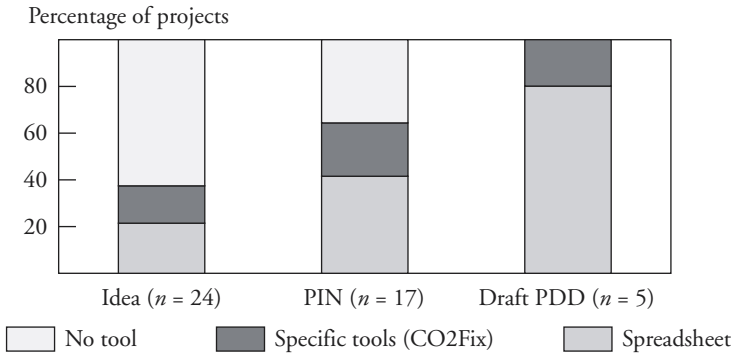
During the development of a CDM project idea, project developers must first define project characteristics such as place, scale, activities, time frame, business plan, and partners. Many technical problems encountered during this step are present in any kind of forestry project, but other problems are specific to the CDM and are related to carbon estimations and the assessment of additionality—the reason the project would not happen without the CDM.

Carbon Estimations

Initial carbon estimations are intended to quantify the amount of carbon dioxide that will be removed from the atmosphere during the crediting period of the project. The estimations should define a simple baseline scenario and quantify the carbon stock changes that are likely to occur in both the project and the baseline scenario. Tools used during these initial estimations range from simple spreadsheets to comprehensive software programs such as CO_2Fix.[4] Input data can range from default values and generic equations to data specific to the site.

In FORMA's large portfolio, 46 percent of the projects were using no tool, 35 percent used a spreadsheet, and 20 percent used a specific tool. CO_2Fix was the most common tool, being used by 78 percent of the projects that used a specific tool. The use of tools became more widespread when the project design stage was more advanced: only 37 percent of projects in the early stage used a tool, but

Figure 8-1. *Use of Tools according to Project Design Stage in FORMA's Large Portfolio*



65 percent of those with PINs and 100 percent of those drafting PDDs used a tool (figure 8-1).

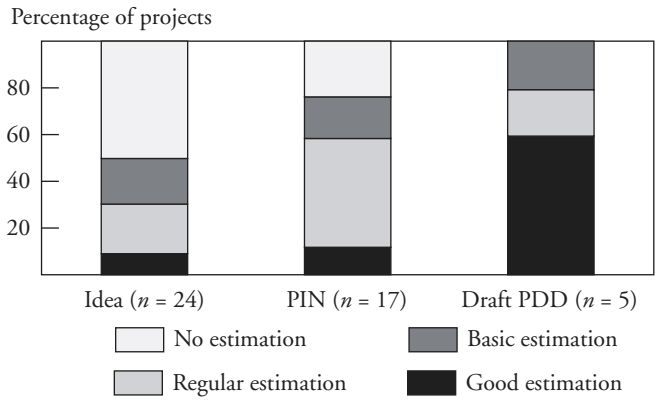
If significant leakage and project emissions are expected, they should be estimated broadly. In FORMA's small portfolio, 41 percent of the projects considered leakage (29 percent for projects in early stages, 36 percent for projects with PINs, and 75 percent for projects drafting PDDs).

A lack of good data and advice often hinder simplified but credible carbon estimations at early stages of project development. In many projects, baseline, leakage, and project emissions are underestimated or ignored, leading to overestimations of the expected carbon benefits. Even if there is no need to use an approved methodology for these first carbon estimations, the use of guidelines or specific tools and the application of the principles of transparency and conservatism are recommended. Of the forty-seven projects of the FORMA large portfolio, 71 percent of those in an early stage of design had a very basic carbon estimation or none at all. The quality of the estimation increased with advances in the project design. However, it is worrisome that 20 percent of the projects at the stage of drafting a PDD still relied on a basic estimation without referring to any methodology or using any tool (figure 8-2).[5]

Additionality

Initial additionality proofs are intended to screen out projects that may not comply with CDM additionality requirements. Even if the use of the additionality tool is not mandatory at this stage, it is highly recommended for guiding the analysis.[6] Even with the tool, some developers appear to face difficulties in understanding the notion of additionality and do not correctly follow the procedures proposed in the tool.

