Forest Concession Policies and Revenue Systems

Country Experience and Policy Changes for Sustainable Tropical Forestry

John A. Gray
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Improving the performance of forest concessions is not a popular topic. It is easier to argue against forest concessions than to propose improvements in concession procedures. Yet, if sustainable management of tropical forests is to be achieved and deforestation brought under control, it may be necessary to strengthen the on-the-ground performance of existing forest concessions and to control the allocation of new concessions.

This study evaluates the past failures of forest concessions and the loss of tropical forests to mismanagement over two decades. At the same time, the study makes clear the potential gains from strengthening the allocation, management, and supervision of concessions by focusing on improving procedures, introducing incentives for performance, and monitoring a few key performance elements.

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Forest concessions have been an important element of forest and forest management in many countries, including many developing countries. More often than not, the concessions experience of these countries has not been successful. Improving the performance of forest concessions is not likely to be popular. It is easier to discuss forest concessions than to propose improvements in their allocation, operation, supervision, and monitoring. However, if sustainable management of tropical forests is to be achieved and deforestation brought under control, it may be necessary to strengthen the on-the-ground performance of existing forest concessions and to control the allocation of new concessions.

Forest concessions involve a contract between a forest owner and another party permitting the harvesting (forest utilization contracts) and/or managing (forest management services contracts) of specified resources from a given forest area. The forest concessions discussed in this study involve both types of contract, a combination that occurs in many countries.

Part One examines the forest concessions experience on public lands with a focus on natural forests in developing countries in Africa, Asia, and Latin America. It also looks at forest concession experience in developed countries that is applicable to natural forests in developing countries. These experiences—good, bad, and indifferent—provide the basis for proposals to strengthen the allocation of forest concessions and improve their forest and environmental management. Economic and procedural incentives for improved forest
management performance are introduced, as are proposals to strengthen monitoring, supervision, and compliance with contract terms.

Part Two evaluates forest revenue systems and presents proposals for revised forest fees designed to reflect the values of both the timber and the concessions. Additional proposals suggest ways to make fees easier to collect and to structure forest fees to provide economic incentives for concession management and performance. Government commitment is essential to the success of the proposals. With tighter control, forest concessions may play a role alongside other forest policies in achieving sustainable forest management and maintaining forest cover.
Acknowledgments

This study draws on my involvement in a number of projects and studies in Africa, Asia, and Central and South America, many dealing with forest institutions, concessions, and forest revenue systems.

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Ideas from the present study were presented in invited papers at a workshop of the Iwokrama International Centre for Rain Forest Conservation and Development, Georgetown, Guyana in September 2000; and at an International Union of Forest Research Organizations (IUFRO) symposium held in Belém, Brazil in December 2000. Comments, questions, and responses helped clarify and sharpen the ideas presented here.

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Jenepher Mosley edited the final draft, identified areas for clarification, and suggested improvements in organization and wording. The final draft greatly benefited from her input. Alicia Hetzner copyedited the final version. James Cantrell contributed design ideas for this volume, and Ding Dizon desktopped it.
Acronyms and Abbreviations

APHI - Assosiasi Pengusahaan Hutan Indonesia (Association of Indonesian Forest Concession Holders)

CAAFF - Contrat d’Appropriement et d’Aménagement Forestier (Québec)

CERFLOR - forest certification program (Brazil)

CFA - Central African francs

COHDEFOR - Corporación Hondureña de Desarrollo Forestal (Honduras Development Corporation)

CSA - Canadian Standards Association

EIA - environmental impact assessment

FFCS - Finland’s Forest Certification System

FOB - freight-on-board

FSC - Forest Stewardship Council

GDP - gross domestic product

ha - hectare

ISO - International Standards Organization

ITTO - International Tropical Timber Organization

IUFRO - International Union of Forest Research Organization

LEI - Lembaga Indonesia Ekolabel

NTCC - National Timber Certification Council (Malaysia)

PEFC - Pan-European Forest Certification Framework

UNDP - United Nations Development Programme

WAHLI - Wahana Lingkungan Hidup Indonesia
Is there a role for forest concessions in the sustainable management of public forests? Can sustainable forest management be achieved under forest concessions? What can be learned from the extensive experience with forest concessions in countries around the world, from the failures and few successes? Can forest concession procedures be strengthened to achieve the sustainable forest and environmental management of public forests and thereby contribute to the survival of forest cover?

A forest concession is a contract between a forest owner and another party permitting the harvesting (forest utilization contracts) and/or managing (forest management services contracts) of specified resources from a given forest area. The concessions discussed in this study involve both types of contract, a combination that occurs in many countries. The study examines the forest concessions experience on public lands with a focus on natural forests in developing countries. However, the study also draws on concessions experience in developed countries that may be applicable to natural forests in developing countries.

The experience surveyed provides the basis for proposals to strengthen procedures for the allocation of forest concessions and improve their forest and environmental management; the study also introduces economic and procedural incentives for improved forest management performance and proposals to strengthen monitoring, supervision, and compliance with contract terms.

Government commitment is essential to the success of the proposals. With tighter control, forest concessions may be able to play a role alongside other policies to
achieve sustainable forest management and maintain forest cover.

**WHAT THE STUDY COVERS**

Part One of the study reviews and evaluates country experience with forest concessions and alternative forest tenures on public lands in both tropical and temperate countries. Important performance incentives are defined. Part One also includes proposals to improve concession allocation procedures, strengthen concession contracts, and improve both forest management on concessions and the monitoring and supervision of concessions.

Part Two evaluates forest revenue systems and presents proposals for revised forest fees. The aim is to reflect the values of both the timber and the concessions, to make fees easier to collect, and to structure forest fees to provide economic incentives for concession management and performance.

**IMPORTANT ISSUES IN FOREST CONCESSIONS**

Many of the issues of forest concessions stem from the complex biological nature of the forests. Other issues are social, institutional, and administrative. The latter are closely tied to a fee structure that in many countries is both too complex and too low to foster conservation. This study identifies eight issues common to tropical developing countries as well as temperate developed countries:

**Issue 1. Public or Private Forest Ownership and Management**

For the slow-growing natural forests discussed in this volume, private ownership of forest land or privatization of forests is not appropriate. These forests have too many nonmarket, environmental, and nontimber public benefits for privatization to be efficient or successful. On the other hand, for fast-growing forest plantations, private ownership or privatization can be perfectly appropriate.

**Issue 2. Public Benefits of Natural Forests**

Public benefits of natural forests include (a) non-timber products, (b) nonmarketed values, and (c) environmental benefits. Nonmarketed values are forest values that are not sold, and therefore not priced, in any organized market. Thus, they are often overlooked in evaluating the benefits generated by forests.

**Issue 3. Local Community Forest Use and Benefits**

Past forest concession agreements have ignored forest uses by forest dwellers. These benefits should be incorporated in redesigned concession agreements along with opportunities for forest concessions run by local communities.

**Issue 4. Length of the Concession Agreement**

Longer term concession contracts do not, as is often thought, provide incentives for sustainable forest management through greater security (Boscolo and Vincent 2000; Gray 1994; Vincent 1990; Walker and Smith 1993). Short-term renewable contracts with renewal based on performance reviews provide better incentives for, and guarantees of, performance.

**Issue 5. Concession Size and Forest Fees**

Forest concessions can vary enormously in size and often are granted over vast areas, beyond a company’s needs. Such concessions encourage wasteful use of timber and poor management of resources. Annual area-based fees at significant levels can encourage concessionaires to relinquish excess forest area.
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Issue 6. Bidding on Concessions and Transparency in Concession Allocation

In most countries, concessions are allocated administratively—a slow process that invites inefficiency and corruption. To improve the process and achieve greater transparency, competitive allocation of concessions has been tried using auctions and sealed tenders. These efforts have had varying success. This experience has demonstrated that procedures must be clearly defined and tightly controlled to ensure that bidding is competitive.

Issue 7. Concession Management Incentives and Performance Incentives

In most countries, concession agreements have not provided sufficient incentives for forest management, nor included measurable performance requirements. Interim concession licenses and performance bonds can provide incentives for compliance, as can the level and structure of forest fees.

Issue 8. Inspecting, Monitoring, and Auditing Forest Management

In many countries, arrangements for supervising and monitoring concessions are weak. Forestry departments and ministries often are underfunded and ill equipped, with little field capability for inspection and monitoring. Proposals to strengthen forest revenue systems are designed to increase forest revenues and provide funds for improving field capacity or for contracting out the work of monitoring and supervision.

Concession Allocation Steps and Procedures

Suggested steps to strengthen the procedures for allocating concessions are outlined here and detailed in chapter 4.

- Step 1. Define the concession area and ensure that it is not encumbered by other land ownership or land-use restrictions.
- Step 2. Begin the allocation process, preferably initiated by the government rather than by concession applicants.
- Step 3. Advertise the availability of the concession area and invite expressions of interest. Concession conditions, rights, and obligations should be specified in the application package issued at this point.
- Step 4. Prequalify applicants. The conditions for prequalification should be stated in the application package.
- Step 5. Evaluate, approve, and notify qualified applicants, all within a limited time specified in the application package.
- Step 6. Allow time for applicants to evaluate the area and the timber and to prepare proposals. Under Step 6, those who are preparing a bid will undertake a reconnaissance inventory of the concession area, unless the government has prepared an inventory as part of the bidding package.
- Step 7. Submit proposals and bids.
- Step 8. Selection winning applicant and bid.
- Step 9. Award and sign the concession contract. Contract conditions should follow a standardized form applicable to all concessions, with special conditions, rights, and obligations for the area in question (in an appendix).

Strengthening the Forest Concession Contract

To be effective, the forest concession contract must provide certainty of rights and obligations for the concession holder and include strong incentives for the concessionaire’s compliance. Required performance steps should be defined by the government, as forest owner, and spelled out in the contract as follows:
- **Step 1. Boundary marking.** Clear and permanent definition of the concession boundaries is essential to forest management.
- **Step 2. Concession area map.** Mapping the concession area is an important prerequisite for a reliable forest inventory and management planning.
- **Step 3. Access control.** The concession holder would be required to control access to prevent conversion of the forest estate into marginal agricultural and grazing land.
- **Step 4. Forest inventory and environmental inventory.** Both inventories would be completed and approved before full-scale harvesting is allowed.
- **Step 5. Forest management plan and environmental management plan.** Both plans would be required to protect timber and non-timber products and environmental benefits. Both should be verifiable on the ground.
- **Step 6. Road plan.** The road plan should be designed for on-the-ground verification.
- **Step 7. Forest utilization plan.** A forest utilization plan would be required in cases in which the concession involves a processing plant.
- **Step 8. Social and community development plan.** This plan should document commitments to the community by the concession owner.
- **Step 9. Initial annual operating area plan.** This plan should include a logging plan and a plan for marking trees for cutting. The latter should be handled in such a way that marking could be inspected and checked by the forest agency before logging begins.

On-the-ground supervision and monitoring of the performance conditions listed above are essential. If the government forest agency is not equipped for that, the work could be contracted out to reputable, impartial private sector firms using increased forest fees.

**Forest Revenues and Pricing on Concessions**

The forest revenue system and the structure of forest fees are key tools of forest policy.

(Landell-Mills and Ford 1999)

- **Issue 1. Low Forest Fees and Revenues.** In many developing countries, forest fees are well below the value of the timber. Low concession fees encourage the over-expansion of forest concessions into areas that may be more appropriate for non-timber uses.
- **Issue 2. Poor Forest Revenue Collection.** Forest fees, which are usually based on the volume of timber cut (stumpage fees), commonly are avoided or are not properly collected, reducing the incentive to harvest or utilize the timber efficiently, or to manage the forest sustainably. There is scope for the wider use of area-based forest concession fees, which are easier to administer and harder to evade.
- **Issue 3. Minimum Forest Fees.** Minimum forest fees can ensure that forest fees cover administrative costs, including those of regenerating the forest and preserving the forest, non-timber, and environmental values.
- **Issue 5. Bidding on Concessions and Bonus Bids.** As well as generating revenues and capturing timber values, competitive auctions by bonus bids effectively allocate concessions and reduce illegal practices.

**Suggested Forest Pricing Policies**

The forest pricing policies and forest fees suggested in chapter 8 are intended to improve forest concession performance and its sustainable management by increasing the financial viability of concessions. The proposals include five elements:
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1. Annual concession fees. Area-based annual concession fees are recommended at rates that generate a significant proportion of forest revenues and provide incentives for forest management.

2. Initial concession fees. A modest initial concession fee is recommended to cover administrative costs and discourage frivolous applications.

3. Bidding on concessions. Where competition can be achieved, it is recommended that concessions be allocated by bidding, preferably by sealed tender.

4. Minimum forest fees: Volume-based and area-based. Minimum volume-based fees are recommended to improve overall efficiency of forestry by preventing harvesting of timber at below cost or below opportunity cost. Minimum area-based forest concession fees are recommended to reflect the environmental and nonmarket opportunity-cost values of alternative forest land uses.

5. Fund to finance forest management, supervision, and monitoring concessions. It is recommended that a substantial proportion of the forest revenues from concessions be allocated to a forest management fund and used to finance the supervision and monitoring of logging and forest management activities on concessions.
A decade ago, less than 1 percent of natural tropical forests (fewer than 1 million ha) was under sustainable forest management. This ratio was established in a study of tropical forest management undertaken by Duncan Poore and others (1989), for the International Tropical Timber Organization (ITTO). Since then, there have been substantial efforts to bring forests under sustainable management. However, these efforts have not always been successful (Hardner and Rice 1999). Questions remain. Can tropical forests be sustainably managed for a diversity of uses, including commercial exploitation, or can tropical forests be preserved only as protected areas? Is sustainable forest management achievable through forest concessions, or should they be abandoned? This study examines these questions primarily from the standpoint of natural tropical forests on public land and proposes revised structures and procedures for concessions contracts and fees.

A forest concession—defined in detail in the first section below—is a contract between a forest owner and another party permitting the harvesting and/or managing of specified resources from a given forest area. Thus, forest concessions may involve both rights and obligations. Concessions have been the primary form of forest tenure and forest management in many developing countries, especially among forest-rich tropical developing countries, but also among a number of temperate developed countries. The experience of individual tropical countries and temperate developed countries with forest concessions has been extensive (box 1). In both cases, these country experiences have been mixed, frequently negative. From these
Box 1 Forest concessions around the world

**West and Central Africa.** Forest concessions of various types are the dominant form of forest tenure in almost all the forest countries of West and Central Africa: Cameroon, Central African Republic, Côte d'Ivoire, Democratic Republic of the Congo, Gabon, Congo, Ghana, and Liberia (Grut, Gray, and Egli 1991). In Gabon, logging concessions cover 11.9 million ha (ha), 56 percent of the forest area of the country (World Resources Institute 2000a). In Cameroon, logging concessions cover 17.3 million ha, 76 percent of the forest area, with over half of the area in abandoned concessions (World Resources Institute 2000b).

