

THE BANK'S POLICY
ON FORESTRY

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I. INTRODUCTION

The Bank's forestry operations began in 1977, with loans totaling more than \$250 million over the first decade, complemented by some \$15 million in technical assistance (TA) grants. A 1978 Working Paper on the "Role of the Bank in Forestry and Forest Industries Development" guided the Bank's investments in the sector during this initial period. The Working Paper emphasized production-related aspects of forestry, agriculture-supportive forestry, watershed rehabilitation and the establishment of forest industries.

Since 1988, Bank's support for forestry has grown substantially to total over \$500 million (see Appendix 1). This followed a burgeoning interest in conservation forestry in the 1980s that stemmed from increased global environmental awareness and (perhaps more importantly) international publicity for controversial natural resource issues. Issues have been globalized, the stakeholders have multiplied and long-held beliefs of foresters have been called into question. In an attempt to accommodate these changes, the Bank prepared a revised Sector Paper on Forestry in 1989 setting out new priorities in the sector as follows: promotion of forestry investment by the private sector and governments, a more comprehensive sector approach to forestry development, assistance to developing member countries (DMCs) in preparing forestry master plans, improved technical effectiveness of projects in social forestry/agroforestry, and protection of threatened tropical forest ecosystems.

In 1992, the United Nations Conference on Environment and Development (UNCED) provided, as its primary achievement, a formal and comprehensive endorsement of the principle of sustainable development. The Conference also adopted, along with Agenda 21,¹ a Statement of Principles for a Global Consensus on the Management, Conservation, and Sustainable Development of Forests; the Convention on Biological Diversity; and the Framework Convention on Climate Change. UNCED, the first attempt to define and develop a global framework for environmental action, was attended by most of the member countries of the Bank. The Bank is also a signatory to Agenda 21 and the other resolutions and agreements that resulted from UNCED.

It is appropriate that the Bank take stock of these recent developments and their implications for Bank policies and strategies in the sector. This Paper therefore sets out a revised and updated strategic basis and policy for future Bank operations in forestry in its DMCs, and related operational implications. The Paper owes much to extensive in-house dialogue and reflection on the Bank's new strategic directives; the Bank's experience in and learnings from past investments in the sector; the views of selected DMC governments; consultations with major multilateral and bilateral aid agencies, nongovernment organizations (NGOs), and representative industry and private sector organizations; and reviews of the extensive literature pertaining to sustainable development.

This Policy Paper acknowledges the need to balance the three imperatives of production, protection and participation. It also underscores the involvement of beneficiaries at an early stage of project development through to implementation and management to ensure that investments in the forestry sector are sustainable. The Paper makes explicit statements on (i) conditions for Bank involvement in forestry sector investments; (ii) the potential role of NGOs in the entire process of the project cycle from design to implementation and monitoring; (iii) the treatment of old-growth forests; and (iv) areas of Bank involvement, taking into consideration emerging priorities.

¹ *Agenda 21 is one of the principal outcomes of UNCED. It sets a blueprint for action to halt and reverse the effects of environmental degradation and to promote environmentally sustainable development in all countries.*

II. THE CONTEXT

A. Forestry in the Asian and Pacific Region and Its Role

1. The Forestry Resource Profile of the Asian and Pacific Region

The Asian and Pacific region, with 2,800 million people, is home to half the world's population. The land area of the region is close to 3,000 million hectares (ha). Grasslands occupy almost one third of the area at 963 million ha. Agricultural land accounts for 17 percent of the land area, or 500 million ha which is 30 percent of the world's arable land. Forests and woodlands occupy a slightly larger portion of the land area at 21 percent or about 618 million ha.

About 445.5 million ha of the region's forests are spread over 20 tropical, subtropical, and temperate DMCs of the Bank.¹¹ Between 1980 and 1990, the region's total forest area was reduced by 45.1 million ha, equivalent to about 4.5 million ha a year (see Appendix 2). The annual rate of planting, on the other hand, has been about 2.1 million ha per annum. There is increasing evidence that the biggest threat to the tropical forests of the region is uncontrolled fuelwood collection and unsustainable agriculture. Such forest degradation, however, is initiated in the first instance by unsustainable logging, which also continues to be a widespread practice in the region.

The region's ecological diversity is reflected in the heterogeneity of its forest cover. Some of the principal commercial tree species are red pine (*Pinus koraiensis*), fir (*Abies sp.*) in the temperate forests in the People's Republic of China (PRC); sal (*Shorea robusta*) in India, Nepal, and Bangladesh; the highly valued and increasingly scarce teak (*Tectona grandis*) in India, Indonesia, Myanmar and Thailand; and the multipurpose *Dipterocarpus* in Southeast Asia. The region also has 40 percent of the world's mangrove forest resources comprising a diverse group of unrelated trees (*Rhizophora*, *Bruguiera*, *Ceriops*), palms, shrubs, vines, and ferns. A large number of nonwood products such as rattan, bamboos, gums, resins, fruits, nuts, essential oils, dyes, and medicinal plants and herbs are also found in the natural forests of the region. Five of the 12 "megadiversity" countries of the world, in which half of the earth's plant and animal species lie, are found in Asia—PRC, India, Indonesia, Malaysia, and Philippines. Much of the biological wealth of the world (20-25 percent of the earth's plant species along with the greatest variety of animals) is found in the region's tropical moist forests in Southeast Asia.

2. Utilization and Management of Forestry Resources in the Region

The pattern of utilization of the region's forest resources has been influenced by growing rural population, with limited income opportunities and the related widespread poverty and migration of landless people in the forest areas. This has intensified shifting cultivation and inappropriate exploitation of forest resources, resulting in depletion and degradation of forest resources. The region's forests are utilized for essentially three purposes: (i) as fuelwood and small timber by local resident communities and industries; (ii) as wood for industrial purposes such as construction timber, plywood, veneer, and pulpwood; and (iii) as semiprocessed or processed nonwood forest resources such as rattan, bamboo, resin, gums, essential oils, and medicinal plants and herbs, both for domestic consumption as well as for export. Although the major drain from the forest is the removal of wood for fuel—700 million cubic meters (cu m) annually—the removal of growing stock for industrial processing is also substantial—about 100 million cu m annually. The general pattern of forest resources for industrial utilization has been exports of lumber and plywood from major source countries (Indonesia, Malaysia, and Papua

¹¹ These are forest area estimates of 1990, as documented by the Food and Agriculture Organization in the "Final Report of the forest Resources Assessment of the Tropical World". A significant portion of it is degraded or second-growth.

New Guinea) to major consumer countries in Europe, Japan, America, and PRC, and development of wood processing facilities in source countries (Indonesia and Malaysia). In 1992, the region earned about \$7 billion from the export of wood products, accounting for about 11 percent of world trade in forest commodities. A notable feature in the region is the growing dependence of India, Philippines, and Thailand on the import of logs in recent years. A large variety of nonwood forest resources provides raw materials for small-scale cottage industries: harvesting of rattan and its processing into an assortment of goods (\$2 billion in trade), processing of bamboo for furniture, basket making, handicrafts, beekeeping and honey collection, and the processing of medicinal plants and herbs. The role of nonwood forest resources in reducing rural poverty in the region will continue to be important.

The Bank's *Review of Forestry and Forest Industries in the Asia-Pacific Region*¹ estimated that the total requirements of wood and wood products in the region will increase considerably by the year 2000.² Given a shrinking resource base, industrial wood in the region will meet only one fourth to one half of the demand. In the case of fuelwood, the annual deficit is expected to be around 500 million cu m. Based on current trends, imports of forest and timber products will cost the region nearly \$20 billion a year by 2000. The supply deficit will considerably raise prices in the case of tropical logs over the next decade—by almost 100 percent. The value of exports of sawn timber, processed products, and a small quantity of logs is expected to increase from \$7 billion to \$11.7 billion by 2000.³ The region is expected to remain a net importer of forest products.

Management of the forest resources of the region is usually vested with governments of the DMCs, while harvesting, transport, and processing (including major forest industries) are the responsibility mainly of the private sector. Throughout the region emphasis in the forestry sector has been on the removal of growing stock. Indiscriminate and excessive exploitation with inadequate regard to forest protection and logging regulations, and the lack of enforcement measures to prevent destructive logging practices have dominated the forest utilization practices of the region. Wastage in logging is also considerable. Forest utilization practices, however, provide a tax base for the government. The management of natural forests through timber concessionaires and the direct sale of timber provide substantial revenue to the governments for financing major development activities in many DMCs. Forests also provide direct employment to more than one million people.

3. Impact of Forest Degradation and Depletion

The rate of forest extraction and the methods utilized have led to serious economic, social, and environmental ill effects. These include widespread soil erosion, increased sedimentation of reservoirs and irrigation systems, the destruction of agricultural lands and coastal areas, and negative impacts on the sequestration of carbon for maintaining the climate. Asian deforestation is estimated to have contributed to 6 percent of the recent increase in the global atmospheric concentration of carbon dioxide.⁴ Deforestation has also substantially affected ecological processes and the life support systems of a variety of species, in many cases resulting in their loss altogether, thus endangering biodiversity. Social impacts have similarly been severe and extensive. Forest-dwelling and/or forest-dependent communities have found their livelihood and local culture disrupted, often forcing whole communities to relocate.