Figure 8-2. *Quality of Carbon Estimation according to Project Design Stage in FORMA's Large Portfolio*

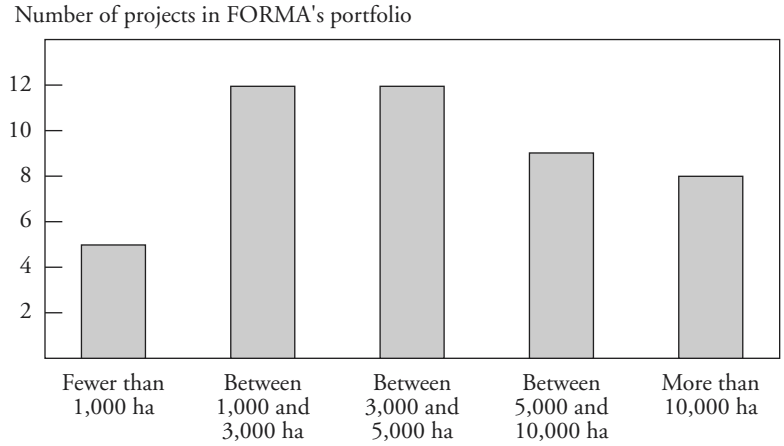


Many project developers have trouble following the logic of the additionality test. Normally, in order to find investors and partners, project developers try to demonstrate that their projects will be profitable and face no major barriers. In the case of the CDM, they must do the contrary: demonstrate low profitability or the existence of barriers to show the effect the CDM has on the project's viability. This may cause inconsistencies, as when an AR project without Certified Emission Reductions (CERs) is described as highly profitable in a document for investors and unprofitable in a CDM-related document. In FORMA's large portfolio, six out of forty-seven project developers, when asked about the barriers that might impede the implementation of their AR project, answered that there were no barriers. Four of these projects were at an early stage and two had PINs.

Demonstrating that the CDM will help to increase financial attractiveness so that the project is feasible is a necessary step to demonstrate additionality. Beyond the issue of additionality, this step is important for project viability. Project developers must evaluate whether accessing the CDM is worthwhile. If the revenue obtained from selling CERs is insufficient to offset CDM transaction costs, then the project would be better off without the CDM. Using various scenarios about projects and CDM costs and benefits, we have shown that on average the minimum project area required is 2,300 hectares if carbon trading is to be profitable for projects relying on temporary crediting (temporary CERs [tCERs] or long-term CERs [lCERs]).[7]

In FORMA's large portfolio, the area of the proposed projects ranged from 10 to 253,000 hectares, with a median of 4,625 hectares. In their project descriptions, five projects had fewer than 1,000 hectares (figure 8-3) and did not esti-

Figure 8-3. *Areas of Project Included in FORMA's Large Portfolio*



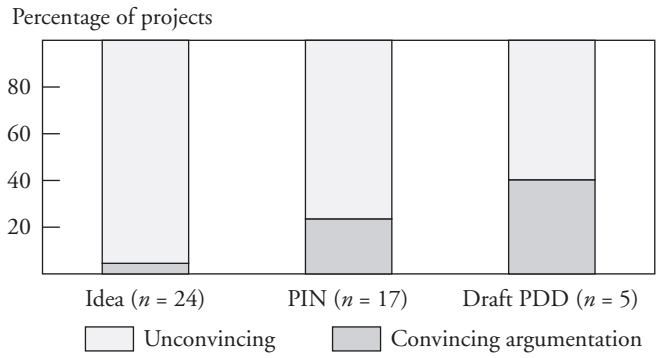
mate the transaction costs associated with the CDM. Three project ideas were for fewer than 30 hectares. Because of CDM transaction costs, projects of such small size will not benefit from carbon trading, even if the simplified modalities and procedures developed for small-scale projects are applied to them.