**Southeast Asia.** Forest concessions are the dominant form of forest tenure in Cambodia, Indonesia, Malaysia (Peninsular Malaysia, Sabah, and Sarawak), and Papua New Guinea. In Indonesia, the 427 forest concessions active in 1998 covered 52.3 million ha and yielded 15.6 million cubic meters of logs, 53 percent of the total official harvest of wood (Essama-Nssah and Gockowski 2000). Another 34 percent, 10 million cubic meters of the official harvest, came from land clearing. The actual harvest, however, is considerably higher. Cambodia has 24 concessions, covering 4.6 million ha, about 44 percent of Cambodia's 10.5 million ha of forest (Fraser Thomas Partners and Associates 2000). An additional 12 concessions, covering an additional 2.3 million ha, were canceled in 1999 for nonperformance. Illegal logging and the unreported timber harvest are substantial in both Cambodia and Indonesia. These problems will be explored below.

**Latin America.** Forest concessions are the dominant form of forest tenure in Bolivia, Guyana, Nicaragua, Suriname, and Venezuela R.B.. In Suriname, for example, the 32 concessions cover 712,000 ha; expired concessions 560,000 ha; Incidental Cutting Licenses (shorter-term concessions that do not require a management plan) 357,000 ha; and exploration licenses a further 1.3 million ha, for a total of approximately 3.1 million ha: 22 percent of the total forest area of Suriname (Sizer and Rice 1995; Mitchell 1998). Forest concessions exist in other Latin American countries but are less important.

**North America.** Canada has a variety of types of forest concessions. Some are area-based; others are volume-based, allowing a specified quota of wood to be cut. The latter include tree farm licenses and other types of concession licenses, and short- and long-term timber sales—another form of concession license (Haley and Locker 1990; Ross 1995; World Resources Institute 2000c). Types of forest tenure differ among the 10 provinces and 2 territories (Nonevent Territory is no forested), each of which has its own forest legislation and administration, providing a diverse portfolio of forest management experiences. These tenures cover 220 million ha: 77 percent of the commercial forest area (World Resources Institute 2000c). They represent an annual allowable cut of approximately 180,000 cubic meters per year, 83 percent of which is in long-term tenures (Haley and Locker 1990).

Few, if any, concession-type forest tenures remain in the United States.

experiences, good and bad, there are useful lessons to be learned for the redesign of forest concessions systems.

There have been numerous challenges to the viability of sustainable forest management of tropical natural forests. One view argues that forests can be conserved only by setting them aside in protected areas in which logging is strictly controlled (Bowles and others 1998). Proponents of protected areas argue that it is not possible to control logging to achieve sustainable forest management outside protected areas.

Against this, it is argued that protection will be ineffective because agricultural incursion following logging is experienced in many tropical countries (Angeles 1999; Farris 1999; Whitmore 1999). Nevertheless, a recent study of 93 parks in 22 developing countries in which forests have been set aside as protected found that “... the majority of parks are successful in stopping land clearing, and to a lesser degree effective in mitigating logging, hunting, fire, and grazing.” (Bruner and others 2001).

Another viewpoint argues that, for countries with low population pressures on forest lands,
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such as in the Amazon of Bolivia, areas can be set aside after conventional logging and protected from incursion or deluging more cheaply and efficiently than under conventional forest management (Rice, Gullson, and Reid 1997; Rice, Sugar, and Bowles 1999). However, doubts have been raised about the success of such a policy, given future pressures for deluging (Pearce, Puts, and Vanclay 1999).

Finally, others have pointed out that although parks and protected areas are essential to conserve forests and biodiversity, on their own they are inadequate to preserve the range of forest ecosystems, species, and plant and animal communities in tropical forests (Puts and others 2000). They note that, in addition to establishing protected areas, "... priority must be given to ensure that the greatest possible amount of biodiversity is conserved outside protected areas by altering harvest patterns in these landscapes of resource extraction." (Putz and others 2000).

These differing perspectives suggest a range of models for forest conservation and forest management. For countries with public forest lands, the best arrangement to maintain forests and biodiversity will likely be a combination of some or all of the following alternatives:

1. Protected areas large enough to provide habitat protection, and in a contiguous pattern
2. Forest concessions with enforceable performance-based management criteria, and incorporating protected areas and other use zones
3. Forest plantations of higher-yield species (situatuated on compact land areas close to processing plants and markets) to provide for domestic forest products needs and to reduce pressure on natural forests
4. Community forests and community forest concessions managed by communities and indigenous groups.

5. In countries with private forest lands, private woodlands and woodlots are a fifth alternative.

The challenge is to undertake both land-use planning and its implementation and to meet those commitments in the face of countervailing pressure from special interest groups.

For countries with significant public forest lands, improved forest concessions policies can be important components of sustainable forest policy. Such concessions policies would involve:

- Restrictions on the areas allocated to concessions
- Government initiative in selecting areas for concessions
- Restructured forest concessions procedures
- Setting aside protection areas within concessions for preservation and other uses
- Measures to protect the environment and biodiversity within the management plan
- Low-impact logging
- Improved on-the-ground supervision and monitoring of concessions operations
- Provision for community-based forest uses
- Nontimber forest products production and wildlife management
- Community management and co-management of concessions
- New directions, such as simplifying and raising fees and introducing incentive systems for concession holders (Hardner and Rice 1999, Putz and others 2000).

This study examines the experience, role, and effectiveness of forest concessions in the use and sustainable management of forests on public lands in developing countries. It also examines alternative forest tenures. The study focuses on tropical natural forests but draws on the experience of both tropical and temperate countries. Many of the issues, conclusions, and recommendations also will apply to public forests in temperate countries, and to countries in transition. A number of proposals based on
these experiences will be discussed. They seek to:
- Impose restraints on granting concessions
- Strengthen procedures for the allocation of forest concessions
- Improve forest and environmental management on concessions
- Introduce performance incentives for improved forest management performance
- Strengthen monitoring, supervision, and compliance.

The proposals incorporate a number of performance incentives, both economic and procedural, designed to encourage compliance and performance; reduce the incentives for graft, corruption, and illegal activities; and increase transparency. However, if the proposals are to be successful in improving forest concession operations and management, it is necessary that governments be committed to deal with graft and corruption in the forest sector, and to increase transparency of concession allocation, operation, supervision, and monitoring. Without these commitments, the proposals will fail to improve concession operations.

An important feature of the proposals is raising forest fees. Sustainable forest conservation and management depend on it. Low forest fees on timber and concessions provide the wrong incentives, signaling abundance rather than scarcity. Low forest fees on timber make commercial logging and processing profitable and attractive for entry and expansion, encouraging entry, wastage of valuable timber, overcutting, and depletion of the forest (Karsenty 2000). Low concession fees make forest concessions profitable and attractive and encourage overexpansion of forest concessions, and into areas that may be more appropriate to nontimber uses or protection forests.

The fee structure in many countries is complex and needs to be simplified. The final chapters of this study discuss fees in detail. In the meantime, it will help to know that they break down broadly into two categories: (1) fees on forest tenures, that is, on forest concessions, and (2) fees on timber. Fees on tenures, such as area concession fees, confer the right to exploit the resources of defined areas of the forest. In the case of the type of contracts discussed in this study, that right would be in exchange for undertaking the duties of forest management. Fees on timber, such as volume-based stumpage fees, are based on the measured volume of timber cut but do not always reflect its true economic value, which is the price that would prevail in a competitive market.

**FOREST CONCESSIONS DEFINED**

Forest concession contracts can be of two kinds: forest utilization contracts, allocating harvesting and/or use rights to public forest lands; and forest management services contracts, which are procurement contracts for forest management services. Forest utilization contracts may give the holder rights to harvest timber or other forest products or to hunt. They also may entitle the holder to use forest services, such as watershed protection, or to profit from biodiversity or tourism.

Often forest concessions contracts involve both types of contracts, granting concessionaires harvesting or use rights, but also requiring them to undertake forest management activities, reforestation, and/or environmental protection. Forest concessions in many countries are of this dual nature, and these are the types of concessions discussed in this study.

Forest concessions contracts can be between a government, as owner of public forest land, or a private forest land owner on the one side; and a private corporation, private individual, government agency or corporation, community, or cooperative on the other side.

The forest concessions discussed here involve public forest lands. In most cases, they
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also involve contracts between the government, as owner of public forest lands, and private sector corporations. However, concession contracts can sometimes be with state organizations, communities, or aboriginal groups.

**Why Forest Concessions?**

As owners and administrators of public forest lands, governments can manage public forest lands; harvest timber in their own logging operations; and sell logs to sawmills, pulp mills, and other wood processing plants. Governments can even engage in processing forest products, including both nontimber products and other forest outputs, such as bamboo, rattan, gums, and resins, recreation, and ecotourism. For example, in Indonesia, the state corporation, Perum Perhutani, operates and manages forest plantations on state forest land, growing primarily highly valuable teak on the densely populated island of Java. Perum Perhutani manages the plantations; operates logging operations; produces other forest products, including nontimber products; operates processing plants; and markets the products. In several European countries, national, state, or provincial forest services engage in both the management of state forests and in the logging and roadside selling of logs.

In most countries, however, governments do not have the capacity, capital, or experience to operate logging operations, to produce other forest products (rattan, resins), or to run other forest services (recreation and ecotourism operations). Instead, most governments choose to contract them out. They may contract out logging operations through sales of standing timber or logging concessions of various types. Contracting out is often more efficient (Leffler and Rucker 1991).

Governments also may contract out the harvesting of other timber and nontimber forest products through sales, permits, or concessions to individuals, private sector firms, or forest communities. Other forest outputs, such as recreation and ecotourism, also may be contracted out to private sector firms or communities. The design of forest concessions and other contractual arrangements illustrate the applications of contract theory and principal-agent relationships (box 2). Other principal-agent examples from the natural resources field include various types of mineral leases and petroleum leases. Agricultural leases and sharecropping are classic principal-agent arrangements (box 2).

Besides lacking expertise in the specific areas mentioned above, many countries, especially developing countries and countries rich in tropical forests, do not have the human power, capacity, budget, or field capability to manage their forests, control logging, protect forests from incursion, or manage protected areas. These countries also may consider contracting out forest management and protection duties to private sector firms, organizations, or communities by means of forest concessions. These concessions would grant harvesting rights to timber but also require the concessionaire to manage and protect the forest. These, too, are applications of principal-agent theory. Governments may contract out the management of forest protection to communities in exchange for harvesting rights to nontimber forest products, hunting, or other traditional uses. Hence derives the dual nature of the concessions contracts mentioned above.

Thus governments may choose to undertake both forest management and production (harvesting) of forest products or other forest outputs; or they may contract out either or both activities, as shown in figure 1. Communities, as forest owners, and private forest owners,
Box 2 Principal-agent relationships, contract theory, and rationale for forest concessions

The theory of contracts and principal-agent relationships provide the basis for the design of forest concessions as proposed in this study. Principal-agent relationships and contract theory are at the heart of many economic arrangements.

Principal-agent theory, or briefly, agency theory, deals with the relationship between a principal (owner of a resource) and an agent (user of a resource). It is concerned with how one individual (say, a landlord or employer) can design a compensation system (a contract) to motivate another individual (his or her agent, say, a tenant or employee) to act in the agent's interests (Hayami and Otsuka 1993; Eatwell, Milgate, and Newman 1987). The "principal-agent problem" arises because the interests of the principal and agent differ (the landlord and the tenant have different objectives), and the principal's information about the agent's actions is imperfect (it is difficult for the landlord to fully monitor the tenant's actions).

Thus, economic incentives are important in encouraging performance by the agent and harmonization of the interests of the agent and principal. Contract theory is concerned with the design of contracts and contract terms and conditions that provide incentives (both positive and negative) for the agent's actions that achieve the principal's objectives and harmonize their interests. Therefore, principal-agent relationships are at the core of forest concession policy and in the design of concession terms and conditions, or in short-term timber harvesting contracts (Leffler and Rucker 1991). Principal-agent relationships also are involved in delegating the supervision of concessions, monitoring performance of forest concessions, or auditing concession operations (Strausz 1997).

Agricultural leasing and sharecropping represent classic and well-studied applications of principal-agency theory applicable to forest concessions. The substantial and diverse literature on the developed and developing country experience with agricultural leasing and sharecropping provides useful experiences for the design of forest concession contracts and policies. Several applicable references are listed below.

Mineral and Petroleum Leases. The literature and applied experience on petroleum and mineral leasing also provides useful experience and examples applicable in designing forest concession policies.

To explore principal-agent theory and applications, contract theory, and agricultural and other leasing arrangements, readers are referred to Binswanger and Deininger (1993); Dasgupta, Knight, and Love (1999); Gibbons (1998); Hayami and Otsuka (1993); Hendricks, Porter, and Tan (1993); Leffler and Rucker (1991); Mead (1994); Strausz (1997); and Talim (1992).

WHAT'S AHEAD? AN OVERVIEW

Can sustainable forest management be achieved under forest concessions? In Part One, we evaluate the role and effectiveness of concessions in managing forests and using forest resources. Part One has four chapters, starting with this introduction and reviewing and evaluating country experience. From these experiences, the author identifies problems and proposes changes to concession management polices and procedures.

Chapter 2 examines key issues and problems of forest concessions, drawing on the forest concession experience of a number of tropical and temperate developing and developed forest countries. From this review, ways of making concessions more effective are identified and recommendations are developed.

A range of forest tenure alternatives are surveyed in chapter 3, including short- and long-term timber sales, forest concessions, privatization of concessions, joint forest enterprises, and state forest corporations. The review again draws on the case study experiences of a range of countries.

Chapter 4 is based on the preceding review of forest concession issues and country experiences. It presents a set of proposals designed to deal with the problems and issues in forest concessions to make forest concession
more sustainable. A series of steps are outlined to improve the concession allocation process and strengthen concession contracts, forest management on concessions, and the monitoring and supervision of concessions. These steps are designed to introduce performance incentives in the allocation and operation of concessions.