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B. The Bank's Experience in Forestry Lending

The Bank's experience as a forestry lender has met with mixed success. Some Bank-assisted projects have performed satisfactorily, some have been commendably innovative (see Appendix 1), while others have been criticized for inadequacies on a number of counts. The Post-Evaluation Office has postevaluated nine free-standing forestry projects and done an impact study on one of these: plantations (4), natural forest management (1), community forestry (2), and forest utilization (2). Six have been rated as generally successful, two have been rated as partially successful, and one has been rated as unsuccessful. A summary of the lessons learned from these projects as well as from some ongoing projects follows (see Appendix 3 for performance and experience in Bank-financed forestry development projects).¹

- (i) Individual projects must address broad sectoral concerns. For sustained forestry development, a long-term plan and appropriate sectoral and macroeconomic policies are necessary, given the intersectoral and macroeconomic linkages that affect the sector.
- (ii) Forestry projects should be prepared, processed, and implemented using a longer time frame than ordinary agriculture projects to allow for the mobilization of the community for reforestation efforts and/or to address related tenurial requirements and other issues.
- (iii) Two important prerequisites for the sustainable management of natural forests are appropriate wood pricing systems and the effective long-term land tenure.
- (iv) To be successful, forestry projects must actively involve the community living in or around the forests in the protection, development, and management of forest resources. The projects should also provide some immediate direct benefit to elicit the participation of the community.
- (v) Before a forestry project is implemented, land tenure and potential land use conflicts must be recognized and resolved. Forestry projects should also take note of potential conflicts that could develop between traditional uses of forests (for fuelwood and fodder), and commercial uses to ensure minimum disruption of traditional forest use.
- (vi) It is sometimes necessary to support pilot projects prior to the investment phase, particularly to test and demonstrate strategies that address difficult issues (e.g., forest destruction caused by cyclones in the Pacific countries, mangrove ecosystem management, and involvement of indigenous cultural communities in forest management).
- (vii) For reforestation/plantation projects, the technical soundness of the chosen species will necessitate ensuring appropriate site-species matching, a proper balance between indigenous and exotic species, utility for the intended purposes, and fire- and insect-resistance properties. To this end such support services as research, extension, and marketing will need to be strengthened.
- (viii) It is imperative to provide long-term security of tenure to beneficiaries involved in reforestation/plantation/forest management activities to secure proper maintenance as well as the protection of the forest.

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- (ix) Institutional strengthening, including human resource development of forestry agencies and of forest users/managers other than the agencies, is essential for the successful implementation of forestry projects and the sustainability of future forestry operations.
- (x) Enhanced technical support from competent in-house foresters in the Bank is essential. Improved monitoring and evaluation of forestry projects are required for proper impact assessment.

C. Recent Shifts in Forestry

Since 1989, there have been changes in the perception of the purposes of forestry in the Asian and Pacific region. The most significant change has been an enhanced environmental awareness. Within the DMCs and the aid community, global concerns (carbon sequestration, biodiversity conservation, ecotourism, forest protection, and “green labeling”) have come increasingly to influence the policies of governments and international institutions. The globalization of environmental issues has resulted in an increase in the number of stakeholders, including future generations. A strategic shift towards decentralization and grassroots participation in planning and management of forest resources is also noticeable in many DMCs.

In formulating its forestry policy, the Bank has attempted to reflect these shifts of focus as well as the goals and global agreements expressed in Agenda 21; the Biodiversity Convention; the Framework Convention on Climate Change; and the Statement of Principles for a Global Consensus on the Management, Conservation, and Sustainable Development of Forests.

III. THE ISSUES

A. Environmental Issues

1. Deforestation and Degradation of Forest Resources

Depletion and degradation of forest resources are among the most significant concerns confronting DMCs in the region. Major causes are summarized as follows.

- (i) Excessive and destructive logging is widely prevalent in DMCs, often exceeding sustainable annual yields. In many cases, governments have allowed unsustainable logging to encourage the timber trade, support industry, or earn foreign exchange for economic development. In other instances, logging takes place illegally because of the inability of governments to protect their forests. Mangrove forests are, however, being depleted due to nonsustainable utilization by traditional users and large-scale conversion to aquaculture.
- (ii) The construction of roads in or through forestlands by legal concessionaires, public highway departments, and other public investment programs (dams, railways) provides increasing access to forestlands for humans and livestock.
- (iii) Growing rural populations with limited income opportunities, and the related widespread rural poverty, and migration of the landless because of inappropriate and outdated agricultural policies (particularly policies related to land use and tenure) have led to encroachments on forest lands, intensified shifting cultivation, and inappropriate

exploitation of forest resources. This has not only degraded forests but also crowded out forest-dependent communities from their traditional “forest farming lands,” and has often endangered their rights, identity, and culture.

- (iv) The inappropriate removal of fuelwood from the forests and the cutting of tree branches for leaf fodder by encroachers and communities living in and around the forests often, following from the influences cited in (i), (ii), and (iii) above, continue to be major causes of forest degradation.
- (v) Governments have adopted forestland tenure, taxation, and pricing policies that encourage “mining” rather than the sustainable management of forests. Often, concessionaires have virtually no incentive to harness and manage the renewable and reproductive capacities of forest resources because of the short-term duration of their concessions.
- (vi) Forest communities are also reluctant to invest their energies in sustainable forest management in the absence of long-term “user rights”—rights that have traditionally been theirs until governments acquired them under “public property” regulations.
- (vii) Fire and pests are among the other causes of the depletion and degradation of forests. It is estimated that more than 200,000 ha of forests in the region are lost annually to these hazards.

2. Global Environmental Considerations

Forests help preserve biodiversity and regulate global climate, including air pollution. Achieving these valued objectives may call for greater preservation of forests and creation of plantations (which also sequester atmospheric carbon) than many countries deem necessary in view of other demands. Such preservation involves substantial costs for regulation and monitoring, as well as opportunity costs foregone from the potential revenue from timber harvests. If nations are expected to conserve forests for the benefit of the global community, the donor community should help support countries’ efforts to contribute to positive global environmental quality.

B. Economic Issues

1. Demand for Forest Products and Services

Commercial wood production from Asian forests continues to supply growing demands for both domestic consumption and export. The Asian and Pacific region as a whole faces a widening deficit between production and consumption of traditional forest products. The greatest demands on forests continue to be for fuelwood, timber, building materials, and leaf fodder. The demand will grow as populations increase. Specialized tropical hardwood requirements for pulp, paper, and panel products will also grow but can be met on a sustainable basis by tree plantations, organized by the private commercial sector or by smallholder farmers/rural communities if tenureship and price issues are appropriately addressed. In general, demand can also be addressed by more efficient wood extraction and processing techniques (wastage is estimated at 33 percent) and by increasing the use of wood substitutes. The growth in demand for forest-derived medicinal herbs, tree extracts, edible plants and handicraft materials will also be considerable. In some cases, the markets for such products/byproducts are expanding. Meeting these demands on a sustainable basis without destroying forests can again be addressed if government forest tenure and pricing policies allow extractors to take a long-term view of the

resource and manage it productively, sustainably, and profitably. The amenity and recreational value of forests is becoming increasingly important to many in the most rapidly growing economies of the region; those people will attach even greater importance to preserving these values. Rapidly changing patterns of timber supply, shifting trade relationships, and movement of real prices in timber complicate forecasts regarding future demand, relative prices and the substitution of alternative materials for industrial wood. The picture is further complicated by the growing importance of potentially high-value nonwood forest products, which may change, but will not diminish, demands upon the remaining natural forests of the tropics.

2. Valuation of Forest Products

Economic values attaching to environmental features of forests are real, but are systematically underestimated in traditional cost-benefit analyses because of measurement and valuation difficulties. Environmental benefits such as the preservation of biological diversity are recognized even less in such analyses. Foresters' inability to quantify economic, as distinct from financial, costs and benefits distorts many comparisons between natural forests and plantations, and between species within plantations. As a result, the highest rate of return will always attach to the highest production volume (in the short term), irrespective of possible future values and nonmarket characteristics such as soil improvement, ability to coppice, multiple purposes, and the like. Appendix 4 contains a more complete discussion of this issue.

The pricing of raw logs at the "forest gate" is not entirely rational; traditionally, royalty or stumpage was calculated as a "residual" after all costs of production had been deducted from the value of the end product; later on, attempts were made to incorporate a degree of inherent valuation in accord with demand for particular species and sizes but this lacks precision and the legacy of residual valuation remains. The result is that a relatively small change in product price can translate into a substantial change in residual value. As a result, investment returns on forest management (including plantation development) evaluated on a "forest gate" basis are extremely sensitive to assumed prices. The kind of volatility seen in the last year with respect to log and lumber prices can distort financial and economic analyses. The possibility of distortions supports the case for changing from "rate of return" to "least cost" approaches in project evaluation concerned with continuous sustainable forest management.

3. Forest-Dwelling and Forest-Dependent Communities

The stability of forest-dwelling and forest-dependent communities is of concern in all countries. It is a purpose of sustained-yield forestry to ensure this stability. In some instances, efforts to protect these forests have ignored the need for community stability, which is also threatened by migration. The relationship between the management of forests and the stability of forest-dependent communities is complex. The provision of employment is not enough: communities need assured tenure and a vested interest in sustainable production.

C. Technical Issues

It is not to be expected that technologists will agree on all the issues that should be addressed by a forest policy. Those highlighted here are concerns expressed by certain environmentalists, but there is no consensus as to their importance or whether they are issues at all. These are.