When evaluating whether the CDM is worthwhile, some project developers encounter difficulties in calculating the numbers of tCERs and lCERs expected, because such calculations are less straightforward than those for CERs of emission reduction projects. Moreover, almost no information exists about the prices of tCERs and lCERs and transaction costs for forestry projects. Most of the available information about costs and prices refer to industrial emission reduction projects, which are inapplicable to CDM AR projects.

Effects

Socioeconomic and environmental effects should be considered from the moment the project idea is developed. However, when these issues are addressed at early stages, they are usually addressed with very general considerations, such as unconvincing statements about the positive effects of forestry activities on livelihoods, biodiversity, or watersheds. In FORMA's large portfolio, many project developers proposed a list of general effects when they were asked to describe project effects. Ninety-six percent of projects in early stages, 76 percent of those with PINs, and 60 percent of those drafting PDDs gave a general and undocumented argument (figure 8-4). At early stages of project definition, using tools appears to be too cumbersome for most project developers. In FORMA's large portfolio, only one project description out of forty-seven mentioned the use of a standard

Figure 8-4. *Quality of Argument about Socioeconomic and Environmental Effects, by Project Design Stage in FORMA's Large Portfolio*



for evaluating the effects of the project on sustainable development. The project referred to the standards formulated by the Climate, Community, and Biodiversity Alliance (CCBA).[8]

Developing the PDD

During the development of the PDD, many project developers face serious difficulties related to the selection and use of baseline and monitoring methodologies. If none of the already approved methodologies is applicable to the project, developers must build their own. By August 2007, eight methodologies for AR projects had received final approval.[9]

Most approved methodologies were prepared by international consultants or with the support of specialists hired by carbon funds. Available tools and documents, such as the EB's guidelines for completing a new methodology for AR, will not help in developing a new methodology unless project developers possess the required analytical capacities, scientific knowledge, and drafting skills.[10]

In addition to problems related to applying a methodology, the development of the PDD raises technical issues. Project developers are required to delineate the project area geographically by identifying and mapping the limits of each piece of land that will actually be planted during the crediting period of the project. In FORMA's small portfolio, only 56 percent of the projects in an early stage or with a PIN had an idea of the project's boundaries, whereas all projects drafting PDDs had more precise definitions of their boundaries (even if in most cases the exact georeferencing still had to be done).

Identifying and mapping the limits of the project can be difficult if uncertainty exists about the list of land plots and participating farmers or if the eligibility of

land is still unclear, because the areas included in the project boundary must comply with the land eligibility criteria, which we discuss later. Technical problems may arise if the project encompasses several discrete areas, if few spatial data are available, or if the project has weak geographical information system (GIS) and remote sensing capacities. In FORMA's large portfolio, 35 percent of the projects mentioned GIS, satellite images, or aerial photographs (21 percent for early-stage projects, 47 percent for projects with PINs, and 60 percent for projects drafting PDDs). Only 17 percent mentioned these tools in connection with the issue of land eligibility (8 percent for early-stage projects, 24 percent for those with PINs, and 40 percent for those drafting PDDs).

In order to be eligible for the CDM, project developers must demonstrate that the land within the project boundary was (1) not a forest on December 31, 1989 (for reforestation), or during the past fifty years (for afforestation), (2) is not a forest at the moment the project starts, and (3) will not become a forest without the CDM. "Forest" should be defined according to the definition chosen for the CDM by the host country. According to the tool prepared by the EB (under review at the time of writing), projects can demonstrate eligibility by using remote sensing, aerial photographs, ground survey, or, in the absence of other data, testimony produced during a participatory rural appraisal.