Forest fees and charges are key instruments in managing forest concessions, with important incentive effects. Part Two reviews forest revenue systems and evaluates alternative forest fees for concessions, starting with a brief review of forest pricing and forest values (chapter 5). Country experiences are reviewed in chapter 6, and forest revenue issues surveyed in chapter 7. A full range of alternative forest fees is summarized in the appendix, which is expanded on the website with data drawing on the experience of both tropical and temperate countries (http://essd.worldbank.org/rdv/RDVWeb.nsf/forestry/ExternalLinks).

Changes in the structure of forest fees based on these experiences are proposed in chapters 8 and 9. These proposals are designed to reflect the values of both the timber and the concessions, to make fees easier to collect, and to provide economic incentives for concession management.
PART ONE

FOREST CONCESSIONS MANAGEMENT OPTIONS
Many issues in the management and operation of forest concessions result from the complex nature of the forests. Other concessions issues are social, institutional, and administrative. Perhaps surprisingly, many of these issues are common to many developing countries with tropical forests, as well as to a number of forested temperate developed countries. The local details vary, but the similarities provide opportunities for countries to benefit from their shared experiences.

Complex Tropical Forests, Diverse Uses, Benefits, and Values

Most tropical natural forests are slow growing, the timber often achieving growth of no more than 1 m³ per ha per year. The forests are uneven aged and contain a great variety of species of trees—frequently as many as 200 to 300—of widely varying ages, sizes, uses, and values. Tropical forests are renowned for their biodiversity. They contain a wide variety of species of plants and animals (numbering in the thousands, with many species yet unidentified). As a result, tropical forests generate a diverse range of timber and nontimber outputs, environmental benefits, goods, and services, making forest management a challenge.

In most tropical countries, forest tenure arrangements, both for the land and the forests, as well as the ownership of the forest outputs and benefits are unclear. In part, this stems from the complexity and diversity of the outputs and the nonmarketed and collective nature of many of
these outputs and benefits. This context adds to the difficulties of tropical forest management.

In addition, tropical countries face other problems in achieving sustainable management of their valuable tropical forests. Increasing population pressures in many countries lead to agricultural incursion into forest lands by landless people seeking to feed their families. In these countries, unless tropical forests can be protected and managed, little forest will be left to meet the country’s growing domestic demand for timber and nontimber forest products, to maintain water flow and other nonmarket forest values, and to contribute to the country’s economic development and well-being.

Finally, the era of reduced government budgets has made forest management and protection increasingly difficult. In many countries, cutbacks in staff and funding have left the agencies and ministries responsible without the capacity to manage the forests, or to supervise on-the-ground forest activities. Thus, just when tropical forests are most in need of management and protection, governments are least able to provide it.

**Temperate Forest Countries**

Temperate forest countries face many of the same forestry issues and problems as tropical forests, similar in kind if not in degree. Temperate forests, particularly northern boreal forests, also are slow growing (often at 1m³ per ha per year or less). The species composition is far less complex than in tropical forests. Nevertheless, temperate forests also generate a diverse range of outputs, benefits, and responsibilities. The range includes timber and nontimber forest products, the collective benefits and responsibilities of watershed protection and water management, recreational opportunities, and biodiversity.

Forest tenure, forest management, and administration issues in temperate forest countries are less complex than in tropical countries, although similar in nature. Thus, there are useful lessons to be learned from the experiences with forest concessions and forest management in temperate as well as in tropical countries.

Forest agencies in temperate developed countries also have faced budgetary pressures over the last two decades, although admittedly much less severe than in developing countries. The former also have had to curtail forest management, monitoring, and inspection. However, as a result, they have developed innovative approaches to deal with the pressures.

**Key Concessions Issues**

The nature of tropical and temperate natural forests and the diversity of their outputs, benefits, and beneficiaries lie behind many issues, but particularly in respect of the first issue—public or private ownership and management of forests.

**Issue 1. Public or Private Forest Ownership and Management**

Developing countries in particular face difficulties in the regulation, control, and supervision of public forest lands. Supervision and monitoring of public forests by government forest services is difficult. With cutbacks in the government sector, some have argued for deregulation of forestry and the transfer of tenure and forestry responsibilities to the private sector. However, the privatization of tropical forests or forest land is not likely to be successful for two reasons. First, tropical natural forests have too many nonmarket, environmental, and nontimber public benefits. Therefore, deregulation or privatization is not an efficient solution. Private owners would ignore these nontimber and environmental benefits because they would not be able to capture and collect revenue from them.
Privatization is appropriate only for fast-growing forest plantations that produce few non-timber, environmental, and biodiversity benefits.

Second, the slow growth rates of most tropical natural forests mean that the growth rates in volume and value of the timber are too low to make sustainable forestry financially viable for private sector firms. Private sector firms can earn more by practicing “liquidation” forestry and investing the proceeds elsewhere (Pearce and others 1999).

Therefore, public ownership is necessary for the sustainable management of natural tropical forests. Governments can either undertake forest management responsibilities or contract out forest management, either within strengthened forest concessions contracts, or as separate forest management contracts, provided that forest harvesting generates sufficient revenues to fund these forest management contracts. There are ways to maintain public control of forest concessions while contracting out to the private sector, or to an independent government organization, certain forestry activities. These activities could include harvesting operations as well as regulatory functions, or services such as forest inventory, log measuring and grading, inspection of concessions, forest nursery operations, tree planting, and other forest management operations. To avoid collusion and ensure independence, the activities contracted out still will need to be supervised and monitored for performance. This monitoring and supervision can be delegated or contracted out, using the revenues from forest contracts.

Concessions performance can be audited by independent organizations or autonomous inspection services. Greater use can be made of performance incentives, both positive and negative, including such things as refundable performance bonds, which are refunded at the end of each management plan upon demonstration of satisfactory performance.

For natural tropical forests, there are opportunities to strengthen forest concession contracts and procedures, to support forest management with economic incentives, to encourage or require concessionaires to undertake forest management activities, and to put forest management and concession management on a more businesslike footing. A number of proposed improvements are discussed below.

**Issue 2. Nontimber and Environmental Values**

Natural forests, both tropical and temperate produce a diverse set of outputs and values. Outputs such as commercial timber are marketable and are harvested by forest companies. These values are more easily measured.

Other outputs—nontimber products such as fuelwood, rubber, fruits, game, nuts, herbs, medicines, fodder, and a great number of other nontimber forest products—commonly are gathered by forest dwellers and people from communities in or adjacent to the forest. These nontimber forest products may be marketed or kept for family use. For this reasons, values of most nontimber forest products are difficult to estimate.

Still other outputs that provide benefits to individuals, such as recreation, hunting, and tourism, are not easily marketed, and thus are much more difficult to value. Other outputs generate collective, public, or community benefits, some of which go beyond local effects to provide benefits nationally or internationally. These include watershed effects of water supply, erosion control, flood control, and water quality benefits, biodiversity, climate effects, and carbon sequestering. These outputs are even more challenging to measure and to value.

Nontimber values can vary greatly by forest type and location. Unlike timber values, which are realized only at harvest time, nontimber values are annual and continuing. Thus,
small continuing annual nontimber values often can equal or exceed timber values. Non-timber benefits, which add to the value of the forest, make it easier to justify forest management, but they also make forest management complex for multiple outputs.

Forest concession legislation and concession agreements in most countries, tropical and temperate, are based on timber production, and concession agreements are operated primarily for timber production. Under these concession agreements, concessionaires are given little or no incentive to manage the forest for nontimber forest products, or for the environmental values. As a result, these other forest outputs and uses often are ignored by concessionaires and potential forest values lost.

The challenges then are to redesign concessions agreements to incorporate nontimber forest products and environmental values, to require concessionaires to manage the forest for nontimber and environmental values, and to provide incentives (both positive and negative) for concessionaires to manage the forest for these values. Suggestions for the redesign of concessions agreements and of forest management requirements and procedures, performance incentives, penalties, supervision, and inspection procedures are presented in chapter 4.

Issue 3. Local Community Forest Uses and Benefits

Forest communities and forest dwellers are primary producers and users of nontimber forest products, such as fuelwood, foods, medicinal plants, bamboos, and rattans. They also are primary users and beneficiaries of many environmental services, such as wildlife, watershed benefits, and biodiversity. Thus, the issues for forest communities parallel those of nontimber and environmental values.

Because most forest concessions agreements in the past have focused on timber production, concessions agreements have ignored forest uses by forest dwellers and forest communities. As a result, concessionaires have had little incentive to manage forests to benefit local communities or forest dwellers. In addition, forest communities often derive little benefit, employment, or revenues from forest concessions. Suggestions for the redesign of concessions agreements, forest management requirements and procedures to ensure community forest uses and to increase community benefits from forest concessions are proposed in chapter 4. There also are opportunities for community forest concessions, producing timber, nontimber forest products, and other forest outputs, including, for example, ecotourism.

Issue 4. Length of Concession Agreement

In many tropical countries, the short length of concession tenure is often identified as a reason for the unwillingness of the concessionaires to manage the forest and to practice sustainable forest management (FORM Ecological Consultants and Delvingt 2000).

It is commonly argued that longer, more secure concession tenures would provide the required incentive for sustainable forest management. Yet, long-term leases may not be the answer for slow-growing tropical forests producing nonmarket benefits. Under long-term tenures or under privatization of the forest, concessionaires may continue to liquidate, rather than manage, slow-growing tropical forests (Boscolo and Vincent 2000; Gray 1994; Pearce and others 1999; Vincent 1990; Walker and Smith 1999). In an empirical test simulating concessionaire behavior, Boscolo and Vincent (2000) also demonstrate that longer-term concessions give loggers little incentive to adopt reduced-impact logging.

Where growth rates of tropical forests, in volume and value, are low—below rates of return on other investments—concessionaires will have no incentive to manage the forests, even
under long-term, or secure, tenure. Given the slow growth rates of most tropical natural forests—well below private sector rates of return—long-term tenures or privatization cannot provide sufficient incentive for concessionaires to practice sustained-yield forestry. Concessionaires will liquidate the forests and invest the proceeds elsewhere at a higher rate of return.

In practice, under the slow growth rates of tropical forests, short-term tenures may result in better forest management performance. Evidence from Indonesia indicates that short-term tenures, renewable upon forest management performance have provided a much stronger incentive for forest management than have long-term tenures (Gray and Hadi 1989, 1990).

Thus, a more appropriate form of tenure for slow-growing tropical or temperate natural forests might be a concession contract of 15 to 20 years, renewable at 5 to 10-year intervals and subject to inspection and performance evaluation of the concession. This is the type of tenure offered under forest management licenses in several Canadian provinces (Ross 1995). To ensure impartiality, inspections could be carried out by an independent agency funded by forest fees that reflect timber values and better collection of fees, as proposed below.

Boscolo and Vincent (2000) also demonstrate that performance-based renewal conditions provide a powerful incentive for reduced-impact logging, compliance with minimum-diameter cutting limits, and better forest management, even under short-term concession agreements.

Long-term leases can have another disadvantage. Under a long-term lease, if the concessionaire mismanages the forest, it can be difficult to cancel the concession without litigation and/or compensation. If the concession is granted under a short-term or renewable contract (renewable subject to performance), it will be easier simply not to renew the concession for nonperformance. However, if long-term concessions are renewable based on performance, then sustainable forestry may be achieved under long-term concessions, provided performance can be and is properly monitored.

**Issue 5. Concession Size**

Forest concessions can vary enormously in size among countries as well as within countries; the difference can be anything from a few hundred to tens of thousands of ha (Grut, Gray, and Egli 1991). In some countries, concessions are too small to support viable silviculture, logging, and transport units. More often, concessions are too large, often well beyond the needs of concessionaires (see box 3 on concessions size and ownership).

Concessionaires often acquire large forest areas, more for future insurance purposes or speculation than for regular timber supplies. Large areas of forest are locked up, and public forest resources lie idle. The acquisition of large concessions areas can leave concessionaires with excess timber. Large concessions and excess timber supply provide little incentive to use the timber efficiently or to practice more intensive forest management. This excess timber supply encourages wasteful logging, creaming or high-grading, that is, taking only the best trees.

Large concessions with excess timber supply also are especially prone to deforestation by agricultural incursion or shifting cultivators. With excess forest area, concessionaires have little incentive to control encroachment.

The acquisition of large concessions, beyond the company's needs is encouraged by low forest fees and, in many countries, by low or negligible area-based fees on concessions. With low, negligible, or nonexistent annual area-based fees, there is little or no cost to acquiring and holding large concession areas, and little or no incentive to relinquish excess area.
Forest Concession Policies and Revenue Systems

Box 3 Forest concession size and ownership

The distribution of concessions size and ownership in most countries is highly skewed toward a few large concessions holding large areas of forest and many smaller concessions, and toward concentration of ownership.

In Cameroon, the 10 largest concessions owners held 50 percent of the area, the 25 largest held 75 percent of the area. The largest concessions holding was 650,000 ha (World Resources Institute 2000b).

In Gabon, the 12 largest concessions owners, 5 percent of the owners, held half of the concession area, equal to 21 percent of Gabon’s total forest cover. The remaining 209 concessions owners held the rest. The largest holding was 699,000 ha (World Resources Institute 2000a).

In Indonesia, of 357 concessions in 1989, covering 58.8 million ha, the top 4 concessions owners held 9.87 million ha, 17 percent of the total concessions area, a high degree of concentration (Gray and Hadi 1989).

In Canada, holdings of timber rights are complicated by the several types of forest tenure and by differences in tenure among the provinces. Several provinces have both area-based and volume-based tenures. Area-based tenures provide rights to timber over a defined area. Volume-based tenures provide rights to a specified volume of timber within the public forest. Thus, the annual allowable cut is the best measure of timber holdings. For example, in British Columbia, the largest forest province, the top 10 forest companies hold 59 percent of the annual allowable cut, a volume of 41.8 million cubic meters per year (World Resources Institute 2000c).

Annual area-based concession fees at a significant level can encourage concessionaires to relinquish excess forest area for allocation to other uses, or as new concessions. Consolidation of small concessions (of less than optimal size) can be encouraged by making concessions transferable. Division of concessions that are larger than the optimal range also can be encouraged. At renewal, concessions that have been operated at less than, say, 75 or 80 percent of their annual allowable cut could be reduced in size. This reduction would free area for reallocation.

