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Application of Clean Development Mechanism to forest plantation projects and rural development in India

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A B S T R A C T

This paper analyses the prospects for establishing afforestation and reforestation Clean Development Mechanism (CDM) projects in Karnataka State, India. Building on multi-disciplinary fieldwork, the aim is to: (i) establish what type of plantations and forests that would best suit a forest-based project activity, considering global climate benefits and local sustainable development objectives; (ii) identify the parameters that are important for ensuring sustainable development at the local level and (iii) develop a transparent ranking tool for the assessment of possible forest-based project activities. Using equal weights for the ranking parameters and a 30-year time horizon, the ranking shows that plantations managed with the shortest rotation period (5 years) would be most suitable for forest-based project activities. However, the performance of individual forest-based project activities will depend on local conditions, which need to be reflected in the weighting procedure. Sensitivity analysis shows that when weights are varied, other forest types can become the preferred option. Based on a combination of the sensitivity analysis and results from the fieldwork, it can be concluded that successful implementation of forest-based project activities will require local participation and are likely to involve multiple forest products and environmental services demanded by the local community.

Introduction

The Clean Developing Mechanism (CDM) was established as one of the flexible mechanisms within the Kyoto Protocol and subsequent climate negotiations. CDM is based on the fact that greenhouse gas (GHGs) emissions lead to the same climate benefits regardless of where they occur. Defined in Article 12, the CDM provides for Annex I Parties (in essence industrialized countries) to implement projects hosted by non-Annex I Parties (in essence developing countries) that lead to emissions

Abbreviation: AGB, above ground biomass; BGB, below ground biomass; CDM, Clean Development Mechanism; CER, certified emission reductions; FAO, Forest and Agriculture Organization; GHG, greenhouse gases; IPCC, Intergovernmental Panel on Climate Change; LULUCF, land use land-use change and forestry; SBSTA, subsidiary body for scientific and technological advice; SOM, soil organic matter; UNEP, United Nation Environmental Programme; UNFCCC, United Nation Framework Convention on Climate Change.

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reductions and thus to climate benefits and a contribution to the ultimate objective of the Convention.[1] In return, the Annex I Parties obtain certified emission reductions (CERs) that can be used to meet their own emissions reduction commitments. One condition is that the CDM project activities are designed so that they assist the host Parties in achieving sustainable development. In addition, the investor will require that the CERs are generated in a cost-competitive way.

This study evaluates forest-based projects in India, based on a survey of the perceptions of the local villagers concerning different forest types and forest management. We also estimate the carbon stocks in above ground biomass (AGB) and soils in different land-use systems. The overall aim is to establish what kind of forest system that would be best suited for a CDM project activity, i.e. to the best extent meets the two objectives, local sustainable development and carbon sequestration. The empirical data comes from two villages in India, a country with great capacity and interest in CDM project activities; both with different experiences of plantations projects. The specific aims of this study are:

- Identification of plantations and forest types that will best suit a CDM project activity in terms of local sustainable development and climate benefits.
- Identification of parameters that are important to consider for ensuring sustainable development on the local level.
- Development of a transparent ranking tool for the assessment of possible CDM activities.

Even though we have used afforestation and reforestation (A/R) CDM as a possible case in this study, the overall scope of method and result can be applicable in a wider forest-based or carbon sequestration project implementation.

Background

Land use, land-use change and forestry under the Kyoto Protocol

Land use, land-use change and forestry (LULUCF) activities can provide a relatively cost-effective way of combating climate change, either by increasing the sinks of GHG from the atmosphere (e.g. by planting trees or managing forests), or by reducing emissions (e.g. by curbing deforestation) (Sathaye et al., 2001). An increase in forest cover will also have positive environmental effects on a degraded land area: an increase of soil organic matter (SOM) will enhance the fertility of the soil, and, with the exception of monocultures, there will also be an increased biodiversity. The forestry projects would also protect the land from further degradation (IPCC, 2000; Ravindranath & Sathaye, 2002).

However, there are uncertainties regarding the methods for estimating GHG emissions and removals. Further, the *permanence* of carbon stocks created is an issue due to the potential reversibility of carbon benefits due to fire and unplanned harvesting. An attempt to deal with this problem has been the launching of two different CERs, one for long-term CERs (lCER) and one for temporary CERs (tCER) (UNFCCC, 2004a). The idea is basically to issue credits that have a defined lifetime and that has to be replaced if lost. Further, there have been worries that the inclusion of LULUCF activities under the CDM would undermine the environmental integrity of the Kyoto Protocol, and result in the reaping of ''low hanging fruits'' in developing countries and postponed actions for emission reduction in Annex 1 countries. Thus, LULUCF activities under the CDM have been a controversial issue during the global negotiations under United Nations Framework Convention on Climate Change.

In addition to genuine uncertainties connected to the difficulties in monitoring and verifying the climate benefits of LULUCF activities, there are several important issues that have to be addressed for satisfactory accounting of carbon credits from such projects. In order to establish *additionality* of the project, a *baseline* (i.e. a scenario depicting the development in the absence of the proposed project) must be set as a reference (Mendis & Openshaw, 2004). This is a difficult task since all eventual future scenarios in the absence of the project must be evaluated. This requires knowledge about the history in the specific area, the local socio-economic situation and wider economic trends, which may affect the future land use and carbon stocks. The risk of *leakage* must be minimized. Such leakage can occur if the project leads to local access to land, food, fuel and timber resources becoming restricted, forcing people to find needed supplies elsewhere. One basic principle is to take a debit for the lost carbon at the time of its occurrence, e.g. when abandonment of activities leading to carbon sequestration results in a loss of the stored carbon (Ravindranath & Sathaye, 2002). Finally, socio-economic and environmental impacts need to be addressed, including impacts on biodiversity and natural ecosystems (Boyd, May, Chang, & Veiga, 2007).

The rules for LULUCF activities that were agreed upon as part of the Marrakech Accords (COP7) also include specific regulations limiting the use of such activities to meet emission targets for the first commitment period. According to these regulations, only afforestation (planting of non-forested land) and reforestation (replanting of forest land) projects are eligible under the CDM (UNFCCC, 2001). Further, greenhouse gas removals from such projects may only be used to help meet emission targets up to 1% of an Annex 1 country's baseline for each year of the commitment period. The five carbon pools eligible within CDM is: AGB, below ground biomass (BGB), soil carbon, dead wood and litter.

The market for forestry CERs is still small with a limited supply and demand for credits. This is exemplified by only one registered A/R project today (March 2008) while there are 10 approved methodologies. The fact that there is only one registered project is a result of the complex methodological issues resulting in expensive procedures of validation

[1] "… stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system".