Project developers must further select an approach for addressing nonpermanence—that is, selecting between temporary CERs (tCERs) and long-term CERs (lCERs). The selection depends on market factors (buyer preference, credit prices), project-specific financial needs, and project risk (high-risk projects should go for tCERs). The selection may be complicated if there is still no identified CER buyer or if information about market preference is lacking. Project developers must also define the project's duration and select a crediting period with a starting date. The crediting period can be renewable (twenty years each, renewable twice at most) or fixed (thirty years). The starting date for the crediting period must be the same as the project's starting date. The crediting period should be selected according to project duration, plantation turnover, and project risk.

As part of the project design, the project developer has to indicate the estimated net anthropogenic greenhouse gas (GHG) removals by sinks (project scenario minus baseline minus leakage) based on applying an approved methodology, followed step by step with adequate data, and applying principles of transparency and conservatism. But because of the large number of variables and equations used in any methodology, it seems impossible to present all steps in a transparent way; this would require that a spreadsheet be enclosed with the PDD, with a template adapted to each methodology.[11]

Finally, project developers must present in the PDD an analysis of possible effects on the environment (biodiversity and natural ecosystems, soils and hydrology, and perturbations such as fires, pests, and disease) and society (local

communities, indigenous people, land tenure, local employment). If negative effects are considered to be significant, then project developers must present an environmental or socioeconomic impact assessment according to host country procedures and a plan to monitor and mitigate effects.

Carbon Market and Legal Issues

Many issues arising during project design are related to market and legal matters. A project can be accepted under the CDM only if the host country complies with the participation requirements listed in decision 3/CMP.1. The host country must have ratified the Kyoto Protocol and established a Designated National Authority (DNA) for the CDM. In addition to general CDM requirements, CDM AR is possible only if the DNA has chosen and reported to the EB a definition for forest.

Before proceeding to validation, projects must receive approval from the host country's DNA in the form of a Letter of Approval (LOA). Approval from the DNA must be obtained before presenting the PDD to the Executive Board. Obtaining the LOA is a legal requirement that may cause delay or refusal of approval of the project if the DNA has not been consulted at an early stage of the project design about the national procedures and criteria, if any, used in project evaluation. In FORMA's large portfolio, 22 percent of the projects mentioned contacts with the DNA (4 percent for projects in early stages, 35 percent for projects with PINs, and 60 percent for projects drafting PDDs).

Other major legal issues are not CDM requirements but must be resolved before the implementation of the project. Some are related to the contractual relationships between project participants, such as the project developer, the project manager, the project owner (if they differ), landowners, farmers, and contractors. Legal issues regarding the relationships between project participants are similar to those encountered in any forestry project, especially regarding land tenure. In FORMA's large portfolio, land tenure was clear in 70 percent of the cases, and no difference was observable among projects at different design stages. Landownership and tenure must be described in the PDD. Not clarifying these ownership issues may delay the registration of the project and induce conflicts and marketing problems.

In addition to the legal issues present in any forestry project, CDM project owners face the challenge of clarifying the legal ownership of CERs. It is possible that three different entities may own the CERs, the trees, and the land, respectively. Legal ownership of the CERs depends on the national legislation of the host country. In some cases governments may claim their rights to CERs on the grounds that an emission reduction or a carbon removal is a public natural asset or national property.[12] Many countries have no specific regulation dealing with the ownership of CERs. In these cases general legal principles regulating owner-

ship in the respective jurisdiction apply. The LOA and a host country authorization to sell will help make the buyer comfortable.

Many uncertainties also persist with respect to domestic taxes on CERs. Depending on whether a CER is considered a good, a service, a financial instrument, or a business asset, it may be taxed differently. A levy on CERs may also be applied by host countries to finance their DNAs and is in addition to regular taxes: value added tax, consumer tax, sales tax, or income tax. For project developers, an unclear legal framework for CDM AR projects complicates the project design.[13] In FORMA's large portfolio, only 7 percent of project developers had an idea of national legislation about CDM projects and CER ownership.