- (i) ***Clear Cutting***: in which all the trees in a discrete area are removed; it has been a controversial issue for more than a hundred years because of its potential impact on biodiversity; and if sustainable techniques are not applied, it can increase soil erosion and sedimentation;

- (ii) **Monocultures:** human-made plantations of single species selected for rapid growth on short rotations; traditionally, certain genera (e.g., *Eucalyptus* and *Pinus*) have been used in high-yielding monoculture plantations; the practice has been criticized by environmentalists for a variety of reasons: there are perceptions that such genera permanently degrade or deplete soil and water resources; the restrictive and uniform habitat limits the opportunity for encouraging biodiversity; it is not certain that—despite rapid growth—monocultures fully exploit site potentials; pests and diseases in monocultures are potentially more damaging than in more diverse ecosystems; and
- (iii) **Natural Forest Management:** an issue because of the widely held belief that “nature knows best”; there are few unquestioned examples of its successful sustainability; neoclassical economic analysis does not enable objective comparison of the cost-effectiveness of natural forest management and alternatives; there is a continuing need for accurate and credible data on quantitative forest resources and refinement of the statistical databases.

D. Policy and Institutional Issues

The question remains of how DMCs can reconcile their need to foster and exploit their natural forests for economic advantage, yet ensure that the environmental values of this resource are retained and that the socioeconomic needs of forest dwellers are respected. There is obvious need for a *policy framework* within DMCs that will effectively address these often conflicting demands. A related issue is the development of an equitable system, for adoption by the international community, of supporting countries that preserve forests primarily for global environmental considerations.

Beyond the policy framework, the DMCs also need to strengthen their *regulatory and management framework* for the conservation, management, and development of forest resources. This is inadequate in its current form in many DMCs. Since government resources and capacities are typically limited, it is necessary to devise approaches to delegate responsibilities to the private sector, NGOs and forest-dependent communities. This inevitably has implications on tenureship/ownership of what is currently classified as “public property.” Governments will need to devise tenure policies and instruments and timber pricing regimes that offer incentives for the long-term sustainable management of forests, and will have to introduce supportive legislation, long-term planning, responsive research and enforcement mechanisms, as well as strengthen local institutions and impact assessment systems.

The Bank’s policy and strategy on forestry, as explained in Section IV of this Paper, is essentially a response to these issues, and in the process defines the Bank’s role in the region’s forestry sector.

IV. THE RECOMMENDED STRATEGY

The Bank will carry out its forestry sector operations along the lines outlined in this Paper. The application of the principles and strategies outlined below will be ensured not only in forestry and agriculture-related projects, but in all sectoral investments of the Bank which have impacts on forests. In particular, specific policy recommendations drawn from the paragraphs above are summarized below, for the Bank’s approval, **with key recommendations given in bold face.**

A. Basic Principles of Bank Involvement in Forestry

The Bank's forestry policy is founded on three imperatives. These should be optimized rather than any one of them maximized.

- (i) **Protection:** the protective functions of forests with respect to soil, water and biodiversity are vital for the welfare of present and future generations; hence, sustainability of forest ecosystems is an essential component of environmental conservation.
- (ii) **Production:** forests provide renewable resources for the production of goods and services increasingly in demand; sustainable harvesting is a legitimate objective of the management of natural forests and human-made plantations. It must be cost effective, involving minimal waste.
- (iii) **Participation:** the involvement of people—where appropriate, with the help of NGOs—in policy formulation and implementation is both an objective and a means of development; forestry is characterized by strong backward and forward linkages, and the participation of all true stakeholders can ensure a rational balance between its ecological and economic roles.

Following from these imperatives, the Bank's policy and strategy on forestry development in its DMCs will be guided by the following principles.

- (i) Forests have significant economic, environmental, and social values for each DMC. These multiple and complementary functions and uses of forests should guide the Bank's policies and strategies in promoting their equitable, balanced, and sustainable development.
- (ii) Forests are a renewable resource if managed appropriately. Their management, utilization, and conservation should be guided by policies and strategies that capitalize on this renewable character to achieve their long-term protection and sustainable development.
- (iii) The sustainable management of natural forests is contingent upon managing the demand-supply equation. Demand management implies the promotion of wood substitutes and alternative energy sources; enhancing supply implies emphasis on efficient wood extraction and processing, sustainable harvests from natural forests, and creation of additional resources through industrial and other types of plantations.
- (iv) Forests are occupied by forest-dwelling communities as well as by recent forest-dependent encroachers from around the forests. Any future forest development strategy must recognize and duly support the identity, culture, and rights of all such communities, including the constructive involvement of the recent encroachers, enabling them to have an economic stake in forests through land tenure arrangements that serve as an incentive for using and managing them sustainably. The identification of, and consultation with, interest groups involved in a particular forest area (including NGOs, elected local bodies, educational organizations, revenue officials, school teachers, and other relevant bodies in appropriate circumstances) should be a prerequisite for initiating any forest development strategy.
- (v) The role of plantation forests as sustainable and environmentally sound sources of renewable energy and industrial raw material must be recognized. Their contribution to the maintenance of ecological processes to offset pressure on old-growth forests and to provide regional employment and development, with adequate involvement of local inhabitants, should be recognized and enhanced.

- (vi) The vital role of forests in maintaining biodiversity values and in acting as a global carbon storage area and reforested area as carbon sink, reducing air pollution and mitigating global warming, must be recognized.
- (vii) The Bank's approach to the forestry sector should be multisectoral, and operations in such other sectors as agriculture, energy, industry, and infrastructure should be obliged to consider the implications of their actions on forest resources.
- (viii) The intrinsic value of old-growth forests is irreplaceable; thus the Bank will promote investments or policies that will entail/encourage preservation of old-growth forests and designation of conservation areas to protect unique ecosystems.
- (ix) Forests play a major role in the environment; forest development and management projects should be undertaken only on condition that it is assured, via a prior environmental assessment in accordance with the Bank's standard environmental assessment requirements and environmental review procedures that such considerations are adequately addressed.

B. The Bank's Policy in the Forestry Sector

The Bank will adopt the following policies and strategies to guide its dialogue, and TA and lending operations in the forestry sector in its DMCs.

1. Strategic Approach

While the policies described in this section will guide Bank forestry investments in all of its DMCs, there will be a differing strategic approach in forest-rich DMCs as against those that are now net importers of wood products. Seven DMCs—Fiji, Indonesia, Lao People's Democratic Republic, Malaysia, Myanmar, Papua New Guinea, and Solomon Islands—still have significant old-growth forests. Philippines and Thailand are not yet in deficit, although they have little surplus wood left to export. The Bank's strategic emphasis in these forest-rich DMCs will be to maximize the area kept as functioning forests and press for adequate areas to be set aside for harvesting, habitat and catchment protection, plantations, and for forest-dwelling communities. In forest-poor DMCs, the Bank's emphasis will be particularly to create more domestic wood supplies through plantations and improved forest management practices. In both sets of DMCs, the Bank will actively promote reducing demand through wood substitutes and alternative fuel energy sources.

2. Policy and Regulatory Framework

a. Forest Zoning and Regulations

Forestland must be clearly distinguished from agricultural land. The Bank will encourage and assist DMCs in developing land use policies, supported by accurate maps and rational allocations. ***The Bank will support natural resource inventories not restricted to forestlands alone and will assist DMCs in zoning lands based on appropriate use. The Bank will also help DMCs develop and strengthen mechanisms by which the use of forest lands will be regulated to ensure that adequate areas remain under tree cover and that a balance is achieved between protected and production forests.***

b. Macroeconomic and Intersectoral Policies

The Bank recognizes the implications of macroeconomic and intersectoral issues such as population growth, poverty, agricultural subsidies, development of rural infrastructure (roads,

power, railways), and energy policies on the exploitation and sustainable management of forest resources. The Bank's support for population control and poverty reduction, particularly in rural and forested areas, will take specific account of effects on conservation and sustainable forest resource management. A major objective of rural job creation should be to draw people away from illegal forest exploitation and extraction activities. ***In the agriculture sector, the Bank will promote a policy framework that will encourage intensive production on existing lowlands (rather than extensive farming by clearing forestlands); agroforestry in upland areas already under cultivation; reforestation; plantation forest development; and/or soil conservation technology on degraded forest lands.***

The Bank will not finance any rural infrastructure or other public investment project that contributes significantly, directly or indirectly, to deforestation or to the degradation and depletion of forests. Should any such deforestation or degradation become inevitable, the Bank will insist upon a compensatory mechanism to reforest or rehabilitate equivalent areas as appropriate in full consultation with affected communities. The Bank will not support construction of roads in old-growth forests. The Bank will actively promote energy pricing policies that encourage the use of energy sources alternative to fuelwood, based on a careful assessment of the production and environmental cost of each source (biogas, kerosene, solar power).

c. Land Tenure Policies

Land tenure matters are central to the development of the forestry sector. Insecure and unclear tenure, short-term and nontransferable concessions, and/or the absence of tenure (both land and tree) exacerbate the destruction and degradation of forests. Secure land tenure policies empower local communities and concessionaires to manage forests and woodlands sustainably. Longer term and transferable concessions encourage sustainability of production and, therefore, replanting and postharvest maintenance. ***The Bank will encourage and assist DMCs to establish proper land use policies and rationalize user rights to publicly owned forest areas. The Bank will, prior to financing any forestry project, carry out social assessments and necessary social design studies in accordance with standard Bank procedures to examine the degree to which customary land rights and land tenure of relevant forest-dwelling and/or forest-dependent communities are satisfactory, and to design and agree upon, with borrowers, necessary steps to rectify significant shortcomings in these issues.*** In support of these aims, the Bank will finance studies on land tenure structure, including customary rights, and offer training support to staff of appropriate agencies to develop their skills in carrying out improved tenurial arrangements.

