

## 8. Environmental and Socioeconomic Impacts

The Kyoto Protocol exhorts Annex B parties, in fulfilling their obligations, to minimize negative social, environmental and economic impacts, particularly on developing countries (Articles 2.3 and 3.14).<sup>1</sup> Furthermore, one of the primary goals of the Clean Development Mechanism is sustainable development.<sup>2</sup> At this time, it is unclear on what indicators of sustainable development need to be addressed in the evaluation of forestry projects. Once there is an understanding of this, then MERVC guidelines for those indicators will need to be designed. For example, if biodiversity needs to be monitored and evaluated, then items similar to the Biodiversity Convention may need to be addressed (Box 5). At a minimum, forestry projects should meet current country guidelines for non-Clean Development Mechanism projects.

LBNL's MERVC guidelines for forestry projects include environmental and socioeconomic impacts for two additional reasons. First, the permanence of GHG reductions and carbon sequestration and the sustainability of forestry projects depend on individuals and local organizations that help support a project during its lifetime. Both direct and indirect project benefits will influence the motivation and commitment of project participants. Hence, focusing only on GHG impacts would present a misleading picture of what is needed in making a project successful or making its GHG benefits sustainable. Second, a diverse group of stakeholders (e.g., government officials, project managers, non-profit organizations, community groups, project participants, and international policymakers) are interested in, or involved in, forestry projects and are concerned about their multiple impacts. In the monitoring and verification forms (Appendices B and C), checklists are provided for developers, evaluators, and verifiers to qualitatively assess the impacts described in this section. These checklists are not exhaustive but are included to indicate areas that need to be assessed. Other existing guidelines are better suited for addressing these impacts: e.g., third-party forestry certifiers are examining these impacts under the aegis of the Forest Stewardship Council (Forest Stewardship Council 1996), and the World Bank has developed guidance documents for World Bank-supported projects (World Bank 1989). LBNL's checklists should help to improve the credibility of the project (by showing

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<sup>1</sup> As defined in the Kyoto Protocol, Annex B countries are OECD countries and countries undergoing the process of economic transition to a market economy (UNFCCC 1997).

<sup>2</sup> In one definition, development is sustainable when it "meets the needs of the present without compromising the ability of future generations to meet their own needs" (World Commission on Environment and Development 1987). In order to translate this general definition to specific applicable policies, a variety of definitions have appeared, sometimes serving different objectives and interest groups (see Makundi 1997; Michael 1992; O'Riordan 1988).

stakeholders that these impacts have, at least, been considered) as well as to facilitate the review of forestry projects.

### Box 5

#### Items to Monitor under the Biodiversity Convention

Under the UN Convention on Biodiversity, the following specific elements in the mentioned articles of the Convention can be classified as requiring some specific action for the purpose of compliance. If the MERVC guidelines for climate change projects require non-contravention (or enhancement) of the Biodiversity Convention, then to the extent applicable in the climate change project, these items need to be monitored, evaluated, reported, verified and certified.

*Article 7:*

- Inventory of species, genetic materials, habitats, ecosystems and adverse impacts
- Manage and monitor adverse impacts on biological diversity, including ecosystem fragmentation, pollution, and loss of species and nutrients.
- Monitor changes in the processes that generate and maintain biodiversity e.g. natural disturbance regimes, species dispersal and migration, reproduction, succession, trophic dynamics, etc.

*Article 8:*

- Institute a plan to protect and sustainably manage vulnerable ecosystems, including establishment of buffer zones
- Maintain viable populations of species in natural surroundings.
- Prevent the introduction of, control or eradicate those alien species which threaten ecosystems, habitats or other species.
- Preserve and maintain knowledge, innovations and practices of indigenous and local communities and equitably share benefits.

*Article 9:*

Recover and reintroduce threatened species.

*Article 10:*

Protect and encourage compatible customary uses of biological resources.

*Article 12:*

Cooperate in the application of scientific and technological advances in conservation and use of biological resources.

*Article 14:*

Coordinate and share information on biodiversity adverse activities with other parties, including those outside the national boundaries.

*Article 15:*

- Facilitate access to genetic resources for environmentally sound uses by other parties to the Convention.
- Carry out relevant scientific research with participation of all involved parties, and equitably share the results and benefits of such research.

*Article 16:*

Provide and facilitate access to and transfer of technology, consistent with intellectual property rights.