Carbon contracts deal with the legal and financial issues common to any AR project as well as specific CDM risks and products (CERs). The allocation of risk among buyers, projects, and other entities involved (for example, banks), the definition of CER prices and volumes, and the responsibility for transaction costs are crucial items in negotiations leading to the sale of CERs.[14] In the forms received during FORMA's call for proposals, only 2 percent of the projects mentioned purchase agreements (none for early-stage projects and projects with PINs; 20 percent for projects drafting PDDs). This observation underscores the fact that very few projects consider legal arrangements.

As a consequence of failure to give the required importance to legal issues and of lacking juridical knowledge and information about carbon transactions, many project developers face problems when negotiating contracts. In many host countries, project developers do not have the financial capacity to hire good legal advisors to help negotiate and evaluate contracts internal to the project or with buyers and investors. Moreover, few lawyers have deep knowledge of the CDM and its modalities and procedures. Legal guidebooks specific to the CDM and model contracts are worthwhile for project developers, as are capacity-building training sessions.[15]

Design Issues: Barriers for Project Developers?

Project developers replying to FORMA's call for proposals were asked to identify the barriers they faced in the design of their CDM projects. A majority (74 percent) acknowledged the existence of barriers. The perception of barriers differed between design stages; for instance, all project developers drafting PDDs perceived at least a technical barrier, in comparison with only 33 percent of developers of projects in early stages. Conversely, perception of legal and market barriers increased between the stages of project idea (38 percent) and PIN (59 percent) but did not increase during advancement toward the PDD. This observation may be interpreted optimistically (it results from an alleviation of legal and market barriers) or pessimistically (the lack of awareness about legal and market issues is persistent).

Because few projects in the portfolio showed progress in market and legal aspects, the second interpretation appears to be more likely. Among technical issues, baseline methodology and estimation of emission removals were perceived as major barriers by 30 percent and 26 percent of developers, respectively. The next four perceived technical barriers, in descending order, were additionality (15 percent of developers perceived this), technical data (13 percent), monitoring methodology (13), and land eligibility (11 percent). This result shows that emphasis is placed on the estimation of additional CO_2 in a first step (baseline and estimation) and then on specific technical sections of the PDD. Socioeconomic and environmental effects were considered barriers by only 7 percent of the developers.

Among market and legal barriers, lack of funding for preparing the PDD and covering the costs of the project cycle was perceived as a barrier by 37 percent of the project developers, making this issue the most frequently mentioned barrier. This perception was more acute for projects drafting their PDDs (60 percent) than for projects at an early stage (29 percent). Next in this category, 9 percent of developers cited a shortage of information about the market and CER prices as a barrier. It is notable that developers' perceptions of market and legal barriers involved mainly short-term issues such as immediate funding for design. Few project developers mentioned barriers related to the search for CER buyers or investors (4 percent) or legal issues (4 percent), and none mentioned negotiations with buyers.

The foregoing result might suggest that a majority of projects had already overcome legal or market problems, but this was not the case. Regarding market issues, only 13 percent of projects had succeeded in guaranteeing total funding, 22 percent had partial funding, and 28 percent mentioned a possible CER buyer. Regarding legal issues, only 22 percent referred to contacts with DNAs, only 7 percent had clear information about national legislation on CERs, and 2 percent mentioned legal arrangements with market actors. Almost none of the small-scale projects in the portfolio mentioned small project size as a market issue, nor did they recognize that buyers might not be interested in small projects with high transaction costs.[16]

Particularities of CDM AR Projects

Relative to CDM activities in other sectors, CDM AR projects appear to face more barriers. First, because the CDM modalities and procedures were decided later for AR activities than for activities in other sectors, forestry projects are suffering a delay in development and implementation that is prejudicial in a market interested in buying CERs for the first commitment period of the Kyoto Protocol (2008–2012). This delay is an important issue because the sale of CERs from forestry projects depends on tree growth. In the case of energy projects, a tech-

nological change will produce immediate additional emission reductions, but forestry projects deliver most of their carbon removals when the trees reach their maximum growth, several years after the project starts. This specificity makes it impossible for AR projects to deliver a significant number of credits in the first commitment period.