d. Terms of Access to Timber Resources

In many DMCs with large areas of natural forests, timber harvesting privileges have been granted by the state to lessees under concession arrangements that contain few or no incentives to maintain the long-term productivity of the underlying asset. Recent steps taken by most governments to increase timber royalties have generated greater revenues for the state without, however, fundamentally altering producers' incentives nor, therefore, their modes of operation. ***The Bank will encourage policy changes in the terms of timber concessions and access to forest resources, which will require lessees to bear the full cost of timber production, including the environmental costs to the extent these can be identified and quantified, and will ensure that the lessees themselves shoulder the cost of and responsibility for maintenance of the asset.*** Further, to ensure satisfactory performance, ***the Bank will encourage the imposition of a performance deposit—sufficient in magnitude to provide a financial incentive for concessionaires to undertake sustainable forestry practices.***

3. Support to Technological, Policy, and Valuation Research

The adoption of new technologies in forestry and transferring scientific forestry knowledge and technology to the people at the grass roots have lagged behind those in agriculture. Considerable technological innovations in forestry have actually taken place but still need to be transferred to and adopted in the Bank's DMCs. ***The Bank will promote transferring scientific knowledge and technology to the common man in areas such as tree planting and care, nursery management, clonal propagation, and tissue culture through manuals in vernacular languages, organizing training programs, and other means as appropriate.*** Further, a broad array of policy and technical research studies will be required to implement a comprehensive forestry development program at the country level.¹ ***The Bank will support these studies, among others, using the networks established*** by the ongoing Forestry Research Support Program for Asia and the Pacific, which was established by the Bank in 1990 in cooperation with the Food and Agriculture Organization (FAO) and United Nations Development Programme (UNDP).

Attempts to address the needs of forestry resource management and development through conventional economic analysis fail to acknowledge the fact that environmental degradation may be irreversible and many environmental services cannot be traded off (e.g., species extinction). At the project level, "safe minimum standards" are an important environmental supplement to cost-benefit analysis (see Appendix 4). ***The Bank will support the current international agenda for research in the ecology-economics interface and initiate its own research on valuation techniques to refine appraisal of investment projects for advancing environmental objectives.***² The Bank will further examine the current economic evaluation techniques as prescribed in the Bank's *Guidelines for the Economic Analysis of Projects* with a view to supplementing them to include environmental valuation and to ensure uniformity of analysis in all Bank projects.³

4. Promoting Public Consultation in Forestry Development

One of the key changes in the perception and purposes of forestry over the past decade relates to the multiplication of acknowledged stakeholders in sustainable forest management issues. Traditionally, the forestry agencies in the DMCs have recognized few stakeholders other than the wood processing industry. Traditional forest product users were often either prohibited or heavily restricted. Consequently, many forest-dwelling and/or forest-dependent people had little voice in forest management. More recently, their rights and role in forest management have been increasingly recognized and appreciated. ***The Bank will actively promote the involvement of people from a wider cross-section of society in forestry policy formulation and implementation.*** This will also ensure a more rational balance among the social, ecological, environmental, and economic roles of forestry. The Bank will support endeavors to establish long-term relationships between forests and communities with a view to creating dependence that serves the interests of both. ***The Bank together with DMC governments will, prior to financing any forestry project, carry out social assessments and necessary social design studies in accordance with standard Bank procedures, including assessing the role of women in the total resource utilization and production to identify constraints facing women to ensure appropriate levels of beneficiary consultation/participation at all stages of project identification, preparation, and implementation; and to design and agree upon, with borrowers, necessary activities in this regard.***⁴ The Bank will also assist DMCs in developing and strengthening mechanisms by which public consultation on forestry issues can be facilitated and forest-dwelling and/or forest-dependent communities can be involved in land use decisions related to forest lands—the potential role of NGOs, elected

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local bodies, educational organizations, village revenue officials, school teachers, and other relevant bodies in this context will be encouraged.

5. Investment Strategies

The future investment program of the Bank in the forestry sector will be built around the following priority areas: (i) the promotion of sustainable management of natural forests for timber and nontimber forest products; (ii) forestry as a part of alternative land use systems; (iii) plantations for industrial timber, fuelwood, and watershed rehabilitation in degraded areas; (iv) conservation of forest habitats critical to biodiversity and protection of ecosystems; and (v) institutional strengthening. The Bank's approaches in these potential investment areas are outlined below.

a. Sustainable Management of Natural Forests¹

The Bank's primary task will be to persuade and help DMC governments to (i) set aside old-growth forests for conservation and watershed protection—in such forests the Bank will not support any commercial logging; and (ii) replace wasteful and destructive logging practices in second-growth forests with those that are sustainable and environmentally sound. This will help the DMCs achieve environmental and social benefits from old-growth forests, as well as economic gains from its second growth ones.

With respect to the sustainable management of second-growth forests, the Bank will promote (i) the establishment of permanent forest estates in accessible second-growth forests for sustained timber management, including their utilization in major forest industries; (ii) the use of appropriate pricing mechanisms to ensure better timber management on these estates; (iii) concession management reforms by providing long-term tenure to private sector entrepreneurs selected through competitive bidding; (iv) the introduction and adherence to sustained-yield principles and related management approaches as an alternative to destructive/illegal logging; (v) involvement of forest-dwelling and/or forest-dependent communities, including the traditional mangrove users in the rehabilitation, enrichment planting, and assisted natural regeneration in second-growth forests through community-based forest management agreements that will include improved land tenure and other incentives as appropriate; (vi) the use of internationally accepted "certification of origin" for wood marketed as originating from sustainably managed forests; and (vii) the establishment of small-scale industries based on nonwood forest products as a long-term measure for reducing poverty, providing rural employment, and developing rural areas. In any project involving natural forest management, the Bank will encourage the inclusion of specific provisions for the refinement of databases to enable better economic and environmental assessments using currently standard practices until such time as there is more general agreement on environmental economic evaluation.

b. Forestry as a Part of Alternative Land Use Systems

The linkage between forestry and other sectors such as agriculture, livestock, energy, and urban greening and greenbelts must be addressed through an integrated, multisectoral approach. The Bank will promote this integrated approach by supporting a variety of activities integrating forestry with other productive land uses.

The Bank will support small-scale forestry and agroforestry in areas from which people are migrating to forestlands or on cleared forestlands where subsistence agriculture is practiced—with a view to promoting and enhancing the economic self-reliance of the target participants. The small-scale forestry activities will comprise promoting the role of trees in farm

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production and soil conservation, and encouraging tree planting by communities and individual farmers. Particular attention will be given to multipurpose trees for subsistence (fruits, fuelwood, small timber, medicines) and for commercial purposes for generating cash income. The Bank will also promote agroforestry involving the judicious use of trees and shrubs (including tree crops) in combination with crops for increasing productivity in subsistence agriculture as well as for watershed protection. Another important role of agroforestry will be to improve practices of shifting cultivation with tree fallows and tree/crop combinations to improve land productivity and soil conservation. In semiarid areas, where livestock provides the main livelihood of the population, the Bank will promote improved management of rangelands as a component of forestry projects by promoting fodder trees and shrubs in combination with grasses, which will ensure green feed for livestock throughout the year, as well as protection for the land from wind erosion. The Bank will also continue to support forestry as a component of irrigation, rural development, fisheries, and other agriculture-supportive development projects including promotion of urban greening, greenbelts, tree parks, and roadside tree plantations.

c. Rehabilitation of Degraded Forest Areas by Tree Plantations

Some countries in the region have large degraded forest areas that can be successfully rehabilitated. These can productively be done both with high-yielding, quick-growing species and with multipurpose indigenous species useful in industry, as household fuelwood and for stabilizing watersheds. The Bank will promote the following specific activities.

i. Industrial and Fuelwood Tree Plantations

The most critical problem facing the Bank's DMCs is that of maintaining supplies of industrial wood and fuelwood without causing serious environmental damage. A growing segment of the population in Asia (rural people, as well as the urban poor) will continue to use fuelwood as their main source of energy. ***The Bank will encourage the establishment of fast-growing, high-yielding industrial and fuelwood tree plantations of softwoods and hardwoods in selected degraded forests and grasslands. The involvement of the private sector (corporations, communities, and individual farmers) will be encouraged in the establishment of such industrial and fuelwood tree plantation projects. The Bank will also support efficient harvesting and delivery systems in such industrial and fuelwood plantations projects. It will also seek to improve efficiencies in fuelwood use.¹ The support and participation of local communities are critical to the success of such projects, and their design will be based on prior consultation with and concurrence of these communities. The potential for involvement of NGOs, elected local bodies, educational organizations, village Revenue officials, school teachers, and other relevant bodies in the consultative, design, and implementation process will be tapped, as appropriate. Particular care will be taken not to interfere significantly with ongoing viable and legitimate agricultural activities in such project areas without the full concurrence of project-affected populations.*** Government incentives and services (credit, long-term tenure, marketing, use of alternate energy sources, and other support) necessary for this purpose will be encouraged by the Bank. ***The Bank will also promote technological support (tissue culture, clonal propagation) to improve production capacity.*** Although such plantations pose certain environmental risks (fire, pest and fungus attacks), such risks can be minimized by careful planning and the judicious mixing of species. ***The Bank will encourage mixed plantations rather than the monoculture of single species with appropriate matching of species with specific site conditions.***

ii. Maintenance of Critical Watersheds

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The Bank will actively pursue protection and rehabilitation of degraded forestlands in its DMCs. The role of enrichment plantings, plantations, and assisted natural regeneration in conserving soil, stabilizing sand dunes, protecting water catchments, and improving environmental quality is frequently as important as that in the production of industrial timber. **The involvement of local communities with NGOs, where appropriate, will be encouraged to rehabilitate these watersheds by reforestation and enrichment plantings with indigenous tree species, shrubs and tree crops through improved land tenure and other incentives as appropriate.**

d. Conservation of Biodiversity, Endangered Species, and Ecosystems

A compelling case has been made by various environment groups for more concerted action to protect unique plant and animal associations that are threatened with extinction and to maintain the biodiversity of these ecosystems for the benefit of the future generations. **The Bank will assist its DMCs in defining and prioritizing conservation issues and will endeavor to standardize ecological definitions. The Bank will further assist DMCs in the protection of unique plant and animal associations that are threatened with extinction. Biodiversity conservation must be an integral component and criterion in the siting of timber concessions and in the design and management of logging systems and regulations. The Bank will encourage DMC governments to create and develop integrated protected areas (national parks, nature reserves, and other designations) in support of the Convention on Biological Diversity.** Such areas should incorporate major ecosystems (old-growth forests; selected biodiverse communities of mangroves, wetlands and marine resources; grasslands; and deserts) and could be linked with a system of existing natural forests managed for timber production. **The Bank will also promote development of forest management systems designed to accommodate the needs of endangered species, both flora and fauna.** Particular attention will be placed on situations where species extinction is imminent because of rapid forest destruction. The Bank will also assist in the preparation of management plans for integrated protected areas. Where appropriate, the Bank will provide advice on planning for sustainable management of ecosystems, including old-growth forests, and may fund the implementation of such plans.