Issue 6. Forest Fees and Forest Revenues on Concessions

The forest revenue system, forest fees on timber, and fees on concessions can have a significant effect on forest management and the performance of forest concessions. Low forest fees on timber and on forest concessions are common to developed countries (Grüt, Gray, and Egli 1991; Repetto and Gillis 1988). Few, if any, countries price forests properly and use economic incentives to encourage efficient use and sustainable forest management.

Forest fees and forest revenue issues are discussed in greater detail in Part Two in the chapters on forest revenue mechanism and pricing policies (chapters 5-7). Forest pricing policies to strengthen forest revenue systems, increase fees to reflect forest values, and improve revenue collection are suggested in chapter 8.

Included among the proposals in Part Two is the suggestion that a more significant share of forest revenues be levied through concessions fees. Concessions fees are fees on forest concessions in addition to those levied on the timber harvested and are easier to collect. They could include any or all of the following: (1) an initial concession license fee; (2) an annual concessions fee based on the concessions area, inventory volume, or annual allowable cut; or (3) bonus bidding to pay a premium over basic concessions fees in which concessions are allocated by competitive application and through oral auction or sealed tender.

Concessions fees, properly designed, can serve a number of forest policy objectives. First, concessions fees are much easier to collect than volume-based stumpage fees, based on the measured volume of timber cut. With stumpage fees, forestry departments are dependent
on accurate and correct measurement of the volume of timber cut, which is usually carried cut by the concessionaires. As a result of this and other factors, forestry departments often collect only a small fraction of the stumpage fees due. Concessions fees based, for example, on the area or productivity of the concession are a fixed annual fee, easier to collect, and much less subject to abuse.

Second, concessions fees can reflect the security value of timber supply provided by the concession. This security value is an important and real value to concessions holders: the insurance value of a guaranteed timber supply. Concessions fees can discourage the nonproductive efforts (lobbying, persuasion, influence, or bribery, that is, "rent seeking") invested in obtaining a concession and so channel efforts into more productive activities.

Third, concessions fees can encourage better management of concessions and more intensive forest management within concessions. They also can reduce speculative acquisition of concessions. Low or zero concessions fees provide the wrong incentive. They encourage the acquisition of concessions, make the acquisition of large concession areas cheap, and thus encourage creaming or high grading, that is, taking only the most valuable species or parts of the tree, and leaving the rest as waste.

**Issue 7. Bidding on Concessions and Transparency in Concession Allocation**

Concessions are all too commonly allocated administratively, which invites corruption, bribery, and kickbacks. As a result, persons with little knowledge of the forest industry but much influence are sometimes awarded concessions that they then sell or contract out (World Resources Institute 2000a). Forest values, which should go to the government, as owner of the forest, are thus dissipated in inefficiencies, bribes, and kickbacks.

When there is adequate competition, concessions should preferably be allocated through bidding. Concessions sold by bidding also can provide an indication of what should be charged on concessions when competition is not possible (Gray 1983; Gray and Hadi 1989). Examples of experience with auctioning of concessions are presented in box 4.

It is generally believed that sealed-tender bidding generates higher prices for concessions than open-bid auctions, because the former provide less opportunity for tacit or open collusion among bidders (Bran~man 1996; Crampes and Estache 1997; Gray 1983; Johnson 1979). "Vickery" type auctions, in which the concession is awarded to the highest bidder but at the second highest bid prices, also have been recommended to achieve higher bids by encouraging bidders to declare their true offering prices (Karsenty 2000).

Allocation through bidding, sealed tender, or oral auction has advantages. It avoids the difficult administrative decisions in choosing among competing applicants. It allocates concessions areas to those to whom the timber or concessions are most valuable. Bidding also generates additional revenue for forest owners, be they governments, local communities, or private owners.

Bidding has another advantage. The prices bid for concessions provide a market-based indicator of whether forest fees on the timber harvested are at the right level. If forest fees are low, profits from harvesting timber will be high, concessions financially attractive, and the premiums paid as bonus prices bid for new concession high. On the other hand, if forest fees fully reflect the value of the standing timber on concessions, the bids for concessions will be lower. They will reflect only the value of the security of the timber supply provided by the concessions. Bidding on concessions is discussed further in Part Two in several chapters on forest revenue mechanisms and pricing policies.
Box 4 Experience with auctions and sealed tenders

A few countries in West and Central Africa, Latin America, and South East Asia have experimented with bidding for concessions, introduced auctions, or are planning to do so (Landell-Mills and Ford 1999). Auctions and sealed tenders have been used at various times and to varying degrees in allocating forest concessions in Côte d’Ivoire, the Democratic Republic of the Congo, Ghana, a number of peninsular Malaysian states, Sabah and Sarawak, and Venezuela R.B. (Gillis 1992; Grut, Gray and Egli 1991). Cameroon’s auction experience provides useful lessons for other counties on how and how not to design and operate concession bidding.

In Congo, in the past, bidding was used to allocate concessions in areas opened up for exploitation or for concessions cancelled or returned. Bids were for the annual allowable cut (volume maximum annual) based on per cubic meter bonus bids (Grut, Gray, and Egli 1991). Côte d’Ivoire has experimented with bidding on concessions, and Ghana agreed to introduce bidding in the allocation of new logging concessions (World Bank 1988). Honduras has used auctions in the sale of pine timber under short-term timber sales (Ryburn 1997; Gray and Hägerby 1997).

Cameroon has had uneven success in auctioning concessions, starting in 1997 (Essama-Nssah and Gockowski 2000). This uneven success was the result of uncertainty and confusion over the sale conditions and the government’s commitment to the bidding process, and the government’s failure to fully specify the procedures and conditions and stick to them (Seymour and others 2000). Several of the concessions designated for bidding were allocated through a discretionary process (de gré à gré, meaning “by mutual agreement”). Others were not allocated to the highest bidders, while others appeared to be allocated to individuals of influence (Seymour and others 2000). In total, 16 of the 26 concessions did not go to the highest bidder (Essama-Nssah and Gockowski 2000).

The revenue generated for Cameroon from the auction would have been two-and-a-half times greater if the highest bids had been accepted (World Resources Institute 2000d). The World Bank had hoped that public auctions would increase government revenue and reduce corruption (Essama-Nssah and Gockowski 2000). Under pressure from the Bank to increase transparency and accountability, the government made changes, tightened procedures, and appointed an independent observer (Seymour and others 2000). Cameroon’s auction experience provides useful lessons for other counties on how and how not to design and operate concession bidding.

In the late 1990s, Brazil auctioned a first concession in the Amazon on a second attempt. Largely as a result of the newness of the process and uncertainty on the part of potential bidders, there was only one bidder and the bid was low. Nevertheless Brazil gained experience in the process, and perhaps the advantages of proceeding slowly.

Peru has developed plans to auction managed forest concessions in the Biabo Permanent Forest in the Peruvian Amazon under the auspices of the World Bank and World Wide Fund for Nature Forest Alliance (Toledo 2000). The Biabo Forest project will bring 2.18 million ha under management, including over 1 million ha as protected forest and 631,000 ha managed under the proposed forest concession system. The project includes the design of the proposed bidding and auction system, forest management supervision, inspections and monitoring of procedures and capacities, management of protected areas, and community participation in forest management and monitoring.

Indonesia announced its intention to auction 3 million ha of expired concessions (Reuters 1999). However, to achieve this goal, Indonesia also would have to put in place procedures and conditions for auctions and performance bonds (Seymour and others 2000).

As shown by the examples in box 4, auction procedures need to be under tight control, to ensure that bidding is competitive and that concessions are awarded to the highest bidder, or to the highest ranking bidder when technical competence and other factors are considered. To ensure impartiality, the auction process might be carried out or supervised by an independent organization as auctioneer. This auctioneer might need to be an organization of international standing.

Bidding conditions can be tailored to support a country’s industrial strategy. For example, to prevent large companies from acquiring large areas, concessions could be auctioned in smaller, but manageable, units. To encourage
development of a more competitive and diverse forest industry, small companies without concessions could be given preference in bidding or given the opportunity to match the highest bid.

It is recommended that competitive allocation of concessions be applied first to new concessions in areas of the country in which competition can be expected. Competitive bidding also could be used to reallocate concessions returned, expired, and not renewed; or cancelled for nonperformance, perhaps with existing holders being given the option of matching the winning bids.

**Issue 8. Concession Management Incentives and Performance Incentives**

In most countries, concession agreements do not provide sufficient incentives for forest management, nor do they include measurable performance requirements. Incentives can be used to support the regulation and management of concessions. These can be positive incentives—payments or reduced fees based on performance—or negative—penalties or loss of deposits for nonperformance.

Granting interim concession licenses that are converted to an operating license upon demonstrated performance provides another incentive. It puts the onus on the concessionaire to demonstrate forest management performance rather than requires the forestry department to be continually checking performance.

Concession management also can include greater use of guaranteed performance deposits and refunds upon performance. Performance bonds can serve as a strong incentive for compliance with concession terms and requirements, for performance in concession management, and for adoption of low-impact logging (Boscolo and Vincent 2000). Performance deposits can be required at various stages in the process of concession application, approval, and granting. However, concessionaires would need to be confident of the return of their deposits if deposits and prepayments are to provide incentives for forest management.

The concession renewal provisions at 5- to 10-year intervals, mentioned above, can provide a strong performance incentive for compliance (Boscolo and Vincent 2000).

The level of forest fees and the way they are structured can have important incentive effects on concession performance, logging methods, adoption of low-impact logging, compliance with diameter limits, and use of species. (Gray 1983; Grut, Gray, and Egli 1991; Boscolo and Vincent 2000; Karsenty 2000).

Forest fees and pricing issues are discussed below and summarized in the appendix.

Prepayment will ensure that concessionaires are up to date with payment of their forest fees. Other incentives are introduced in the concession proposals of chapter 4.

**Issue 9. Inspection, Monitoring, and Audit of Forest Management**

In most countries, arrangements for supervision and monitoring of concessions are weak, often close to nonexistent (Grut, Gray, and Egli 1991; Gray and Hägerby 1997; Gautam and others 2000; Essama-Nssah and Gockowski 2000; Seymour and others 2000).

Forestry departments and ministries often are underfunded and ill equipped to supervise and monitor logging activities and forest management on forest concessions. They are understaffed and underequipped and have little field capability for on-the-ground inspection and monitoring (Grut, Gray, and Egli 1991; Hardner and Rice 1999).

Forestry agencies commonly do not have the vehicles or fuel to enable staff to go into the field (box 5). As a result, personnel often are dependent on concessionaires for transportation, accommodation, and support, thus jeopardizing their independence and their ability to supervise and monitor concession operations. In addition, forestry staff often have little
To improve concession management, logging, and forest management of concessions, it is important to strengthen the field capability of forestry agencies. It is important to provide staff with incentives to undertake field work and training in field inspections. It also is important to strengthen the independence of field staff so that they are less

**Box 5 Inadequate field capability**

The number of vehicles does not correctly measure an organization's field capacity. Vehicles do not ensure that inspections are made or concession performance evaluated. Vehicles may not be operational or may be used for other purposes than in field supervision. However, the number of vehicles is a ready measure of potential field capability. Recent data from Cameroon and Gabon illustrate the general lack of resources for field supervision and inspection of forests and forest concessions.

In the late 1980s, as a result of the economic crisis, the Cameroon Ministry of Environment and Forestry was forced to sell most of its vehicles. It only recently (1998) acquired new vehicles. It now has a total of 5 four-wheel-drive vehicles (one in each region), and 28 motorbikes for 793 field agents assigned to forestry monitoring and enforcement, most of whom remain office bound (World Resources Institute 2000b). Maintenance of vehicles and fuel further limits field operations.

In Gabon, the Ministry of Water and Forests has nearly 100 vehicles, a substantial increase from 19 in 1997, but two-thirds of them are in the capital. Only 34 vehicles are available for provincial inspectors (World Resources Institute 2000a).

or no incentive to go the field. In some cases, daily subsistence allowances are not sufficient to cover even the cost of food and accommodation; expenses may not be fully reimbursed; and repayment may be delayed or never materialize. At the other extreme, travel allowances may be paid whether the person visits the field or not, again providing little incentive to go into the field.

Forestry staff in many countries are undertrained and underpaid. Salaries commonly are so low that people must work at other jobs to survive. Salaries are viewed as retainers rather than as payment for performance. Under such circumstances, staff are vulnerable to bribery to approve logging plans, certify logging or forest management performance, or approve log volume measurements and records without field inspection.

**Box 6 Forest certification**

Independent third-party certification is beginning to play a role in monitoring and assessing performance in forest harvesting operations and forest management. Forest certification emerged in the late 1980s. Environmental groups including Friends of the Earth, World Wildlife Fund, and Greenpeace pressured the International Tropical Timber Organization (ITTO) to implement an international system for labeling tropical timber (Kickens 1999). As a result, the ITTO has developed a series of guidelines and criteria for sustainable management of tropical forests (ITTO 1992a, 1992b, 1993). A number of independent third-party international and national monitoring institutions and monitoring systems have been established. These include the Forest Stewardship Council (FSC), FSC Principles and Criteria; International Standards Organization (ISO), ISO140; Pan-European Forest Certification Framework (PEFC); Finland's Forest Certification System (FFCS); Canadian Standards Association (CSA); Brazil's CERFLOR forest certification program; Malaysia's National Timber Certification Council (NTCC); Cameroon's FSC National Working Group; Bolivia's FSC Working Group; and Indonesia's Lembaga Indonesia Ekolabel (LEI) among others (Forest Stewardship Council 1999; World Bank 1999d).

Around 20 million ha (about 0.5 percent of the earth's forests) have been certified worldwide, with most of it in forests already managed in temperate developed countries (Forest Stewardship Council 2000b; World Bank 1999c). Certification systems proliferate. Third-party monitoring and certification is growing rapidly and offering opportunities to strengthen monitoring and inspection of forestry operations and forest management of concessions.
dependent on the concessionaires and less vulnerable to persuasion or bribery.

Contracting out monitoring and supervision to independent (public or private) organizations funded by improvements in forest fees is an alternative to maintaining field staff. To strengthen performance incentives for concessionaires and to provide performance incentives for forest agencies, independent auditing of concession management, logging performance, and forest management is proposed. Forest certification can play a role in independent monitoring and auditing of forest concessions (box 6).
Alternative Forest Tenures: Experiences from Selected Countries

Forest concessions have been the predominant form of forest tenure and the primary mechanism for the allocation and use of forest on public lands in developing countries and in numerous developed countries. However, forest concessions have not been without considerable problems: Johnson and Cabasle 1993, Rice, Gullison, and Reid 1997, Hardner and Rice 1999, some of which have been identified in chapter 2.