In addition to time frame differences, forestry projects are disadvantaged relative to industrial emission reduction projects with respect to methodological issues. For instance, determining land eligibility, calculating preexisting carbon stocks, conducting GPS surveys, developing GIS databases, and performing other measurements, surveys, and evaluations required by the methodologies are time and resource consuming. The nonpermanence issue and the current rules that cause all temporary CERs to expire at the end of the crediting period also create a disadvantage relative to emission reduction projects. The problem comes not from the procedures for calculating tCERs or lCERs but from the market risk associated with expiring credits.

Regarding legal issues, forestry projects are disadvantaged by more complex regulations. For instance, the DNAs must choose a definition for forest and may define rules about exotic, transgenic, and invasive species. In the PDD, AR projects must include sections that are not required for other CDM projects, one about socioeconomic effects and another about ownership issues.

Non-CDM Related Barriers

Difficulties encountered by project developers are not only related to the CDM. The success of a project depends on the developer's ability to overcome the traditional barriers of the forest sector. Financial barriers were faced by 72 percent of the projects in FORMA's large portfolio and included lack of funding for plantation activities or lack of interest by banks and international funding agencies, which can be explained by the high risks and long-term financial return associated with slow tree growth.

The second major barrier, faced by 52 percent of the developers in FORMA's portfolio, is a cultural one. In many places a lack of forestry culture impedes the implementation of plantation activities. This barrier is particularly important for projects working with farmers planting trees on their own land. The third type of barrier, faced by 46 percent of the projects, is institutional. It includes the lack of priority given to the forest sector by national policies and institutions or the lack of stability or transparency of organizations related to the forestry sector. Technological barriers were mentioned by 30 percent of the project developers and included deficiencies in information sharing and lack of experience with plantations of certain species, such as native species. Natural barriers (pests, soil degradation) and human resources (lack of capacity-building, resistance to change

toward a modern vision of forestry) were also mentioned as barriers by some project developers.

Capacity as a Barrier

The quality of the CDM component of a project determines whether a proposed CDM AR project achieves validation. Analyzing the twenty-two projects in FORMA's small portfolio, we found that quality depended heavily on the capacity of the project developers. In our analysis, each project was valued by a pair of experts, and paired evaluations were confronted. The evaluation was organized according to the following three criteria:

—the technical capacity of the developer (indicators: experience in similar forestry activities measured in number of projects or in years, knowledge of technical forestry issues, use of relevant technical forestry information)

—the organizational capacity of the developer (indicators: capacity of entities involved in the project, clarity of roles in the implementation of the project, clarity of the project concept, clarity of the work plan and the chronogram)

—the technical quality of the CDM project (indicators: knowledge of CDM cycle and requirements, knowledge about needed and available data, perception of barriers, awareness of the need for a methodology, a clear baseline scenario, clear selection of carbon pools in the baseline, good estimation of carbon removals in the baseline, a clear project scenario, clear selection of carbon pools and sources in the project scenario, good estimation of emissions and carbon removals in the project scenario, and good assessment of leakage)

A regression analysis showed that the technical quality of the CDM project was positively correlated with the technical capacity of the developer ($r = .66$; $p = .001$) and with organizational capacity ($r = .45$; $p = .035$). This result shows that CDM design issues do not represent the same barriers for all projects. A team with greater organizational and technical capacity will remove these barriers more easily.