Source: UNEP. 1992. *Convention on Biodiversity*, Nairobi, United Nations Environmental Program.

## 8.1. Environmental Impacts

Forestry projects have widespread and diverse environmental impacts that go beyond GHG impacts (Frumhoff et al. 1998). The environmental benefits associated with forestry projects can be just as important as the global warming benefits. Potential environmental impacts that need to be considered are presented in Table 5. Direct and indirect project impacts need to be examined, as well as “avoided negative environmental impacts” (e.g., the deferral of the construction of a new dam). Both gross and net impacts need to be evaluated.

At a minimum, developers need to describe the environmental impacts associated with the project.<sup>1</sup> In addition, the developer needs to identify any proposed mitigation activities to address the negative impacts (e.g., draining of wetlands and planting of monocultures of exotic species in sites where natural or assisted restoration of indigenous forests is feasible). The filing of an environmental impact statement (EIS) is likely to help ensure the permanence of forestry projects. Where applicable, developers need to indicate whether an EIS has been filed and that their response to the checklist in Table 5 is consistent with the EIS. In addition, developers need to indicate if any existing state laws require these impacts to be examined.

At a minimum, evaluators need to review the checklist of environmental impacts and the EIS, if available. Evaluators need to collect some minimal information on potential impacts via surveys or interviews with key stakeholders. The evaluator should also check to see: (1) whether any existing state laws require these impacts to be examined, (2) if any proposed mitigation efforts were implemented, and (3) whether expected positive benefits ever materialized. Evaluators may want to conduct some short-term monitoring to provide conservative estimates of environmental impacts. The extent and quality of available data, key data gaps, and uncertainties associated with estimates should be identified and estimated.

The information collected and analyzed by evaluators will be useful for better describing the stream of environmental services and benefits of a project, in order to attract additional investment and to characterize the project’s chances of maintaining reduced GHG emissions over time. This information will, hopefully, also help in mitigating any potentially negative environmental impacts and encouraging positive environmental benefits.

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<sup>1</sup> An issue that still needs to be resolved: does an investor abide by its country’s environmental laws, or must it abide only by the host country’s laws?

**Table 5. Potential Environmental Impacts**

<b>Impact Category</b>	<b>Comments</b>
Agrochemicals	Application and disposal of pesticides and fertilizers
Biological diversity	Endangered plants and animal species, critical habitats, and protected areas
Coastal and marine resources management	Coral reefs, mangroves, and wetlands
Dams and reservoirs*	Implementation and operation
International treaties and agreements on environment and natural resources	Status and application of current and pending treaties and agreements, including notification requirements
International waterways	Quality or quantity of water flows
Natural hazards	Measures to address earthquakes, floods, volcanic activity, etc.
Soil conservation	Protection and management
Sustainable land use	Multiple use management and non-declining yields
Tropical forests	Protection and management
Water quality	Protection and enhancement
Watersheds	Protection and management
Wetlands	Protection and management (e.g., estuaries, lakes, mangroves, marshes and swamps)
Wildlands	Protection and management
Wildlife and habitat protection or enhancement	Protection and management

\*Without project

Source: Adapted from World Bank (1989).

## 8.2. Socioeconomic Impacts

A project's survival is dependent on whether it is economically sound (i.e., the benefits (including the value of carbon) outweigh the costs) and are equitably distributed. Developers should use one or more economic indicators for assessing the economics of forestry projects: e.g., cost-benefit ratio, net present value, payback period, rate of return on investment, or dollars per ton of carbon emissions reduced. These indicators should be calculated from different perspectives (e.g., government, investor, and consumer), and all assumptions (e.g., lifetime, discount rate, project costs) should be described. In addition, the distribution of project benefits and costs needs to be evaluated to make sure one population group is not being unduly affected (equity impacts).

In constructing these indicators, the developer should also consider possible macro-economic impacts from the project: e.g., gross domestic product, jobs created or lost, effects on inflation or interest rates, implications for long-term development, foreign exchange and trade, other economic benefits or drawbacks, and displacement of present uses.