Chapter 3 reviews a range of alternative forest tenures on which concessions may be based. They are evaluated in terms of their suitability for sustainable management of slow-growing, natural tropical forests, drawing on the experience of both tropical and temperate forest countries. Forest tenure refers to the rights to the timber but also may include rights to other forest outputs and values.

Some forest tenures may be more appropriate for countries with well-developed forest access and transportation networks, or for countries with a well-developed, technically trained, well-equipped, and capable forest service that has good field capability. Some are more appropriate to plantation forests.

Chapter 4 suggests important changes to forest concession agreements, concession allocation procedures, and forest management requirements. The authors also suggest changes to concession monitoring and supervision procedures to improve forest management; to incorporate nontimber, community, and environmental values; to increase community and national benefits; and to raise forest revenues.
SHORT-TERM TIMBER SALES

Timber Sales of Standing Timber is a form of forest tenure under which the buyer has rights to the trees only, not to the forest land. The tenure rights are for a specific volume of timber, for trees of certain species or diameters, or perhaps for marked trees only. The rights to the timber are for a limited time: the length of the timber sale. Timber sales can be one, two, three, or five years, occasionally longer. Timber sales do not include rights to future crops of timber nor to any guarantee of future timber supply.

Under short-term timber sales, the forest agency retains responsibility for management of the public forest, for surveying boundaries, inventorying, and selling blocks of timber. The forest agency also is responsible for supervising logging, and for regeneration afterwards. This is the traditional timber sale model.

Short-term timber sales commonly are sold in competitive auctions by open auction, oral bidding, or sealed tender. To achieve bid prices that reflect the value of the timber, it is important that the forest service set appropriate “upset prices” (starting prices for the bidding), and encourage adequate competition among bidders (Klein 1998; Elyakime and others 1997).

Timber sales sometimes may be allocated administratively at fixed, volume-based stumpage prices. However, this formula is likely to generate less revenue, and the timber is more likely to be used inefficiently.

Short-term timber sales are well developed and widely used in the United States. They are used by the U.S. Forest Service on National Forests, by the U.S. Bureau of Land Management on BLM forest lands, and by a number of the states on state forest lands. The U.S. Forest Service, Bureau of Land Management, and state forest services have the staff, funding, and field capability to manage public forests and supervise logging operations. And there is usually sufficient competition to ensure bidding and reasonable stumpage price bids.

Short-term timber sales, along with other forms of forest tenure, also are used in several Canadian provinces, including Alberta, British Columbia, Manitoba, and Ontario. In Canada, 90 percent of the productive forest is on public forest land. The provinces and territories are the owners of the public forest lands and are responsible for management of these public forests. Forest tenures and forest management arrangements differ among the 10 provinces and 2 territories (Haley and Luckert 1990; Ross 1995). As well, a number of the provinces have several different types of forest tenures. British Columbia, for instance, has 10 different types of forest tenures, representing many of the alternative tenures discussed here, including a couple of forms of long-term forest concessions.

Canada and many tropical countries have similar forest circumstances and face similar forestry issues. Each has extensive forests of slow-growing trees (although of very different species), physically remote forests, and economic remoteness due to difficulty of access and high transportation costs, and environmental and aboriginal land rights issues. Thus, the experience of Canada and the provinces in forest tenures and forest pricing issues can be useful to many developing countries.

Among developing countries, Malaysia has successfully used short-term timber sales. In the Peninsular Malaysian states, timber is commonly sold under competitive timber sales contracts, achieving a five-to-six-times increase in stumpage revenue. Peninsular Malaysia has a good transportation network and a well-developed, well-staffed, well-trained, field capable forest service. The forest industry of Peninsular Malaysia consists of a number of independent logging companies, and a separate processing industry without a captive timber supply. As a result, competition for logs and timber is well developed (Vincent and others 1997).

In Latin America, Honduras provides another example of timber sales. A system of timber sales has been developed for the pine forests
managed by the State Forest Development Corporation (COHDEFOR) and introduced in 1995 (Gray and Hägerby 1997; Ryburn 1997). Timber sales volumes vary between 2,000 and 8,000 cubic meters, and contracts are of two years duration. The forest road network in Honduras is well developed, better than in many developing countries. The forest administration, COHDEFOR, is staffed and field-capable.

COHDEFOR first does a detailed inventory of a timber sale area, marks the trees to be cut, and makes the plan of operations. A reference price (appraised price) is established by a “market index” appraisal, based on the market price of sawn lumber and its relationship to stumpage price. This market index appraised stumpage price is adjusted to the stand conditions of the timber sale area (volume per ha, stand quality, terrain, log-hauling distance, and road construction costs. See Ryburn 1997). The appraised price serves as the basis for the deposit and as the starting price for bidding. The auction takes place in two stages. Bidding is first by sealed tender. At the auction, the tender envelopes are opened, and the top bid serves as the starting point for the oral auction.

West Africa and South East Asia also have made limited use of timber sales, primarily for plantation timber (Gray 1983; Grut, Gray, and Egli 1991). In Gabon, per-tree timber sales contracts were provided for in the legislation, but the system could not be implemented because the forestry department was not able to mark the trees or control the cutting (Grut, Gray, and Egli 1991).

LONG-TERM TIMBER SALES

Long-term timber sales are similar to the short-term timber sales described above but extend for longer terms of 10 to 20 years. They often require the timber sale holder to undertake forestry activities such as forest planning, road construction, forest management, and reforestation, but otherwise are similar to short-term timber sales. A few examples are found in the United States and among the Canadian provinces. Although there are no developing country examples, long-term timber sales contracts can be an alternative forest tenure for countries with well-developed forest service institutions.

SALE OF FELLED TIMBER AT ROADSIDES OR CENTRAL LOG YARDS

In some countries, instead of selling the standing timber, the forest agency may decide to undertake the logging itself and sell the timber as logs, at roadsides or in central log yards. When the forest agency sells felled timber from public forest lands in these locations, the agency is responsible not only for managing the forest and allocating areas for logging but also for the logging operation. Logging operations can be carried out by the forestry agency itself or by contractors hired by and supervised by the department. When the forest agency sells public timber at a central log yard, it also is responsible for transporting the logs to the central log yard, usually using contract truckers.

Timber sold in these locations usually is sold in lots. It can be sold at set prices, by oral bidding, or by sealed tender auction.

Organizing and supervising logging operations, as well as forest management, requires a very well-developed, field-capable, and well-financed forestry department. If competitive bidding for logs is to be achieved and competitive log prices realized, sale of logs at roadside or in a central log yard also requires a developed forest industry composed of a number of processing plants.

The sale of felled timber at roadside or central log yards is used in several European countries (for example, Finland, Germany, and Sweden) and, to a limited extent, in a few developing countries (for example, Tanzania). In Thailand, before logging was banned, the
government-owned Forest Industries Organization sold logs by public auction (Gray 1983).

As mentioned in the Introduction, Perum Perhutani, an Indonesia state forest enterprise, owns and manages substantial forest plantations, primarily of teak, on the densely populated central islands of Java and Madura. It manages these plantations, carries out logging operations, and operates sawmills and other wood processing plants. It also auctions some of its log production to supply other forest products plants. The strong demand for timber on the densely populated islands of Java and Madura ensures Perum Perhutani high prices for the logs sold.

**Forest Management Licenses**

Forest management licenses are similar to forest concessions. Both are long-term, area-based forest tenures. However, most examples of forest management licenses have much stronger forest management obligations than forest concessions found in developing countries. Countries’ experiences with forest management licenses and problems can provide ideas for other countries in redesigning their forest concessions. For this reason, it may be useful to examine forest management licenses in some detail.

Forest management licenses are the major forest tenure system in Canada. Forest management licenses provide rights to the annual allowable cut of a geographically defined forest area (Ross 1995). These tenure rights are for a specified length of time, commonly 20 to 25 years. They are renewable at regular intervals, following a performance evaluation. The licensee has rights to the volume of timber equal to the annual allowable cut at specified forest fees. The standing timber remains the property of the government, as owner, until approval of the annual cutting plan and logging begins. The specified forest fees can be either the forest fees applied to other tenures, or forest fees established in the license agreement and adjusted by a pre-established formula. In exchange for the security of timber supply without competition, the licensee agrees to undertake forest management and forest renewal activities, either with or without compensation for the costs incurred.

In Canada, forest management licenses in various forms and under different names are the major form of forest tenure in 9 of the 10 provinces (Ross 1995). They are called Tree Farm Licenses in British Columbia, Forest Management Agreements in Alberta, Forest Management Licenses Agreements in Saskatchewan, Forest Management Licenses in Manitoba, Sustainable Forest Licenses in Ontario, Contrat d’Approvisionnement et d’Aménagement Forestier (CAAF) in Quebec, Crown Timber Licenses in New Brunswick and Newfoundland, and License and Management Agreements in Nova Scotia (Ross 1995). The general form of the agreement is similar in all nine provinces, but with significant differences in specific aspects among the provinces.

These long-term, area-based forest tenures share the following major characteristics:

1. They all involve a negotiated agreement between a provincial government and a large forest company.

2. In most cases, agreements are negotiated privately by the minister, at the minister’s discretion, and approved by cabinet. In a few cases, potential areas have been advertised and offers invited (competitive bidding has not been used).

3. Almost always, the agreement is linked to the construction and operation or supply of a major wood processing plant (a pulp or paper mill, large sawmill, plywood or board plant).

4. Most agreements contain renewal provisions, under which they are reviewed at regular intervals and extended by another full term.

5. Tenure holders are granted exclusive rights to harvest timber on the area, within the
limits of the sustained yield, and subject to the restrictions agreed on, at stumpage prices established by the agreement, or at stumpage prices levied on other tenures.

6. Tenure holders are given extensive responsibilities for reforestation and management of the lands for timber production on a sustained yield basis. In some cases, tenure holders are reimbursed for reforestation and forest management costs; in other cases, they are fully responsible for these costs (Ross 1995).

Forest management licenses in most provinces are for a 20- or 25-year period. In almost all provinces, the licensee is subject to a performance review, and the license is renewable periodically, at 5-year intervals in most provinces, 10-year intervals in others. Review and renewal provides a continuing incentive for performance of the required forest management activities. The licensee, who values the security of timber supply, is willing to undertake forest management and regeneration to preserve this security of supply. With satisfactory forest management performance, tenure becomes continuing tenure, almost perpetual. Almost all provinces have provisions to allow withdrawal by the government of up to 5 percent or 10 percent of the area at the review for specific alternative land uses, such as parks or reserves.

Forest management and reforestation expenditures are handled differently among the provinces. In some provinces, companies are reimbursed; in others, they are required to pay for reforestation and forest management. Other features of the forest management license arrangements vary among the eight provinces and provide a rich experience and an opportunity for comparison and evaluation.

The Canadian experience with forest management licenses is far from perfect. The granting of licenses has been by negotiation without an open and competitive process. Forest management licenses have been criticized, among other things, for encouraging deforestation and over cutting, for not incorporating nontimber uses and environmental values in forest management planning or operations, and for ignoring indigenous peoples’ uses of forests (World Resources Institute 2000c).

In spite, or perhaps because, of the failures and criticisms, Canada’s 40 to 50 years of experiences with forest management licenses can provide useful lessons for developing countries. The successes, failures, and imperfections all have something to teach about strengthening existing forest concessions arrangements and designing forest tenure arrangements for sustainable forest management.

**Volume-Based Forest Tenures: Timber Quotas Provide Guarantee of Future Timber Supply**

With volume-based tenures, concessionaires do not have forest tenure rights to any specific area of forest. Instead, volume-based tenures provide a timber quota, giving the right to cut a specified annual volume of timber from larger managed forest, or a specified proportion of the annual allowable cut of the managed forest. The volume-based timber quota can be in terms of a total volume, of certain species (mahogany, coniferous, deciduous), or of types or qualities of timber (sawtimber, pulpwood). Thus, volume-based timber quotas can overlap other forest tenures, sometimes adding complexity and confusion to forest tenures.

Only a few countries have had experiences with volume-based forest tenures. Canada provides a number of examples. Eight of the 10 provinces have had experience with volume-based tenures extending over several decades (Ross 1995). They include British Columbia’s Pulpwood Agreement and Forest License, Alberta’s Timber Quota Certificate, Saskatchewan’s Term Cutting Agreement, Manitoba’s Timber Sale Quota, Ontario’s Forest Resource License, New Brunswick’s Crown Timber Sub-License and Crown Timber Permit, Nova

The names differ and the specific rights, terms, and conditions vary considerably, but they all involve a volume-based guarantee of timber supply. Tenure lengths vary among provinces from 5 to 20 years (25 years for British Columbia's pulpwood agreements). In most provinces, the quotas are for 10 to 20 years. Most of the volume-based agreements are renewable or replaceable but with less certainty than for the area-based tenures. For some of these volume-based tenures, the volume is reduced if the timber quota has not been fully used. The provincial governments retain considerable discretion to modify the terms and conditions at renewal.

Most volume-based agreements are granted within managed public forests on which allowable cuts have been established. However, some volume-based tenures are granted overlapping rights within area-based tenures or other forest tenures. British Columbia's pulpwood agreements cover smaller, pulpwood-sized timber within tree farm licenses or provincial managed public forests (timber supply areas). In New Brunswick, Crown Timber Sub-Licenses are granted within area-based Crown Timber Licenses. In Alberta, Saskatchewan, and Manitoba, when area-based tenures were granted, volume-based quotas were granted to companies that had traditionally logged within the area (Ross 1995).

The forestry department designates a one-to-three-year cutting area permit to each quota holder. These cutting area permits are replaceable to the life of the timber quota agreement. Timber quota agreements therefore can provide the holder with a guaranteed timber supply for 10 to 20 years if all other conditions are met (Ross 1995).

Obligations for forest management and planning and for reforestation vary among the various volume-based tenures. In most provinces, the forest is managed by the provincial forest service. In a few provinces and on some volume-based tenures, timber quota holders are required to undertake forest management planning. Reforestation responsibilities also vary. In most provinces, reforestation is done by the provincial forest service. In other provinces and on some volume-based tenures, timber quota holders are required to reforest. In some cases, timber quota holders pay reforestation fees on the timber cut (Ross 1995).