Conclusion

The success of a CDM project transcends technical design issues. With the accumulation of experience in the design of CDM AR projects, the production of guidebooks about technical issues, the capacity-building sessions organized in host countries, and the technical assistance provided by specific funds (for example, the BioCarbon Fund) and projects (for example, FORMA and ENCOFOR, or "Environment and community-based framework for designing afforestation, reforestation and revegetation projects in the CDM"), project developers should recognize that technical issues can be overcome.[17] Although some guidebooks pro-

vide useful information about legal issues, the majority of documentation and capacity-building efforts deal mainly with technical issues.

The viability of CDM projects will eventually depend not on technical issues but on market and legal issues such as contract negotiation and project attractiveness in the carbon market. Until now, few developers have taken these market and legal issues seriously into consideration, as was shown in FORMA's portfolio. Because of the delay in the take-off of CDM AR projects, experience regarding market and legal issues is lacking. Only a few carbon contracts have been signed with AR projects, and many of them are confidential. Information about the prices of tCERs and lCERs is inaccessible.

Project developers should strive to make their projects attractive in the carbon market. For that they must be aware of the importance of project scale and CER volume for CER buyers, because many buyers may seek to avoid the high management cost induced by a portfolio of small projects. At the same time, some buyers might be reluctant to buy from very large-scale industrial projects because of the negative image possibly associated with them. Public image is an important factor explaining project attractiveness, and project developers could improve this by working transparently and demonstrating the absence of negative effects. Some projects may choose to be certified—for instance, by applying the CCBA standards for demonstrating positive effects on community and biodiversity and facilitating project marketing—even if, for the moment, it is unclear whether certification will result in higher CER prices.

Other important factors influencing project attractiveness in carbon markets are low complexity, good governance, level of delivery risk, and time horizon (the sooner the project will issue CERs, the better for buyers). Another important marketing factor is the possibility for a forestry project to propose innovative solutions to the problem of nonpermanence. For instance, the project may be included in a portfolio of projects or facilitate the purchase of nonexpiring credits in replacement of its tCERs and lCERs at the moment they expire.

After the creation of the CDM in 1997, many foresters were enthusiastic about this new mechanism. They envisioned the possibility of selling large quantities of carbon credits at high prices—for instance, from forest conservation projects. Since 1997 the modalities and procedures of the CDM have been progressively defined, and project developers have begun to realize that the mechanism has become increasingly restricted by complicated rules and requirements, such as the rules about eligible activities, permanence, land eligibility, project cycle, and associated transaction costs. As the technical issues became increasingly cumbersome, a good portion of the initial enthusiasm was lost. At the same time, capacity-building efforts were conducted, which helped remove the barriers created by the technical issues. Project developers with sufficient technical capacity may now be able to tackle the technical issues and reach project validation. However, the viability of a

CDM AR project reaches beyond the validation step and depends largely on its attractiveness in the market and the legal arrangements in which it is involved. Market and legal issues define the next challenge for CDM AR project developers.

Notes

1. The decisions 3/CMP.1, 5/CMP.1, and 6/CMP.1, adopted during the first Meeting of the Parties to the Kyoto Protocol (Montreal, November 28–December 10, 2005), represent the legal basis for forestry projects under the CDM for the first commitment period (2008–2012). These decisions had previously been adopted by the Conference of the Parties under the following references: decision 17/CP.7 (Marrakech, FCCC/CP/2001/13/Add.2), 19/CP.9 (Milan, FCCC/CP/2003/6/Add.2), and 14/CP.10 (Buenos Aires, FCCC/CP/2004/10/Add.2).

2. FORMA is the acronym for "Fortalecimiento del MDL en los sectores forestal y bioenergía en Ibero América," which translates as "Strengthening the CDM in the forestry and bioenergy sectors of Iberoamerica." FORMA was a joint effort of INIA (Instituto Nacional de Investigación Agraria y Alimentaria, Spain), CATIE (Tropical Agricultural Research and Higher Education Center, Costa Rica), CIFOR (Centre for International Forestry Research, Indonesia), ECOSUR (Colegio de la Frontera Sur, Mexico), and MGAP (Ministerio de Ganaderia, Agricultura y Pesca, Uruguay) to assist CDM AR project initiatives in Latin America and produce guidelines and tools to facilitate the preparation of these types of projects.