e. Institutional Strengthening

Implementation of the sustainable use of forest resources will require not only an appropriate policy and regulatory framework and a responsive research and investment program, but also institutional strengthening to make government and private sector investments in the sector more effective and efficient. **The Bank will assist its DMCs in such institutional strengthening which will involve enhancement of capacities in three main areas: (i) sector analysis and program planning, (ii) enforcement capabilities, and (iii) reorientation of the operational focus of forestry agencies.**

i. Sector Work and Master Plans for Forestry Development

Forest sector lending should be based on a strong sectoral analysis and assessment. Sector work in advance of investments will help integrate sector aims and objectives with wider economic and environmental concerns. **The Bank will continue to place high priority on the preparation of master plans for forestry development (MPFDs)** as have been carried out for Bangladesh, Nepal, Pakistan, and Philippines. MPFDs will form the basis for long-term sectoral development and investment plans, for policy dialogue for institutional reforms, and for assistance in engendering commitment to sustainable and conservation-oriented forestry. The Bank will ensure trans-sectoral involvement in the formulation of MPFDs; so far the MPFDs have had limited inputs from nonforesters. The Bank will also use the results from sector studies completed

under the Tropical Forestry Action Program (TFAP), undertaken by other bilateral and multisectoral agencies.

ii. Strengthening Enforcement Capacities

In many DMCs of the Bank, efforts at ensuring strict compliance with forest protection, logging regulations, and efficiency in resource development and utilization have not been successful because of weak enforcement of regulations and, in some cases, absence of countrywide enforcement network. ***The Bank will support enactment of appropriate legislation and help in the strengthening of forest regulation and enforcement agencies with respect to monitoring performance of logging concessionaires; control of access to forests, particularly to prevent illegal logging and unsustainable shifting cultivation, and depletion of forest resources; and supporting and enforcing the tenurial and usufruct rights of forest-dwelling and/or forest-dependent communities.***

iii. Reorienting Forestry Agencies in DMCs

A feature of forestry in the region is the burgeoning interest of legitimate stakeholders in forestry policies and programs. The forestry agencies' in many DMCs are still regulatory in nature. Realignment of the forestry agencies functions in many DMCs will be necessary to promote increased participation in planning and implementation of their programs. ***The Bank will play an active role in (i) reorganizing and realigning sector agencies to focus on policy analysis, planning, and regulatory functions as opposed to production-related (enterprise) activities such as those being exercised by the forest departments of the DMCs; (ii) removing regulatory and procedural constraints to enable local communities and the private sector to be actively involved in sustainable forest development and management; (iii) initiating reforms to divest much of the management burden in favor of local communities, local governments, and the private sector; (iv) changing the legal framework to ensure consistency with proposed policy reforms; and (v) enhancing staff skills and reorienting forestry education towards a much broader concept of forest management, as reflected in UNDP's "Capacity 21" initiative.***

6. Cooperation with International and Regional Initiatives in Forest Management for Sustainable Development

The complementarity and close relationship of the environment and forest resource management in the pursuit of achieving environmentally sustainable development have resulted in many international and regional initiatives in support of the sustainable development of forests and the containment of tropical deforestation at the global and regional levels. ***The Bank will maintain and improve its regular consultations on forest issues with FAO, UNDP, International Tropical Timber Organization, bilateral agencies active in forestry in the region, and international NGOs. In particular, closer cooperation with the World Bank will be maintained.*** The Bank will also continue to participate actively in the TFAP Forestry Advisors' Group set up by the aid agencies to deliberate on issues to contain tropical deforestation. In the area of international cooperation, the Bank will continue to liaise with the follow-up Secretariats of Agenda 21 and of the two Conventions on Biodiversity and Climate Change. The Bank will also liaise with the UN Commission on Sustainable Development, under the auspices of Economic and Social Council, and with FAO to monitor the implementation of Agenda 21.

7. Selection and Design of Investment Projects

a. Selection of Projects

The Bank's assistance to the forestry sector should be formulated in the context of a long-term perspective (25 years) to enable achievement of a sizeable impact. Within this context, the Bank's initial emphasis should be on developing country capacity in sustainable forest resource management and establishing the necessary conditions for implementing a long-term investment program. **Each forestry investment project to be financed by the Bank should fit within the country's long-term plan for forestry development.** It should be prepared on the basis of a strong sectoral analysis and an assessment of appropriateness of sectoral policies, objectives, and supporting legislation. Lending in the forestry sector will be conditional on government commitment to sustainable forestry principles.

b. Types of Projects

In all countries **the Bank will distinguish between investment projects that are environment protective (e.g., reforestation, biodiversity protection, and rehabilitation of critical watersheds) and other forestry projects.** Projects in the first category will be supported by the Bank principally on environmental criteria. The second category of projects may be classified as production-related forestry projects and will be supported on financial/economic and sustainability criteria.

Before providing assistance in either category, the Bank will ensure the following: (i) the government's commitment to the preservation of old-growth forests and biodiversity; (ii) the existence of an adequate legal framework to enforce regulations, and government capacity to control illegal logging; (iii) the government's willingness to work with forest-dwelling and/or forest-dependent communities and with NGOs, as appropriate, beginning with in-country consultations at the design stage, followed by an active role in project monitoring and evaluation and, wherever possible, in actual implementation; and (iv) appropriate environmental and social documentation as required under existing Bank guidelines.

c. Design of Projects

In designing both categories of projects, the Bank will address the following through all of the stages of project conceptualization and design.

- (i) **Ownership:** It is critical that the government as well as the intended beneficiaries "own" the project concept, objectives, and approaches. This implies their active involvement in the preparation of the feasibility study, and continuing consultation by the Bank with acknowledged stakeholders including NGOs in appropriate circumstances at each stage of project preparation to ensure agreement, support, and "ownership."
- (ii) **Incorporation of postevaluation Experience:** The findings of post-evaluation experience will be built into the terms of reference of the feasibility study to ensure that lessons learned are appropriately incorporated in the project design during the formulation stage.
- (iii) **Environmental Impact Assessment:** Prior to considering any project proposal that could have adverse environmental impacts on forests, the Bank will complete an EIA of the proposal in accordance with Bank's standard procedures with the involvement of the concerned agencies.

- (iv) **Public Participation and Consultation:** A consultative process will be initiated during the design stage of the project to ensure beneficiary participation, involvement, and institutional capacity assessment. The Bank will, prior to financing any forestry project, carry out social assessments and necessary studies in accordance with standard Bank procedures, including assessing the role of women in gaining access to resources to ensure appropriate levels of beneficiary consultation/ participation at all stages of project identification and implementation.¹
- (v) **Technical Soundness:** Depending upon the type of project to be formulated, the following factors will be taken into consideration: (i) for natural forest management—the inventory of forests will be a prerequisite; this will include improving the database and information system; development of management plans; and the establishment of a permanent forest estate; (ii) for industrial plantations—identification of site-species factors, demand and market analysis, and identification of technologies to improve nursery practices and plantation development; and (iii) for fuelwood plantations—appropriate assessment of supply and demand, involvement of all major users as potential producers, market research to identify potential approaches to fuelwood substitution, and improved harvesting and fuelwood conservation measures.
- (vi) **Institutional Capacities:** Institutional capacity assessment is a key determinant of project quality and will be a major input in project design. This will include assessment of capacities for technical support, regulation, and enforcement as well as openness to cooperation with NGOs; the assessments will also cover the capacities of such NGOs and of the potential of beneficiaries to organize themselves for involvement in the project.
- (vii) **Appropriate Performance Monitoring:** Provision will be made to monitor the impact of the project on the beneficiaries as well as on nonbeneficiaries. This will require the identification of appropriate performance indicators, which should be decided in consultation with the target groups. The multiple effects of individual projects (policy and investments) should be given special attention and measured; improved monitoring will also involve monitoring for environmental impact to ensure sustainability.
- (viii) **Economic Valuation:** The limitations of current valuation techniques for forestry projects with positive externalities will be reviewed; and refinements, if any, to supplement cost-benefit analysis will be included in the terms of reference of all feasibility studies for Bank investments.