**GOVERNMENT FOREST ENTERPRISES**

Government forest enterprises—state-owned enterprises that undertake forest business operations to manage public forests—are another tenure arrangement for public forests. Government forest enterprises may be involved in logging operations, or in both logging and processing.

In the present era of privatization and tight government budgets, state forest enterprises may not be politically attractive. Governments may be more interested in selling public enterprises and assets than in investing in improving efficiency and profitability of state enterprises.

State enterprises have been widely criticized as being unprofitable, inefficient, and wasteful. Government enterprises commonly have suffered from overstaffing, lack of a clear mandate and mission, shortage of capital for reinvestment with no authority or ability to raise the capital themselves, and political interference in operational policies, all of which have prevented them from achieving efficiency and profitability.

In cases in which state enterprises have been given a clear, direct mandate, independence from government interference in operations, the ability to raise capital retain and reinvest profits, authority to control staffing levels and to operate independently under strong
management, government enterprises have demonstrated an ability to function efficiently, generate profits, and modernize.

Where state forest enterprises have a clear mandate and independence and are properly capitalized, they may be better equipped than private sector companies to manage tropical forests on a long-run sustainable basis. State forest enterprises are likely to have a longer-term time horizon than private sector companies and to operate with a lower discount rate in evaluating long-term investments.

They still will need to be given the right performance incentives if they are to manage tropical forests sustainably. State forest enterprises should still pay stumpage and other forest fees for the timber. If they pay no fees, they will treat the timber as a free good and use it inefficiently and wastefully.

There are a variety of examples of state forest enterprises. Some manage public forests only. Others operate forest concessions and logging operations. Still others operate concessions and logging and processing facilities such as sawmills and plywood plants.

For example, in Honduras, COHDEFOR is responsible for the planning and management of the pine forests and the organization and auction of timber sales contracts to private sector logging firms, as described above under timber sales tenures (Gray and Hagerby 1997).

In Indonesia, five state forest enterprises (Inhutani I, II, III, IV, and V) own and operate forest concessions in the outer islands. These concessions are among the largest in the country. Indonesia's largest forest concession is owned by Inhutani I. It also has logging operations and operates processing facilities, including sawmills and plywood plants. Although the performance and forest management of Indonesian concessionaires generally has been poor (Gray 1989 and 1996), the concessions operated by the state forest enterprises are reputedly among the better managed, and the profitability of their forestry, logging, and processing operations are comparable to those of private sector forest companies.

Perum Perhutani auctions some of its log production to supply other forest products plants. It also processes timber and nonwood forest products from the plantations and markets the goods produced. In addition, it is involved in a variety of social forestry activities, social services, and training to improve village life in villages adjacent to the forest plantations. It is a profitable enterprise, resulting in part from its high-value teak plantations and the strong demand for timber on the densely populated islands of Java and Madura.

In the Peninsular Malaysian states, a number of state-owned forest enterprises operate forest concessions along with wood processing facilities. However, these state forest enterprises reportedly have not been particularly efficient compared to the private sector forest companies. However, the Sabah Foundation, in Sabah, Malaysia, has done well. It is a unique and autonomous state institution that owns and operates the largest forest concession in the state, an 850,000-ha concession with a 100-year term.

State forest enterprises operate forest concessions in a number of other countries. Most have not been particularly efficient or profitable in their operations, nor outstanding in forest management practices. However, their performance may be attributed to general problems of interference, overstaffing, undercapitalization, and shortage of funds for reinvestment. Undercapitalization and shortage of investment funds imposes an extremely short planning horizon on state enterprises, thus inhibiting sustainable forest management.

A number of developing countries and a few developed countries also can draw on experience with state enterprises in other natural resource fields, such as mining, petroleum, and fisheries. State enterprises in these fields have been used to capture the value of public resources (the economic rent) for the country,
control the rate of development, and manage the resources.

**Privatization of the Forest but Not the Land**

Privatization of the forest excluding the land involves the sale of the existing forest crop and future crops for a specified time period, for one or more additional rotations, or perhaps forever. New Zealand adopted this policy to sell its exotic plantation forests, primarily radiata pine (*Pinus radiata*) (Hall 1995). The plantations were sold in lots, by sealed tenders, and under international bidding. The sale was for the existing crop of trees, plus the land-use rights to grow a second forest crop on a 35-year rotation schedule or for other purposes. Bids were for an initial payment with no additional fees on timber harvested. Had it not been for the legal challenge of Maori land claims, the New Zealand government might have sold the land as well. In spite of high expectations, the initial auction was not very successful. In the first round auction, held in July 1990, most sealed bids were rejected as too low. Only two bids, covering 15 percent of the forest area advertised, were accepted by the government. The government then moved to sell the remainder by negotiation.

Privatization of forests can be appropriate for fast-growing plantation forests but not for natural tropical forests that grow slowly and generate additional nontimber benefits. New Zealand chose to privatize its plantation forests but not its natural forests (Hall 1995). Plantation forests involve large initial capital investments. Security of tenure is required to allow recovery of the investment. Plantations produce primarily market outputs of wood or other products. Nontimber outputs and nonmarket environmental values are usually much less than in natural tropical forests. For plantation forests, these nontimber and nonmarket values can be protected by contract clauses, easements, or by separate land-use legislation.

**Privatization of Public Forests and Forest Lands**

Because forest concessions have been so disappointing in so many countries (Grut, Gray, and Egli 1991), and with the current fashion for privatization, some countries have come to see privatization of public forests and forest lands as a good alternative to granting forest concessions. The last decade has seen increased private sector participation in the forestry sector, in forest ownership, forest use, and forest management (Landell-Mills and Ford 1999). Here the authors examine the trend to private sector ownership of forests and forest lands. The restructuring of forest management and forest agencies through contracting out, corporatization, and privatization of forest management, supervision, inspection, and auditing is discussed in chapter 4.

Privatization of forest lands may be entirely appropriate for forest plantations on forest land planted to fast-growing, short-rotation species (Hall 1995). The financial return from fast-growing plantations for pulp and paper can equal the return from alternative investments, and forest plantations produce far fewer nonmarketable forest outputs, collective public benefits, and beneficial externalities.

Privatization of forests and forest lands is the approach taken by the British Forestry Commission in selling a portion of the Commission's forest plantations from 1981 until 1997 when a temporary moratorium on privatization was introduced (Landell-Mills and Ford 1999). It also is the approach taken by Chile in the sale of its forest plantations and, more recently, of its natural forests.

However, privatization of tropical natural forests is likely to be a serious and irreversible mistake (Gray 1997a). First, as suggested above,
the rate of growth in tropical forests is too slow to make sustainable management attractive to private sector investors. Private sector investors are more likely to practice liquidation forestry, that is, mining the forest for its timber and reinvesting the proceeds where they can earn a higher return (Walker and Smith 1993).

Private management of forests will be financially profitable only if the growth rate in value of the forest biomass (the volume of the residual stand after logging) is greater than the rate of return the concessionaire can earn elsewhere (Gray 1994). If the growth rate in value is less than the rate of return the concessionaire can earn elsewhere, the private investor’s financial choice will be to liquidate the forest, taking all salable trees and abandoning the residual stand to fate or nature. Growth rates of physical biomass of 1 percent to 3 percent per year, combined with the growth in real value per cubic meter of 1 percent to 2 percent per year (relative to other prices and inflation as a result of increasing scarcity of timber), would yield a combined growth in value estimates of from 2 percent to 5 percent per year. This is well below the opportunity cost rates of return on alternative investments for concessionaires in most developing countries.

Second, as explained earlier, tropical forests provide a wide range of nonmarketed forest products, collective benefits, and beneficial externalities: nontimber forest products, watershed, erosion control, ecotourism and recreation, and biodiversity. These important nonmarketed outputs and values benefit individuals, communities, the country, and the world, but generate little or no monetary return to private owners.

**Joint Ventures and Partnerships with Private Sector Corporations**

Joint ventures or partnerships between the government or a state enterprise and private sector corporations to management and operate public forests are another tenure alternative for public forests. Joint ventures have been used to attract the capital, corporate management skills, forest management expertise, and product marketing connections to develop public forests. Under the joint venture arrangements, the government commonly contributes the forest resources; the private sector partner the capital, management, and marketing. The government hopes to capture a proportion of the value of the timber (the economic rent) as its share of the profits of the joint venture.

Joint venture arrangements have some advantages but also important cautions and significant dangers. The advantages are the opportunity to harness the strengths of each partner: the finance, business management, forest management, and marketing skills of the private sector company, and the public forest resource assets of the government.

Nevertheless, joint venture arrangements carry dangers. The government cannot be a silent partner. It must have the necessary financial and business management expertise and forestry management expertise to be an equal partner, to oversee and evaluate the operations of the joint venture. Without these skills, the government could be merely signing a blank check.

Transfer pricing presents a danger to government participation in joint ventures. Through transfer pricing, the private sector partner can sell the joint venture machinery and equipment, materials and other inputs, or various types of management or marketing services at prices above market prices, thereby transferring profits to the subsidiary that provides the goods or services. Similarly, by selling the logs or processed products to another company or a marketing subsidiary at prices below market prices, the private sector partner can transfer profit to the other company, and perhaps out of the country. Inappropriate
transfer pricing and other problems are hard to detect without expert knowledge of the company and the industry.

Joint venture forest enterprises should not preclude the government from setting forest fees at an appropriate level to reflect timber values. The government should not depend on its share of the joint venture profits to capture the value of the timber harvested. Because the government receives only a proportion of joint venture profits, it would receive only a proportion of the value of the timber. In addition, if joint ventures pay no forest fees, they will treat the timber as a free good and use it inefficiently and wastefully.

A number of developing and some developed countries have had experience with joint ventures in the forest sector as well as in other natural resource sectors, particularly in mining, petroleum and fisheries.
Handing over forest management responsibilities to private sector forest concessions companies has not worked well in the past and has not been very successful in achieving sustainable management of tropical forests (Grut, Gray, and Egli 1991; Gray and Hadi 1990; Johnson and Cabarle 1993; Hardner and Rice 1999; Salim and Ullsten 1999). Nevertheless, these experiences with forest concessions and the problems encountered with them provide important lessons and the basis for strengthening concessions policies, procedures, and requirements.

There are opportunities to make forest concessions management more effective and more environmentally sustainable. Chapter 4 suggests changes to concessions agreements and procedures to control logging and environmental damage and to strengthen and improve the management and operation of forest concessions. It outlines steps for the allocation, supervision, and monitoring to improve forest concessions, along with suggestions for strengthening the forest revenue system on concessions.

**Concession Contract Objectives**

Concession contract objectives will be based on the country’s forest policy objectives (Clawson 1975). They can be categorized in several ways, but the present authors have followed Hardner and Rice (1999), grouping the contract objectives into two broad sets: conservation and economic development.
Conservation objectives can be divided into environmental objectives and forestry objectives. Environmental objectives include maintaining forest cover, maintaining wetlands, protecting watershed, controlling erosion, protecting habitat, and maintaining biological diversity (Hardner and Rice 1999). These two sets of conservation objectives are embraced in the two management plans outlined below: the environmental management plan and the forest management plan.

Economic development objectives can be divided into economic efficiency and equity objectives. Economic efficiency involves efficient use of resources (efficient use of inputs and efficient production of outputs) and efficient investment (of inputs and outputs over time), administrative efficiency (administrative costs to government and compliance costs for concessionaires), and efficient pricing of the resources to reflect their values and to generate revenues.

Equity objectives involve equitable access to resources, and equity in the distribution of the benefits and costs, economic impacts, and social effects. Together, the objectives provide a holistic framework.

These contract objectives can be listed hierarchically:

**Conservation Objectives**

**Environmental objectives**
- Maintenance of forest cover
- Maintenance of wetlands
- Watershed protection
- Erosion control
- Habitat protection
- Maintenance of biological diversity

**Forestry objective**
- Sustainable forest management

**Economic Development Objectives**

**Economic efficiency objectives**
- Efficient use of forest resources (efficient use of inputs and efficient production of outputs)
- Efficient investment (of inputs and outputs over time)
- Administrative efficiency (administrative costs to government and compliance costs for concessionaires)
- Efficient pricing of resources to reflect values and generate revenues

**Equity objectives**
- Equitable access to resources
- Equity in the distribution of the benefits and costs, economic impacts, and social effects.

It should be recognized these objectives are not wholly independent of each other (Clawson 1975). They are interrelated. In some cases, the objectives may be complementary and supportive; in other cases, conflicting. For example a concessions contract that achieves efficient use of the forest resources may not provide equity in the distribution of the benefits, or it may not achieve efficient pricing and generate revenues.

**Principles of Forest Concession Contract Design**

To achieve the objectives identified in the previous section, the concessions allocation and management procedures need to be carefully specified, clear, and detailed, as do the concessions holder's rights and obligations and the government's responsibilities. All these procedures, rights, and obligations need to be practical, easily verified, and clearly laid out in law and in regulations. Clarity and precision of the
concessions conditions will maximize the value of the forest, the return to the government, the value of the concession to the industry, and its contribution to the economic development of the region and the country.

The concessionaire also needs security of the terms and conditions in order to invest and to carry out the forest management obligations. Security of concessions terms and conditions will enable the government to obtain higher bids and forest fees for concessions.

To provide flexibility in concessions agreements to accommodate changing forestry, environmental, and economic circumstances, there must also be a process for negotiating changes in the concessions contract and a process for making changes in the regulations governing concessions.

**DEVELOPING CONCESSION PROCEDURES**

Most countries already have concessions procedures, although in many cases the procedures focus more on process than demonstrable and measurable performance; and they often fall short on implementation and supervision of performance. The concessions procedures proposed here are intended to strengthen and extend the existing procedures. They also focus on implementation, performance, and on on-the-ground concessions monitoring and supervision. The key to success is introducing the proper incentives in the concessions agreements and forest management requirements, and following through on monitoring and supervision.

The forest concessions procedures proposed involve, first, the allocation of concessions contracts by bidding or other competitive allocation; followed by the management of the concession by the concessionaire; and supervising, monitoring, and auditing concessions operations by the government or by an independent organization.

To implement a policy of allocating lands to forest management concessions, countries still need to build the capacity to carry out the concessions policies proposed. To do this, they need to evaluate potential concessionaires, carry out auctions of concessions, negotiate with powerful and experienced forest companies, and carry out the monitoring and supervision of forestry and logging activities on concessions, or delegate monitoring and supervision to an independent organization. Guyana, for example, put a moratorium on granting new concessions and sought foreign assistance to strengthen its ability to negotiate concessions and to monitor and control concessions performance (Sizer 1996).