3. A multicriteria analysis was applied to the small portfolio to select ten projects for financial and technical support by the FORMA project.

4. G. M. J. Mohren and others, "CO_2FIX for Windows: A Dynamic Model of the CO_2 Fixation in Forest Stands," Institute for Forestry and Nature Research, Instituto de Ecologia de la UNAM, Wageningen, Netherlands, 1999.

5. For the purpose of our analysis, we defined a "regular estimation" as a consistent but preliminary estimation and a "good estimation" as an in-depth estimation providing details about methodology and presenting consistent results for the whole project lifetime.

6. "Tool for the demonstration and assessment of additionality in AR CDM project activities," report of the twenty-first meeting of the CDM Executive Board, September 2005, Annex 16 (http://cdm.unfccc.in).

7. B. Locatelli and L. Pedroni, "Accounting Methods for Carbon Credits: Impacts on the Minimum Area of Forestry Projects under the Clean Development Mechanism," *Climate Policy* 4, no. 2 (2004): 193–204.

8. Climate, Community, and Biodiversity Alliance (CCBA), "Climate, Community and Biodiversity Project Design Standards," first edition (Washington, May 2005) (www.climate-standards.org).

9. See http://cdm.unfccc.int/methodologies/ARmethodologies/approved_ar.html.

10. "Revised Guidelines for Completing the Project Design Document for AR" and "The Proposed New Methodology for AR, Version 05," report of the twenty-sixth meeting of the CDM Executive Board, September 2006, Annex 21 (http://cdm.unfccc.int); T. Pearson, S. Walker, and S. Brown, "Sourcebook for Land Use, Land-Use Change and Forestry Projects," BioCarbon Fund, Winrock International, Washington, 2005; S. Kamel, "Clean Development Mechanism PDD Guidebook: Navigating the Pitfalls" (Roskilde, Denmark:

UNEP Risø Centre, 2005); M. K. Lee, ed., "Baseline Methodologies for Clean Development Mechanism Projects: A Guidebook," 2005 (www.cd4cdm.org).

11. See "Tool for Afforestation and Reforestation Approved Methodologies (TARAM)," developed by FORMA and BioCarbon Fund (www.proyectoforma.com; http://carbonfinance.org/biocarbon).

12. M. Wilder, M. Willis, and J. Carmody, "Legal Issues Guidebook to the Clean Development Mechanism" (Roskilde, Denmark: UNEP Risø Centre, 2004), p. 65.

13. N. Chowdhury and V. Kumar, "Legal Implementation of the CDM in India: Challenges and Opportunities," *CDM Investment Newsletter* 1 (2005): 3–7 (BEA International and Climate Business Network); M. Socorro and others, "Legal Aspects in the Implementation of CDM Forestry Projects," World Conservation Union (IUCN) Environmental Policy and Law Paper 59 (Gland, Switzerland: IUCN, 2005).

14. CD4CDM, "Legal Issues Guidebook to the Clean Development Mechanism."

15. Ibid.; Socorro and others, "Legal Aspects in the Implementation of CDM Forestry Projects"; C. Streck and B. O'Sullivan, "Legal Tools for the Encofor Programme," 2007 (www.joanneum.at/encofor/tools/Tools.htm); CER Sales and Purchase Agreement (www.cerspa.org).

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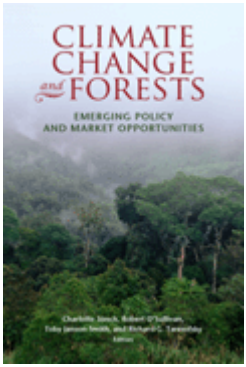

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