8. Improving the Supervision of Bank-Financed Forestry Operations

Systematic supervision is essential to the success of Bank-financed forestry projects. The implementation of forestry projects has suffered in the past on many accounts related to Bank supervision: inadequate technical staff supervision; limited project reviews, which have focused on monitoring the progress of procurement and disbursement matters as opposed to factors crucial to development impact; and inadequate follow-up action on deficiencies identified. **The Bank will take steps to make forestry supervision more intensive and systematic.** Improved supervision will particularly involve (i) strengthening review missions with adequate technical staff, (ii) increasing the duration and frequency of review missions, (iii) appropriate and timely follow-up of the findings of reviews, (iv) improved environmental project monitoring with appropriate local participation, and (v) periodic consultation with people affected by the project.

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9. Lending Modalities and Cooperative Programs

The Bank's TA and lending in forestry will support both policy reform and institutional strengthening. This will require the Bank to use a broad range of TA and lending instruments (sector loans, program loans, and free standing projects) for improving sector management and performance. ***The Bank will utilize both Asian Development Fund and ordinary capital resources for investment. It will facilitate access of funds from the Global Environmental Facility to finance projects on conservation of biodiversity.*** It will also pursue a policy of selective use of its concessional loan funds to finance such projects to reward countries with higher levels of national commitment to conservation of biodiversity. The Bank will provide loan funds and advisory and operational TAs to support monitoring and evaluation (particularly of pilot programs), applied studies, and the institutional strengthening of both government and nongovernment agencies.

The Bank will pursue cofinancing of projects, particularly those with third parties providing TA grants and funds on concessional terms. ***The Bank will also assist in the design of biodiversity/conservation projects that could be financed through innovative and appropriate financing mechanisms such as debt-for-nature swap, trust funds, and the like.*** The Bank will also pursue cooperative programs involving NGOs, where appropriate, which could improve project design, implementation, and performance monitoring; these may also facilitate delivery of low-cost, small-scale projects to promote biodiversity and other conservation-related projects.

APPENDIXES

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3	Performance and Experience of Selected Bank-Financed Forestry Development Projects	
4	Economics and Ethics: Approaches to Sustainable Forest Development and Conservation	

**STAND-ALONE FORESTRY PROJECTS FUNDED BY THE BANK
(As of June 1994)**

A. Chronological List of Projects

Serial No.	Name of Project	Date Approved	Borrower	Loan Amount (\$ Million)
1	Forestry Sector Project	February 1977	Myanmar	25.10
2	Sagarnath Forestry Development Project	December 1977	Nepal	4.90
3	Forestry Development Project	October 1978	Lao PDR	8.00
4	Forestry Development Project	December 1980	Western Samoa	1.74
5	Community Forestry Project	December 1981	Bangladesh	11.00
6	Community Forestry Project	March 1982	Sri Lanka	10.00
7	Second Forestry Project	June 1982	Myanmar	25.10
8	Paper Mill Technical Services	December 1982	Nepal	4.00
9	Hill Forestry Development Project	August 1983	Nepal	16.70
10	Forestry Development Project	December 1983	Philippines	34.00
11	Compensatory Forestry Sector Project	November 1984	Malaysia	24.50
12	Second Forestry Development Project	December 1984	Lao PDR	8.00
13	Third Forestry Development Project	October 1985	Nepal	10.00
14	Forestry Development Project	November 1985	Indonesia	28.00
15	Paper Mill Project	September 1987	Nepal	25.10
16	Forestry Sector Program	June 1988	Philippines	120.00
17	Second Compensatory Forestry Sector Project	November 1988	Malaysia	29.50
18	Hexian Pulp Mill Project	December 1988	China, People's Rep. of	49.00
19	Upazila Afforestation and Nursery Development Project	March 1989	Bangladesh	43.50
20	Timber Plantation Project	December 1989	Indonesia	33.30
21	Low-Income Upland Communities Project	December 1989	Philippines	32.00
22	Forestry Sector Program Loan	October 1990	Nepal	30.00
23	Sindh Forestry Development Project	January 1991	Pakistan	41.60
24	Industrial Forest Plantations	October 1991	Philippines	25.00
25	Participatory Forestry Project	November 1992	Sri Lanka	10.50
26	Biodiversity Conservation Project	November 1992	Indonesia	24.50
27	Forestry Sector Project	November 1992	Philippines	100.00
28	Mangrove Rehabilitation and Management in Sulawesi	September 1993	Indonesia	8.08
29	Industrial Tree Plantation Project	December 1993	Lao PDR	11.20
30	Yunan-Simao Forestation and Sustainable Wood Utilization Project	June 1994	China, People's Rep. of	77.00
TOTAL				871.32

B. Highlights of Selected Projects

LOAN NOS. 1191(SF)/1192-PHI: FORESTRY SECTOR PROJECT (\$100 MILLION)
(APPROVED IN NOVEMBER 1992)

This sector project was approved as a follow-up of the Forestry Sector Program (Loan Nos. 889(SF)/890-PHI), approved in 1988. It actively supports sector policies for involving the local communities in forest management for sustainable development. The components of the Project are

- policy and institutional reforms relating to adoption of revised contract reforestation regulations: the forest land management agreement (FLMA) and the community-based forest management agreement (CFMA), which will formally involve forest communities in the protection, management, and development of second-growth forests and in the reforestation of denuded areas on a cost-benefit sharing basis;
- involvement of nongovernment organizations (NGOs) in community-based forest management and in the monitoring of reforestation projects;
- financing of 100-120 subprojects totaling 170,000 hectares (ha) with the help of FLMA and CFMA instruments; and
- support to forest protection and enforcement covering 800,000 ha of old-growth forests.

The broad objectives of the Project are to (i) reverse the process of forest degradation; (ii) ensure long-term sustainability of sector investments through broad-based community participation; (iii) enhance environmental rehabilitation through forest protection and law enforcement; and (iv) reduce poverty and augment income-earning opportunities of rural communities, thus transforming them from illegal loggers to responsible forest managers.

LOAN NO. 1187-INO: BIODIVERSITY CONSERVATION PROJECT (\$24.5 MILLION)
(APPROVED IN NOVEMBER 1992)

This is the first project on biodiversity conservation to be financed by the Bank. The Project involves.

- biophysical and socioeconomic surveys; zoning; delineation and demarcation of protected areas, buffer zones and adjacent areas of two unique biodiversity areas, one in Ruteng in Flores Island (moist submontane forests) and the other in Siberut Island in Western Sumatra (tropical rainforest);
- development of protected areas through environmentally benign, ecologically sustainable, and economically productive investments;
- beneficiary participation and involvement of local communities in all conservation-based development interventions;
- income enhancement programs to uplift the socioeconomic conditions of the local population in buffer zones and adjacent areas; and
- strengthening of public and local institutions including NGOs to enhance understanding of the value of conservation of biodiversity.

**PROFILE OF FORESTRY RESOURCES IN
THE ASIAN AND PACIFIC REGION
(1980-1990)**

MEMBER	TOTAL LAND AREA ('000 ha)	FOREST AREA (1980) ^a ('000 ha)	FOREST AREA (1990) ('000 ha)	FOREST COVER (1990) (% of Land Area)	ANNUAL DEFORES- TATION ('000 ha)
Afghanistan	64,750	1,990	1,221	1.9	67.9
Bangladesh	13,017	1,145	769	5.9	37.6
Bhutan	4,700	2,973	2,809	59.8	26.4
India	297,319	55,119	51,729	17.4	339.1
Nepal	13,680	5,567	5,023	36.7	54.5
Pakistan	77,088	2,623	1,855	2.4	76.7
Sri Lanka	6,463	2,015	1,746	27.0	27.0
SOUTH ASIA	447,017	71,432	65,152	—	629.2
Cambodia	17,652	13,474	12,164	68.9	131.0
Lao PDR	23,080	14,467	13,173	57.1	129.4
Myanmar ^b	65,754	32,862	28,856	43.9	400.5
Thailand	51,089	17,888	12,735	24.9	515.3
Viet Nam	32,749	9,683	8,312	25.4	137.0
CONTINENTAL SE ASIA	190,324	88,374	75,240	—	1,313.2
Indonesia	181,157	121,362	108,044	59.6	1,331.8
Malaysia	32,855	21,546	17,583	53.5	396.3
Philippines	29,817	10,991	7,831	26.3	316.1
Singapore	61	4	4	6.6	0.0
INSULAR SE ASIA	243,890	153,903	133,462	—	2,044.2

^a Forests are defined as ecosystems with a minimum of 10 percent crown cover of trees and/or bamboos, generally associated with wild flora, fauna, and natural soil conditions and not subject to agriculture.

^b The figures provided by the Government are different from the FAO estimates. The figures are: forest area (1990)—34,424,000 ha; annual deforestation—220,000 ha.

^c Includes peninsular Malaysia, Sabah, and Sarawak. The FAO figures are different from those provided by the Government. These are: forest area (1980)—20,800,000 ha; (1990)—19,550,000 ha; forest area as percentage of land area—59.5; annual deforestation—125,000 ha.

MEMBER	TOTAL LAND AREA (^{'000} ha)	FOREST FOREST AREA (1980) (^{'000} ha)	FOREST AREA (1990) (^{'000} ha)	COVER (1990) (% of Land Area)	ANNUAL DEFORES- TATION (^{'000} ha)
Fiji	1,827	851	840	45.9	1.1
Papua New Guinea	45,171	38,197	37,418	82.8	77.9
Samoa	283	142	100	35.3	4.2
Solomon Islands	2,752	2,457	2,400	87.2	5.7
Vanuatu	1,476	236	200	13.5	3.6
TROPICAL OCEANIA	51,509	41,883	40,958	—	92.5
China, People's Rep. of	923,641	128,700	125,653	13.6	304.7
Taipei, China	3,600	1,870	1,870	—	—
Korea, Rep. of	9,819	6,515	6,480	65.9	3.5
Mongolia	156,600	15,200	13,922	8.9	127.8
TEMPERATE EAST ASIA	1,093,660	152,285	147,925	—	—
TOTAL ASIAN AND PACIFIC REGION	<u>2,026,400</u>	<u>507,877</u>	<u>462,737</u>	—	<u>4,515.1</u>

Source: Summary of the Final Report of the Forest Resources Assessment 1990 for the Tropical World, Food and Agriculture Organization, Rome, Italy, March 1993.