The concessions allocation and management procedures described below draw on several sources. The sources include the ITTO Guidelines (1992a and 1992b) and the experience and publications of the United Nations Food and Agriculture Organization. In addition, the authors have looked at the recent, extensive work on criteria for forest management and forest certification and their indicators. On a regional basis, they have looked at the experiences and problems faced by Cameroon, the Congo countries, Côte d'Ivoire, Gabon, and Ghana in West and Central Africa; by Cambodia, Indonesia, Malaysia, and Papua New Guinea in Southeast Asia; by Bolivia, Brazil. Guyana, Honduras, Nicaragua, Peru, and Suriname in Latin America; and among developed countries, the experience of Canadian provinces with forest concessions and short-term timber sales (Armitage 1998; Gray 1983; FAO 1992, 1997a, 1997b, 1998a, 1998b; Grut, Gray, and Egli 1991; Gray and Hadi 1989 and 1990; Gray and Hägerby 1997; ITTO 1992 and 1993; Sizer 1996; Sizer and Rice 1995).

The specific steps and procedures, outlined below, are drawn from a report on strengthening concessions procedures in Nicaragua (Gray and Hägerby 1997) and a workshop paper presented in Rio de Janeiro (Gray
These steps and procedures are designed to radically improve present concessions procedures. They are designed as practical steps to strengthen the protection of the forest estate and to achieve sustainable forest management. Once implemented, they could provide the basis for certification of forest management and of forest products.

The planning process has been comprehensive and is very similar to that proposed below. The success of the Biabo Project will hinge on the implementation of the process and procedures, and on the effectiveness of the supervision, monitoring, and control of forest concessions and the protected areas. These are the weak links in the planning and implementation process. They will be key to the success or failure of the project.

Each step should be established with limits specifying maximum or minimum times for completion and procedures to be followed if the time limits cannot be met. These procedures are designed for application to state lands. The conditions and procedures, with some modification, could be used by communities, or by groups of private forest owners, to manage forest concessions on community or private lands. The steps are outlined and summarized here.

**Concession Allocation Procedures**

**Step 1. Ensure That the Area Is Not Encumbered by Other Land-Ownership or Land-Use Restrictions**

An important first step before proceeding is to ensure that land claims are settled and that tenure rights to both the land and the timber are clear. If land tenures and forest tenures are not settled or are unclear, granting forest concessions should be delayed until tenure issues are settled.

It also is important to ensure that the area is not covered by land-use restrictions, such as...
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As for biological or other reserves, that would preclude timber harvesting and forest management. This should be clarified early, before proceeding.

**Step 2. Initiate Proposed Forest Management Concessions**

In many countries, the initiative for concessions has come from the applicant, with the applicant choosing the area applied for. In this scenario, the better forest areas for timber production all will be taken first, leaving the government responsible for managing the remaining patchwork of less attractive forest areas.

It is recommended that the government take the lead and identify areas for potential concessions. The government would then invite expressions of interest in these areas for subsequent tendering. This scenario puts the initiative in the hands of the government. The government can then choose the forest areas to be managed under concessions in line with regional and national development objectives, rather than following private industry’s objectives. It also enables the government to achieve competition and bidding for concession areas and thus achieve higher bids.

This approach does not require the government agency to make the forest inventory although it could do so. Interested parties would have to satisfy themselves of the quantity, species, and quality of the timber in the area offered. A government forest inventory would reduce uncertainty for interested parties, saving each bidder the expense of an inventory, and hopefully resulting in higher bids. However, in this case the government would have to finance the forest inventory. The government could either carry out the inventory itself, or contract it out to a reliable, independent private sector forestry consulting company. In the example of the Biabo Forest Management Pilot Project in Peru (box 7), the government agency responsible for the project financed the forest inventory (field work, office analysis, and preparation of the final inventory results).

**Step 3. Advertise the Areas and Invite Expressions of Interest**

Once land and forest tenure rights are settled and the area defined, the next step is to invite expressions of interest from potential concessionaires. The potential concession would be advertised in major forest industry trade journals in Asia, Central and South America, Europe, and North America. Interested parties would be invited to indicate their interest and submit information for prequalification of bidders.

The bid conditions, concessions management requirements, and other terms and conditions of the forest concession would be made available at this time to provide prospective bidders with knowledge of what is expected of them.

Minimum prequalification requirements would be established and indicated in the announcement. A deadline of perhaps two to three months would be given to submit the prequalification materials.

**Step 4. Prequalify Bidders**

Information to be submitted for qualification would include company financial and ownership information, information on subsidiary and related companies, information on operations in the country and in other countries, annual reports to shareholders and audited statements for the past three years, and preliminary information on proposed operations in relation to the concession. More detailed information would be required of qualified bidders as part of their tender.

**Step 5. Approve Qualified Bidders**

It is suggested that the agency responsible for forest administration have a limited time to evaluate the prequalification materials and
notify qualified bidders. Two to three months might be sufficient, less if possible. The evaluation of prequalification need not slow the concession process. In the meantime, potential bidders could examine the concession area and prepare their bids.

Approval of qualified bidders would be based on the financial strength of the companies and their experience in forest management, logging, and processing operations elsewhere. National companies might be favored in qualification, by means of preferential qualification conditions or concession sizes adjusted to match the capacities of national bidders.

Qualified bidders would be announced. No appeals should be allowed by those who did not qualify. Appeals would only slow and complicate the allocation process.

**Step 6. Allow Time for Bidders to Evaluate the Area and Timber and Prepare Proposals**

Qualified bidders would be eligible to inspect the site and undertake a low-intensity reconnaissance inventory to satisfy themselves of the quantity and quality of the timber.

Two or more qualified bidders might wish to jointly fund and undertake a reconnaissance inventory. Bidders would be required to submit the details of their inventory, methods, and results along with their bids.

From the initial advertising of the area, seriously interested companies would have had time to evaluate the area and timber and prepare their proposals. However, additional time should be allowed to develop proposals. Perhaps three to five months would be sufficient additional time depending on the forest area, access, weather, and other conditions.

**Step 7. Submit Bids**

The deadline for receiving bids would have to be strictly observed to avoid any appeals or legal challenges.

It is recommended that concession bidding be by sealed tender. For transparency, tenders should be opened publicly. It is suggested that bidding be based on bonus bids to pay a premium over the basic contract fees. Bonuses would be in addition to the normal volume-based stumpage prices on the timber cut, area fees, and other charges. The bonus bids would consist of two components: (1) an annual bonus payment per ha on the concession, and (2) a lump-sum bonus paid upon signing the contract in addition to the standard initial concession fee. Bonus bidding has been much used in a few countries and situations as described above. It presents an impartial way of choosing among competing proposals that can avoid administrative choice and the potential for bribery and corruption.

Other nonmonetary components of the bid to be considered in comparing bids might include the proposed forest use plan, the degree of processing proposed, the employment generated, the community development proposals, and the environmental management proposals. If nonmonetary aspects are to be considered in evaluating bids, they need to be spelled out as part of step 3, along with their importance or ranking.

**Step 8. Select Winning Bid**

With prequalification of bidders, all bidders should have the necessary experience and abilities to carry out the concession management obligation. If all proposals meet the previously established concession conditions, the decision should then be based primarily, or exclusively, on the financial terms of the proposals, in which case choosing the winning bid should be easy.

If the bids contain additional proposals on use, economic development of the area, or social or environmental proposals beyond those in the previously established concession conditions, it would be necessary to compare the
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Financial and nonfinancial proposals: However, these conditions would make it difficult to compare competing bids objectively. It is therefore suggested that only in cases in which the bonus bids were equal, or within, say 5 percent to 10 percent of each other would the nonmonetary proposals in the bid be considered.

If it is desirable to give preference to national companies (such as those with majority, two-thirds, or higher national ownership), the nature and extent of the preference should be stated in the initial announcement of the concession area and in the request for bids.

**Step 9. Sign Concession Contract**

The forest management concession contract conditions are described in detail in the next section. The contract would cover the concessionaire's rights and obligations; along with the conditions for the management and operation of the commercial forest lands within the concession and for the protection and management of nontimber producing areas within the concession.

The contract conditions should follow a standardized form, with special conditions, rights, and obligations that apply to the area in question in a separate appendix. Separate appendixes would cover the boundary description, special forest management requirements, and special management conditions of environmental areas within the concession.

**Forest Management Concession Contract: Terms and Implementation**

To be effective, the forest management concession contract must provide certainty of rights and obligations for the concession holder. The contract performance conditions need to be specified with clear, staged steps and include strong incentives for the concessionaire to comply with the management obligations.

The concession contract performance conditions are summarized below in sequential steps. Contract conditions should emphasize performance on the ground, focusing on the design of conditions that can be monitored and verified rather than emphasizing "on-paper" plans, that often are just that—only on paper! The suggested key contract performance steps follow.

**Step 1. Mark Boundary**

Clear and permanent on-the-ground definition of the concession boundary is a vital and practical first step to forest management. It is crucial to maintaining the integrity of the forest and to protecting the area from incursions. It is an essential first step to mapping and inventory of the forest and other nonforest resources to be managed under the concession agreement. It is not possible to define the area for sustainable forest management, nor to derive a meaningful annual allowable cut, without first defining and delimiting the forest to be managed. Marking concession boundary lines by cutting and clearing them on the ground should be the responsibility of the concessionaire, with inspection by the forestry department.

In many countries, concession boundaries have not been marked, sometimes for years after the concession has been granted. In Indonesia, by the 1990s—20 years after the concessions had been granted—the boundaries of many concessions still had not been marked, (Gray and Hadi, 1989). In some cases, concessions had been granted with overlapping boundaries, none of them marked. Similar problems of boundary marking have occurred in Africa (Grut, Gray, and Egli 1991).

To provide an incentive for completion, permanent boundary marking should be completed and inspected by a designated date, not more than 18 months after the signing of the concession contract. Concession boundaries adjacent to the initial cutting area should be
completed, inspected, and approved before logging is allowed to begin.

Step 2. Map Concession Area

Mapping the concession area is a closely related and important second prerequisite for a reliable forest inventory and management plan. Mapping should include the physical features of the entire concession area, both forested and nonforest areas. Mapping also should show the nontimber, environmental, cultural, and heritage features of the concession area. Mapping also should be the responsibility of the concessionaire, but inspected and verified by the forestry department.

Deadlines would be provided for mapping each section of the concession and for completing the entire area. Logging operations would not be approved until mapping is completed over at least the initial operating area of the concession.

Step 3. Control Access

An important condition for sustainable forestry is maintaining the integrity of the forest estate by protecting the area from incursion and being converted into poor quality, marginal, agricultural and grazing land. To prevent agricultural incursion, the concession holder should be required to control access.

Only persons or communities with already established residency within the concession area would be allowed free access. New settlement would be excluded. Agricultural development should be allowed only in limited areas adjacent to existing settlements, and then only by established residents of the area.

Step 4. Inventory Forest and Environment

The forest inventory should be completed before full-scale harvesting is approved. An interim operational plan could be approved for an initial operating area, provided the forest inventory for that area has been completed and an interim management plan approved. To provide an incentive for completing the overall forest inventory and management plan, this interim operating plan and the interim management plan would be valid for only a 12 to 14-month period and not extendable.

Illustrative forest inventory guidelines are provided by the Food and Agriculture Organization (FAO 1992).

In addition to the forest inventory, an environmental inventory would be required. Concessionaires would be expected to protect and manage the entire area and its other resources, including areas outside the designated forest operating area.

Deadlines would be set for the start and completion of both the forest inventory and the environmental inventory. Interim deadlines also could be set for completion of both inventories for the initial operating area.

Step 5. Develop Forest Management Plan and Environmental Management Plan

The value of the nontimber products of natural tropical forests often equals that of the timber production. These products cover a wide range. They include not only foods and fruits, medicinal plants, and wildlife but also subsistence livelihood for forest dwelling peoples, watershed and environmental protection and erosion control, biodiversity values, and environmental tourism. Nevertheless, it is timber production that is usually dominant in forest management. Timber production generates the bulk of forest revenues earned by governments and landowners. It provides the basis on which to finance the protection of the forest and the management for the other nontimber forest products and benefits. However, as a result, important nontimber forest products and benefits may be neglected. The management of forest concessions therefore must generate a balance
between timber production and the other, non-
timber forest outputs and benefits. For this rea-
son, both a forest management plan and an
environmental management plan are called for.

The forest management plan would detail the
silvicultural methods to be followed and
procedures for implementing low-impact log-
ing on the ground.

The environmental management plan would
parallel the forest management plan. The
environmental management plan would differ
from the usual environmental impact assess-
ment (EIA), a snapshot that documents the en-
vironmental resources at the moment and the
anticipated impacts of a development propos-
al. Instead, the environmental management
plan focuses on the ongoing protection and
management of environmental resources (in-
cluding cultural and heritage resources) within
the concession boundaries.

For production forests, that is, forests des-
ignated for production of timber and other for-
est products, the management plan will provide
firm guidelines on the annual yields, by spe-
cies, that can be cut for forest products, from
which areas, and under which harvesting meth-
ods. For protection forests, that is, forests des-
ignated for erosion control, protection of
watersheds, biodiversity, recreation, environ-
mental tourism, amenity values, and other
nontimber uses and products, the forest man-
gagement plan and the environmental manage-
ment plan together would regulate timber
production to sustain these other nontimber
uses.

Requiring forest management plans will
not lead to successful implementation of forest
management on the ground. Nor will approval
of forest management plans lead to the imple-
mentation of forest management. Implementa-
tion of forest management depends on a firm
commitment by the government and the con-
cessionaire to allocate the necessary funds,
personnel, and other resources to execute the
management plan as well as to supervise and
monitor it over its lifetime. Thus, the imple-
mentation, supervision, and monitoring of the for-
est and environmental management plans may
to be dependent on strengthening the forest
revenue system.

The forest management plan and the
environmental management plan would be
approved by the government agency respon-
sible for the administration of forest conces-
sions. However, if the agency does not have
the staff, resources, and field capability to
evaluate the management plans, it may be
necessary to contract out the evaluation of
the management plans to an independent or-
ganization or private sector consulting firm.
To ensure its independence, the organization
or consulting firm may have to be recruited
internationally, drawing on the forest reve-
 nue sources.

Step 6. Plan Road

Road planning is important from both an envi-
ronmental and a cost point of view. Poor road
location and layout can cause serious envi-
ronmental damage, erosion problems, and stream
damage, as well as raise costs for both log trans-
portation and road maintenance.