The socioeconomic benefits of forestry projects have made these kinds of projects beneficial in the minds of supporters of forestry projects. However, the evaluation of socioeconomic impacts is challenging and requires different resources and expertise than those associated with the monitoring of carbon stocks in forests. The socioeconomic impacts are particularly relevant for forestry projects because they are more likely to address the root causes of deforestation and forest use (Andrasko et al. 1996). The socioeconomic benefits of forestry projects are particularly important for rural and developing countries, where forestry projects can have very positive impacts for the local population (e.g., ecotourism or forest warden jobs), although they may be relatively small. However, sometimes these projects may have negative impacts (Box 6). The sustainability of forestry projects will be improved if these kinds of impacts are accounted for and recognized. Both gross and net impacts need to be evaluated.

In examining socioeconomic impacts, developers and evaluators need to ask the following questions: who the key stakeholders are, what project impacts are likely and upon what groups, what key social issues are likely to affect project performance, what the relevant social boundaries and project delivery mechanisms are, and what social conflicts exist and how they can be resolved (World Bank 1994b). To address these questions, developers and evaluators could conduct informal sessions with representatives of affected groups and relevant non-governmental organizations.

The need to analyze social factors that influence a project continues throughout the entire life of a project. The evaluation of the social dimensions of a project is called a social analysis or social

impact assessment (Asian Development Bank 1994). The social analysis typically includes an assessment of the benefits to the clientele participating in the project (e.g., does the project meet their needs), their capability to implement the project (e.g., level of knowledge and skill and capabilities of community organizations), and any potential adverse impacts on population groups affected by the project (e.g., involuntary resettlement, loss of livelihood, and price changes).

### Box 6

#### Socioeconomic Impacts Example

The major concerns regarding large-scale expansion of plantations in Brazil as a climate change mitigation option are social rather than environmental or technical (Fearnside 1998). The attractiveness of charcoal manufacture from the standpoint of carbon benefits contrasts sharply with the social effects of charcoal as compared to other plantation end uses, such as pulpwood. Charcoal manufacture in Brazil is closely linked to a system of debt slavery that has been the center of domestic and international outrage.

Charcoal is frequently manufactured by families, including children, who work for an intermediary who supplies charcoal to legitimate businesses such as pig-iron mills. The charcoal workers are obliged to buy all supplies from their patron and, given the high prices charged for the supplies and the small amounts credited per unit volume of charcoal produced, the debts grow inexorably and become impossible to liquidate. In practice, the workers never receive any payment in cash — only credit towards paying of past debts (Fearnside 1998).

Source: Fearnside, P. 1998. "Forests and Global Warming Option in Brazil: Opportunities in the Brazilian Forest Sector for Responses to Global Warming under the 'Clean Development Mechanism' and 'Joint Implementation' Programs." Manaus, Amazonas, Brazil: National Institute for Research in the Amazon.

During the project development stage, projects are approved if they are consistent with the general development objectives of the host country, in terms of social and economic effects (Table 6). After a project has been implemented, MERVC activities should assess whether the project led to any of these impacts and whether any mitigation was done if negative impacts were experienced. Direct and indirect project impacts need to be examined, as well as "avoided negative socioeconomic impacts" (e.g., the preservation of an archaeological site as a result of the deferral of the construction of a new dam).

**Table 6. Potential Socioeconomic Impacts**

Concerns of local communities and indigenous peoples regarding all project operations
Cultural properties (archeological sites, historic monuments, and historic settlements)
Distribution of income and wealth
Employment rights
Gender equity
Human rights
Induced development and other sociocultural aspects (secondary growth of settlements and infrastructure)
Involuntary resettlement
Land settlement
Legal and customary land and resource use rights of local communities and indigenous peoples
Long-term income opportunities for local populations (e.g., jobs)
Maintaining and fostering local cultures
Public participation and capacity building
Quality of life (local and regional)
Tenure and land use rights
Tribal peoples (measures to address the rights of tribal peoples, including traditional land and water rights)

Source: Adapted from World Bank (1989) and EcoSecurities (1998).

Developers need to indicate whether their project will have one or more of these socioeconomic impacts and, where appropriate, describe the type of impact. In addition, the developer should identify any proposed mitigation activities to address the negative impacts and that may lead to positive impacts.

Evaluators need to review the checklist of socioeconomic impacts and should collect some minimal information on potential impacts via surveys or interviews with key stakeholders. The evaluator should also check to see if any proposed mitigation efforts were implemented and whether expected positive benefits ever materialized. The extent and quality of available data, key data gaps, and uncertainties associated with estimates may need to be identified and estimated.