PERFORMANCE AND EXPERIENCE OF SELECTED BANK-FINANCED FORESTRY DEVELOPMENT PROJECTS¹

1. Lao PDR: Forestry Development Project (Loan No. 361-LAO[SF])

The principal objectives of the Project comprised (i) rehabilitation of certain key wood-processing facilities, (ii) further expansion and modernization of existing facilities, (iii) support for a pilot logging operation designed to ensure a regular flow of raw material to the processing facilities, and (iv) greater utilization of wood residues and reforestation. The Project had an implementation period of five years.

The Project experienced several delays, including an initial delay of 15 months caused by belated declaration of loan effectiveness, late fielding of consultants and lack of steady supply of logs. These and related problems led to a reformulation of the Project in 1981. Despite these problems, the majority of Project physical facilities had been installed by the time of loan closing in 1986. Compliance with major loan covenants was generally satisfactory, although overall compliance was not considered as satisfactory. The Project Performance Audit Report (PPAR) rated the Project as partly successful.

Following an initial failure in tree plantings, the Project reforestation component achieved a measure of success. *Eucalyptus camaldulensis* proved the most successful tree species in terms of growth. A total of 150 hectares (ha) was reforested. The Project Completion Report (PCR) concludes that the support of the local population is essential for any reforestation program.

The PPAR, inter alia, draws attention to the following specific points: (i) the importance of reducing indiscriminate tree harvesting and shifting cultivation in order to ensure a sustained supply of forest products; (ii) the need for proper absorption of training, and management commitment for the effective use of trained staff; (iii) the importance of developing a modern management information system and proper training program; and (iv) the need to provide mechanisms and funds for adequate operation and maintenance.

2. Nepal: Sagarnath Forestry Development Project (Loan No. 334-NEP[SF])

The Project helped to establish a 4,150 ha plantation in Nepal to reforest heavily degraded forestland. It included for the first time the introduction of large-scale planting of exotic species such as *Eucalyptus camaldulensis*. The PPAR, prepared in 1987, and the Re-Evaluation Study (RES) in 1993 evaluate the Project as generally successful. The RES, in particular, finds high-yielding eucalyptus as an important plantation species for the following reasons: (i) it provides an attractive option for afforestation of nonforested areas or reforestation of heavily degraded forest land where the objective is to meet an increasing demand for wood raw material quickly; (ii) it reverses the process of degradation and desertification of forestland and help in watershed management; (iii) it provides substantial social and economic benefits of intercropping with agricultural crops; and (iv) it is not incompatible with the regeneration of natural forests because the fast-growing plantations of eucalyptus can act as buffer zones between villages and natural forests.

3. Nepal: Third Forestry Development Project (Loan No. 794-NEP[SF])

The success of the Sagarnath Forestry Development Project induced the establishment of further plantations in Sagarnath and Nepalganj in the western Terai and woodlots on private farmlands under the Bank-financed Third Forestry Development Project. The PPAR rated this Project as generally successful. The lessons learned underscore the importance of a strong institutional framework and plantation management to secure Project sustainability.

4. Bangladesh: Community Forestry Project (Loan No. 555-BAN[SF])

The Project objectives included (i) augmenting the critically depleted fuelwood supplies and production of timber, fruits and fodder; (ii) raising public awareness of the need for and value of tree planting, and stimulating self-help by individuals and groups; and (iii) developing the institutional capacity within the Forest Department to initiate and support social forestry activities. The PPAR rated the Project as generally successful. The major lessons learned underline (i) the importance of demonstrating the successful cultivation of trees through an entire production cycle to show clearly the input requirements, risks, and results; and (ii) the need for special efforts to secure community participation.

5. Sri Lanka: Community Forestry Project (Loan No. 568-SRI[SF])

The Project's scope comprised support for (i) conventional reforestation in the block plantations program of the Forest Department; and (ii) social forestry to support tree cultivation in rural communities by individuals and through collective efforts. The PPAR rated the Project as generally successful. The following lessons are noted: (i) sustained reforestation and social forestry on a significant scale require the mobilization of adequate local resources in addition to external resources; (ii) the absorptive capacity of the executing agency has to be assessed realistically; and (iii) community participation cannot be taken for granted.

6. Malaysia: Compensatory Forestry Sector Project (Loan No. 709-MAL)

The Project was designed to replant about 40,000 ha of logged-over lands with fast-growing tree species, providing an alternate source of timber, thereby reducing pressure on the exploitation of natural forests. The PPAR rated the Project as successful. The main lessons learned underlined the importance of comprehensive planning and management of single-species plantations as well as the need to secure adequate inputs for plantation operations.

7. Nepal: Hill Forest Development Project (Loan No. 633-NEP[SF])

The Project aimed at halting the loss of forests in the hill areas surrounding Kathmandu and Pokhara by increasing the output of fuelwood and fodder to meet rural and urban needs. The PPAR rated the Project as partly successful. The Project experience highlights the importance of establishing effective control over resource use by adopting appropriate policies on user rights before efforts to increase resource productivity can succeed.

8. Myanmar: Forestry Sector Project (Loan No. 294-BUR[SF])

The objectives of the Project were to increase foreign exchange earnings by improving the utilization of teak resources and to enhance production of other hardwoods to satisfy domestic needs. The PPAR rated the Project as generally successful. The major lessons learned highlight the importance of adequate logistical support by the Government and careful assessment of training needs and organization of relevant training to match Project needs.

9. Western Samoa: Forestry Development Project in Western Samoa (Loan No. 507-SAM[SF])

The Project was to (i) expand reforestation in areas being cleared by shifting cultivators to minimize soil erosion and protect watersheds, (ii) use the timber being felled on communal forestlands to sustain the sawlog supply to industry, (iii) strengthen the Forestry Division, and (iv) augment workshop management skills. The PPAR rated the Project as unsuccessful and underscored the importance of understanding the technical, institutional and sociocultural aspects of natural forests before implementing a project.

10. Lao PDR: Second Forestry Development Project (Loan No. 716-LAO[SF])¹

The overall objectives of the Project were to provide support to four state forestry enterprises (SFEs) with the aim of expanding the forest industry, reducing industry production costs, and improving forest resource utilization. In December 1981, with cofinancing from United Nations Development Programme (UNDP), the Bank approved a technical assistance (TA)² to assist with Project implementation and provide institutional support to the SFEs assisted under the Project.

Although the loan became effective in July 1985, Project activities were curtailed for three years and loan implementation resumed only in mid-1988. Between mid-1986 and November 1987, the Government undertook a restructuring of the Executing Agency, the Lao Wood Industry Corporation, and improved in its operations. With the completion of this exercise, the Project was reformulated in mid-1988 and the loan closing date was extended to 31 March 1993.

In 1991, the Government privatized seven wood processing enterprises under the Project, following which the Bank stopped loan disbursements and TA activities in support of these enterprises. In 1992, the Government dissolved SFE No. 9 and privatized SFE No. 3, following which the Bank cancelled the loan savings of \$3.0 million and closed the loan effective February 1993. The remaining consultant services (6.5 person-months) under the TA were also terminated.

Although the Project was not completed in accordance with the original objectives, the overall objectives of the Project were substantially achieved. The compliance with loan covenants was considered not satisfactory.

¹ These included Lao Plymill, Rattan Furniture Factory, Parquet Factory and State Forest Enterprise No. 9.

² TA No. 1262-LAO: Second Forestry Development (institutional support) jointly financed by the Bank (\$346,000) and UNDP (\$554,000).

ECONOMICS AND ETHICS: APPROACHES TO SUSTAINABLE FOREST DEVELOPMENT AND CONSERVATION

Attempts to address the needs of environment and development through standard market-based trade-offs fail to accommodate the fact that environmental degradation may be irreversible (e.g., species extinction) and that many environmental goods and services cannot be traded off. Inherent market failures have to be acknowledged and, if necessary, substituted by nonmarket mechanisms. Goodland and Ledec (1987) of the World Bank's Environment Department have called for "an agenda for research in the ecology-economics interface." They argue that economic values attaching to environmental features are real, but are systematically underestimated in cost-benefit analysis because of measurement and valuation difficulties. Moreover, intangible environmental benefits (e.g., the preservation of biological diversity) are recognized even less. They conclude that at the project level "safe minimum standards (SMS)" are an important environmental supplement to cost-benefit analysis and that, at the national policy level, steady-state economics can be used to reconcile economic planning with the limits to growth in natural resource consumption. They do not argue that cost-benefit analysis is inappropriate in the appraisal of investment projects or even in advancing environmental objectives ". . . even reasonably low or highly inaccurate estimates of environmental benefits and costs are better than none, because the alternative is to assume implicitly that these benefits and costs are zero." Similarly, ethical values of environmental protection, whether they can be measured by cost-benefit analysis or not, should (and can) be accommodated.

An implicit value judgment in classical cost-benefit analysis is that irreversible consequences of action are no more important than if reversible. In other words, the retention of options has no quantifiable value. Discounting future benefits (and costs) to net present values can equally undervalue environmental functions and services, simply because it expresses a time frame preference. High discount rates discourage investments with long-term benefits and involve excessive discounting of possible future disasters. The Bank-assisted fuelwood project in southern Nepal was (partly) justified by a firewood demand for curing tobacco; and the highest yielding species was presumed to be *Eucalyptus*. But there was always a possibility that, during the life of the project, the tobacco factory might close down: in that event, lower-yielding but more versatile multipurpose species such as teak or rosewood would have been the better choice. Despite the obvious advantage of keeping the option open, the analysts were unable to quantify it; they had no techniques for judging the value of an option until it was exercised and ceased to exist!

Foresters' inability to quantify economic, as distinct from financial, costs, and benefits distorts many comparisons between natural forests and plantations, and among species within a plantation. As a result, the highest rate of return will always attach to the highest production volume (in the short term), irrespective of possible future values and nonmarket characteristics (e.g., soil improvement, ability to coppice, multiple purposes).

Market imperfections lie behind current arguments over bans (or high tariffs) on the export of tropical logs. The neoclassical argument is that DMCs are inefficient at milling timber compared with the importing countries; therefore, the export of raw logs wastes less of the resource. Banning the export of logs would, it is argued, destroy more forest to produce the same amount of finished product. This implies that the gains from efficient milling exceed the gains from improving standards in DMCs (through technology transfer, training, etc.) and, moreover, that the realizable gains will accrue to the DMCs, and will be applied productively and

efficiently. But malpractice is well-known in the tropical timber trade: misnaming of species, under measurement, and under invoicing are easier in the case of logs than with sawn timber (the square edges of which make accurate measurement and identification simpler). Transfer pricing is widespread and more easily hidden.

It is impossible to measure (for example) the value of the “esprit” that has developed within the Indonesian forest industries and that which has accompanied the search for value-added processing, and the boost in employment.

Other economic anomalies are revealed if it is conceded that “environmental dumping” (selling below the full costs of production, including environmental costs) is an illegal subsidy to the traded products. Goodland and Ledec point¹ out that “an environmental subsidy is even more economically inefficient than a tax-financed subsidy because taxes, since they are paid in money, can be shifted to the margin, while environmental costs must be borne where they fall, usually intramarginally.”

The Bank, with the publication of Occasional Paper No. 1 from Office of the Environment (OENV) in 1991 (Paris and Ruzicka, 1991), entered the public debate on supposed economic causes of forest depletion and corresponding policies. The two sides are both championed by academic economists. One side argues that natural forest depletion is attributable mainly to underpricing of the harvest and the existence of “economic rents,” which act as incentives to high-grading. This “rent school” concludes that many environmental problems could be reduced if the resources were “correctly priced” and that appropriate taxation might achieve this. The counterargument advocated by Bank staff members’ questions the application of economic rent concepts in this context and, rather, explains depletion in terms of insecurity of long-term concession tenure. A solution is to provide long-term security together with a performance bond to reinforce market incentives to sustainability.

The debate will doubtless continue. It may be noted, however, that even before the publication of OENV’s Occasional Paper No. 1, an economic report on Indonesia discussed a similar but less theoretical approach to forest concession management in which it was argued that concessions should be granted for a minimum period of 80-100 years rather than a maximum of 25; that royalties and all taxes requiring species identification and log measurement be abolished until such time as countries have the institutional capacity and integrity to perform these operations without malpractice; that they be substituted by an annual rental on every hectare of the concession, whether operating or not; that the rate of harvest be monitored on an area basis only; and that SMS of harvesting and subsequent forest management be enforced by a substantial, interest-earning bond. The rental might be set by auction and indexed to an international timber price. An immediate effect of such a system would be to reduce massively the size of concessions (few concessionaires could afford to pay an annual per ha rent on more than 50,000 ha, which compares with an average concession size in Kalimantan of 500,000 ha).

As a matter of practical politics, the time is not yet ripe to introduce radical changes of the kind proposed here. In the immediate future, there is little alternative to piecemeal, ad hoc adjustments in forest taxation, despite its inefficiency and the many problems associated with collection. But innovation will come, and the Bank will doubtless wish to continue the debate based on further research. That such research is a global need is indicated by the recent experience of New Zealand which is privatizing its plantation forest resources.

All these considerations fall within Goodland and Ledec’s “agenda for research in the ecology—economics interface.” A case has been made for the adoption of SMS analysis to address ecological concerns that may be ignored in conventional cost-benefit analysis. These are non-economic criteria that projects must meet to be approved. The concept has been criticized because it involves subjectivity and disregard for economic efficiency. As Goodland and Ledec

point out, however, reliance on the market to measure social well-being is no more objective than SMS analysis. The World Bank is committed to following SMS principles in projects with ecological implications. The research that will enable it to fulfill that commitment will have to come from economists as well as ecologists and will provide continuing examples of the importance of extra professional involvement in forestry. Like the steady state economy, sustainability has little appeal to neoclassical economists, and a commitment to it is ethical. To a degree, the same is true of biodiversity conservation. The dilemma here is ethical and economic. It is no longer necessary to argue the case for conservation of biodiversity; rather, the questions are "how much is enough?" and "who should decide?" As with forest policy formulation, these questions cannot be left to foresters alone.

ABBREVIATIONS

CFMA	–	Community Based Forestry Management Agreement
DMC	–	developing member country (of the Bank)
EIA	–	Environmental Impact Assessment
FAO	–	Food and Agriculture Organization
FLMA	–	Forest Land Management Agreement
MPFD	–	Master Plan for Forestry Development
NGO	–	nongovernment organization
OENV	–	Office of the Environment
PCR	–	Project Completion Report
PPAR	–	Project Performance Audit Report
RES	–	Re-evaluation Study
SFEs	–	State Forestry Enterprises
SMS	–	Safe Minimum Standards
TA	–	Technical Assistance
TFAP	–	Tropical Forestry Action Program
UNCED	–	United Nations Conference on Environment and Development
UNDP	–	United Nations Development Programme

NOTE

In this Paper, "\$" refers to US dollars.

GLOSSARY

Agroforestry

Land use system in which woody perennials are used on the same land as agricultural crops or livestock in some form of spatial arrangement or temporal sequence.

Carbon Sequestration

The process whereby forested areas retain a revolving but stable store of organic carbon in their biomass

Commercial Logging

Extraction of timber in large quantities for industrial and export markets.

Conservation

Rational and prudent management of natural resources to achieve the greatest benefit while maintaining the potential of the resource to meet future needs.

Coppice

Cutting broad-leaved trees close to ground level with a view to producing new shoots without replanting; similar to ratooning among cultivated perennial crops.

Deforestation

The clearing of forests and the conversion of land to nonforest uses.

Degraded Forestlands

Previously forested lands which have lost their capability in the long-term for natural forest regeneration or economically viable agricultural use, due to biological, chemical or physical processes resulting from human or natural interventions.

Depletion

Reduction of forest area or volume as a result of deforestation.

Ecotourism

A specialized type of tourism wherein the main attraction is naturalscape and biologically unique or rare species of animals, birds, plants, and aquatic or marine life; and wherein attempts are made to minimize disturbance to the area.

Exotic Species

Species introduced from another ecological zone; usually opposite of indigenous.

Forests

An ecosystem with a minimum of 10 percent crown cover of trees and/or bamboos, generally associated with wild flora, fauna, and natural soil conditions and not subject to agriculture.

Forest Estate

An area, whatever its ownership, used for forestry purposes.

Industrial Plantations

Stands of trees raised for the production of industrial forest products (for example: sawlogs, veneer logs, pulpwood, poles).

Mangrove Forest

Forests that are normally found in the coastal zones and tidal areas.

Monoculture

Raising trees of a single species, generally even-aged in a plantation, as opposed to a large number of species of trees found in the natural forests or in a mixed plantation.

Nonwood Forest Products

Outputs from forests, such as gums, resins, honey, silk, hides and skins, fruits and nuts, that are nontimber in nature.

Old-Growth Forest

A relatively intact forest characterized by a large number of species of trees, shrubs and climbers that has remained unmodified by external interventions (human or natural) over a prolonged period of time. This includes both tropical forests as well as temperate forests; frequently referred to as primary forests.

Production Forest

Forest, designated for sustainable production of forest products.

Protection Forest

Forest, preservation of which is designated for stabilization of mountain slopes, watersheds, fragile lands, catchment areas, and sites of ecological value. Controlled sustainable extraction of nontimber products could be allowed in appropriate cases.

Reforestation

The replacement of trees in cutover forest areas.

Second-Growth Forest

Forest from which the original growing stock of timber has been removed.

Shifting Cultivation

Farming system in which lands are periodically cleared, farmed, and then returned to fallow in rotational sequence; often destructive to forest and soil resources, particularly if rotational sequence is too short to allow recovery; synonymous with slash-and-burn or swidden agriculture.

Stumpage (Royalty)

Fee or price of standing trees before logging.

Sustainable Forest Management

A management system that maintains a forest's critical ecological functions and biological diversity, and minimizes the adverse impacts of human activity so as to ensure the availability of forest goods and services in perpetuity for the use of present as well as future generations.

Sustained Yield

Production of forest products with approximate annual balance between net growth and harvest.

Tropical Moist Forest

Forest situated in an area receiving not less than 100 millimeters of rain in any month for two out of three years, with a mean annual temperature of 24°C or higher, mostly low-lying, generally closed.

Woodland

Area that has some forest characteristics but does not meet the definition of forest. Includes areas occupied by wind breaks, groups of trees, fallow land, and shrub land.