The initial road plan would provide the
location of the main road system, and the
planned location of main branch roads, accom-
panied by an overall map and detailed maps
showing the location of the main roads and the
main branch roads.

The road plan would include road specifi-
cations on right-of-ways, roadbed, stream cross-
ings, bridges and culverts, ditching, surface
materials, and the level and frequency of main-
tenance and repair. The road plan also would
detail environmental conditions determining
location of stream crossing, minimum distance
of roads from streams, and treatment of embank-
ments and cuts to control erosion. The road plan
would include conditions for gravel pits and
prohibit gravel removal from streams.
The road plan would be approved by the agency responsible for administration of forest concessions prior to construction. Again, if the agency does not have the capability to evaluate the road plan, evaluation may be contracted out to an independent organization or consulting firm.

**Step 7. Develop Forest Utilization Plan**

Where the forest concession is tied to wood processing facilities, a forest utilization plan would be required. The utilization plan would be based on the forest inventory and forest management plan. As well, it would be based on the species composition, sizes, and quality (including defects) of the timber supply. These, together with the volume of timber available, will determine the size and design of processing plants. All too often, processing plants are built before the forest inventory is completed, or are based on an inadequate forest inventory. The result is a processing plant that is inappropriate for the timber supply, inefficient, of high cost, and unprofitable, wastes the forest resource, and contributes little to the economy.

The processing plant can have an important impact on the development of communities and the region. Thus, the utilization plan is closely linked to the concession social development plan.

The location of processing facilities and the nature, size, and employment involved are important parts of the concession agreement. Any changes in the location, nature, or size of the processing facilities also should require approval.

The concession contract should contain commitments by the concession owner on the size, capacity, start, and completion of construction, and start of plant operations. Any deviation from these commitments should require approval.

For each processing plant, the forest utilization's plan should specify:

- Physical location of each plant
- Capacity, per shift, of each subunit, number of shifts planned per week, operating period (days/year, and weeks/year), and capacity at maximum possible operating level
- Employment per shift of each subunit, person-hours to be worked per week and per year based on the planned operating schedule and at maximum possible operating level
- Description of facilities and equipment for each subunit
- Schedule of construction, start-up, and full operation of the processing plants as subunits
- Outline of future modifications, improvements, and expansions.

The utilization plan would require approval by the agency responsible for administration of forest concessions prior to construction. If the agency does not have the capability for evaluation, it may be necessary to contract out the evaluation to an independent organization or consulting firm.

**Step 8. Create Social and Community Development Plan**

The community and social development plan should document commitments on the part of the concessionaire to community and social development. This plan should document:

- Local community uses within the concession area for timber use, fuelwood, nontimber forest products, hunting, agricultural land uses, and other traditional land uses within the area
- Access rights and access control of others
- Community support for schools, health clinics, transportation
- Local employment commitments and nature of any local employment preferences
- Training commitments.

This plan, also, would require approval by the agency responsible for administration of forest concessions.
Step 9. Develop Initial Annual Operating Area Plan

The initial operating area plan should include the following components, which are key to forest management and can be readily monitored on the ground:

Logging plan layout on the ground. Careful on-the-ground layout of roads, log landings at which trees and logs are assembled for transportation by truck or other means, and skid roads for moving the trees and logs to the roadside log landings is key to efficient and environmentally appropriate low-impact logging. It is probably one of the most important practical steps to achieving environmentally improved sustainable forest management of uneven aged tropical forests. On-the-ground logging plan layout allows directional falling and skidding that will minimize damage to the residual stand.

On-the-ground layout of the logging plan (roads, landings, and skid roads) also can benefit the concession owner by lowering logging costs, reducing damage to felled trees, and improving recovery of the residual forest. Proper layout of roads on the ground can facilitate road construction, reduce environmental damage, reduce erosion, reduce road maintenance problems, and lower log transportation costs. On-the-ground layout of landings can avoid wet locations and reduce skidding distance. On-the-ground layout of skid roads can make it easier to fell trees in the right direction to facilitate skidding and reduce damage to felled trees and to the residual stand. All of these steps will reduce logging cost and benefit the concessionaire, creating a simple and practical "win-win" situation.

Approval would require on the ground inspection and verification, which, like the other steps, is funded from the improvements in the forest revenue system suggested in Part Two. If the agency responsible for administration of forest concessions does not have the resources to undertake on-the-ground inspection and verification of logging plans, it may be necessary to contract out the inspection to a fully independent organization or private sector firm.

Marking trees. Where the marking of individual trees for cutting is required, it is recommended that the concession operator, rather than the forestry department, be responsible for marking the trees to be cut. In this way, marking trees for cutting can be better integrated with forest operations and not hold up logging. It is recommended that marking be carried out after the roads, skid roads, and landings are laid out on the ground. The concessions administration agency staff can then inspect and approve both the tree-marking and the logging plan layout at the same time by on-the-ground inspection.

Supervising, Monitoring, and Auditing Concession Operations

On-the-ground supervision and monitoring of performance of these concessions management steps is essential to ensure compliance, minimize corruption, and achieve sustainable management of forest concessions. Regular reporting by concessionaires on implementation of each of the concession management steps above is the first stage in supervising and monitoring forest management on concessions. Contreras-Hermosilla (2001) surveys the issues involved in forest law compliance and provides practical solutions for reducing illegal activities and minimizing corrupt practices.

A practical approach to monitoring is regular monitoring of key operational indicators. For example, control of logging activities is often key to minimizing logging damage and to achieving sustainable management of tropical natural forests (box 8). On-the-ground inspection of forest boundaries, proper layout of roads and inspection of road plans, on-the-ground inspection of logging plan layout and tree-marking, and on-the-ground inspection of
Box 8  Detection probabilities and logging performance

Walker and Smith (1993) used representative data from Indonesia and a decision model of logger or concessionaire behavior to analyze the effect of different levels of inspection and detection probabilities on contract performance. With the logging costs, prices, revenues, and forest conditions used, they show that with zero probabilities of detection, *...* loggers are always motivated to employ liquidation harvesting ... and to employ liquidation harvesting practices throughout the entire length of the contract." Liquidation harvesting is taking all merchantable trees without regard to the future growth of the forest, and this is exactly what one would expect, both from experience and from observation. However, Walker and Smith also demonstrate that *...* partial inspection policies ... may in many cases be quite cost effective." For low discount rates (interest costs paid or rates of return earned on investments elsewhere), detection rates of 3 percent to 6 percent can be sufficient to deter liquidation logging. At a higher discount rate of 15 percent, to deter liquidation logging, detection probabilities would need to exceed 20 percent. Thus, the intensity of inspection and detection needs to rise as the logger’s discount rate (interest costs paid or rates of return earned on investments elsewhere) increases.

logged areas following logging are key monitoring indicators.

If the agency is not equipped, staffed, and financed to inspect concessions on the ground, the alternative is to contract out the on-the-ground inspections to private sector firms of reliable reputation and impartiality, with the capability and trained staff to carry out the work accurately and conscientiously. It may be necessary or appropriate to contract internationally with forestry inspections firms.

If countries are to achieve sustainable forest management on forest concessions or on other forest lands, a way must be found to fund and implement on-the-ground inspection and supervision of concessions. Improvements in the forest revenue system proposed in Part Two can generate the funds to finance on-the-ground inspection and supervision of forest concessions. Unless field inspection capabilities are strengthened, granting further concessions can be dangerous.

On-the-ground inspection of forest boundaries, proper layout of roads and inspection of road plans, on-the-ground inspection of logging plan layout and tree-marking, and on-the-ground inspection of logged areas following logging are key monitoring indicators.

**Boundary marking.** Boundary marking is a key first step in managing forest concessions and in preventing agricultural incursions. Performance in completing boundary marking can be monitored relatively easily. As boundaries are required to be clearly defined, they can be effectively checked from the air by small aircraft at low levels. Boundary marking should be completed and checked within the time limits specified in the concession contract and before logging operations begin.

**Boundary maintenance.** It is important that concession boundaries be maintained and kept clearly defined. Monitoring boundary maintenance also is relatively easy. Boundary maintenance can be monitored by spot checks at predetermined intervals, every two or three years, by ground spot checks of different sections of the boundaries, or relatively quickly by inspection from light aircraft.

**Mapping, forest inventory, and environmental inventory.** Evaluation of the accuracy of the forest and environmental inventories is important. It is not easy. The accuracy of mapping can be monitored by randomly checking selected areas on the ground against the map, but even this will be expensive and time consuming. The forest inventory can be checked in the same way, by re-measuring randomly selected inventory sample plots and by checking forest types from the forest inventory maps against the forest types found on the ground.

The environmental inventory can be checked
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by selective comparison of the environmental inventory data against the environmental conditions on the ground.

Checking of these inventories can be expensive and time-consuming. However, strategically selected spot checks can be done relatively cheaply. Government agencies frequently will not have the capacity for on-the-ground checking. In this case, it may be necessary to hire an independent organization to carry out spot checks of the forest inventory.

Forest management plans and environmental management plans. Forest and environmental management plans can be evaluated against the requirements and standards specified in the concession regulations and in the concession contract. However, these would be office- or paper-based evaluations. Without on-the-ground checking, there is no guarantee that the management plans match conditions on the ground.

Road planning and construction. Well-designed road systems and proper road construction will contribute to an efficient logging system, reduce logging and log transport costs, and minimize the environmental impacts of logging. These known effects should provide concessionaires with an incentive for efficient road planning and construction. However, in practice, under very short-term horizons, concessionaires often put little effort into road planning and construction. The result is inefficient road layout, expensive log transportation, and environmental damage from poor road layout.

Monitoring road planning can be done relatively easily by evaluating the road plans and accompanying maps to ensure that adequate road standards are specified, that roads are located away from streams, and that stream crossings, culverts, and ditches meet environmental standards and minimize environmental impacts. On-the-ground checks can quickly verify the accuracy of the plans and maps.

Road location and construction also should be monitored on the ground, soon after construction and before logging begins, to ensure that the road layout matches the layout on the road plan and maps, and to correct any problems early. Inspection of roads shortly after construction should be relatively easy because access then is easy. For efficiency, road inspection can be combined with on-the-ground inspection of the logging plan and inspection of the tree-marking. It is important that the on-the-ground inspection of road layout, the logging plan, and tree-marking be done and approved before logging begins.

On-the-ground logging plan layout and tree-marking. On-the-ground layout of landings and skid roads is a key step in the regeneration of the forest and sustainable forestry. On-the-ground layout of skid roads can dramatically reduce logging damage to the residual stand. Logging plan layout also can reduce logging costs.

Where tree-marking is required, inspection and approval of logging plan layout and tree-marking can be done together and should be done before logging begins. On-the-ground inspection of logging plan layout and tree-marking are key to monitoring performance and ensuring sustainable forest management.

The agency responsible for administration of forest concessions may not have the resources or field capability to undertake on-the-ground inspection and verification of road plans and construction, logging plans, and tree-marking. Again, these activities might be contracted out.

Post-harvest inspection of the cutting area. The cutting area should be inspected on the ground again following logging to ensure that:

- Logging was done according to the silvicultural plan
- Logging was done in line with environmental requirements and with minimum damage to the residual stand
- Only marked trees were cut
- Logs and felled trees are not left
- Trees that should be cut are harvested. This is another important step in ensuring sustainable forest management.
Other areas for supervision, inspection, and auditing. The other areas for supervising, inspecting, and auditing forest concessions include:

- Forest security and protection
- Silvicultural management and reforestation
- Community development
- Continuous forest inventory

Review and Extension of Concession License

As demonstrated above, long-term secure tenure is not sufficient to provide an incentive for managing a concession sustainably. Long-term tenure without renewal conditions (or privatization of forests) would likely result in high-grading and mining the forest, leading to rapid depletion and abandonment of forest lands (Boscolo and Vincent 2000). Boscolo and Vincent also demonstrate that performance-based renewal conditions provide a strong incentive for loggers to comply with performance conditions. Combined with performance bonds, renewal conditions provide very powerful performance incentives.

Thus, sustainable forest management may be better achieved if concessions are issued for limited terms and are renewable, subject to audit and satisfactory performance review as proposed. The performance review provides the incentive for concessionaires to manage the forests sustainably for both the timber and non-timber environmental benefits.

It is suggested that the concession term be relatively short, perhaps 10 to 12 years. In addition, an interim review might be considered, perhaps in the fifth or sixth year, with a full performance review in the tenth year, two years before the final year (year 12). To ensure an unbiased and independent review, it is suggested that the performance evaluation (or audit) be carried out by an external, internationally recognized consulting firm or forestry organization. The performance review can serve as the basis for forest certification once these forest and concession management procedures are in place.

If the performance evaluation meets the conditions of the concession agreement, the concession would be extended for an additional 10-year period (that is, to year 22). A second interim review in the fifteenth year may be considered. If the full performance review in the twentieth year is satisfactory, the concession would be renewed for an additional 10 years.

The concession contract should allow for changes to the concession area and boundaries, within defined limits, and for renegotiation of the terms and conditions to accommodate changes in circumstances on either side. The concession agreement should contain procedures for renegotiation of changes.
PART TWO

FOREST REVENUE AND PRICING POLICIES
Structure of Forest Prices

In many developing countries forest revenues and forest fees often are well below the value of the timber and of the forests. In addition, they often are avoided or not properly collected, as noted in chapter 2, Issue 6 (Repetto and Gillis 1988; Gillis 1992; Salim and Ullsten 1999). Stumpage prices, royalties, export taxes, and other volume-based forest fees, which are the major forest revenue source in most developing countries, not only are low but also are difficult to administer and collect. They are subject to widespread avoidance and abuse through corruption, side payments, and illegal logging. As a result of these problems, timber is cheap and is frequently wasted. There is little incentive to harvest timber efficiently or use the forest sustainably. In addition, forest fees often are incorrectly structured (Gray 1983; Repetto and Gillis 1988; Grut, Gray, and Egli 1991; Gray 1996; Karsenty 2000).

Appropriate Forest Pricing Policies

These forest revenue problems can be corrected by more appropriate forest pricing policies for timber, forest concessions, and other forest tenures, along with better forest fee collection and enforcement. Forest pricing policies should ensure that forest fees reflect both the value of the timber and the opportunity costs involved in its harvest, including market and nonmarket values. This means that forest fees on timber cut should reflect the value to loggers and processing plants, allowing reasonable but not excess profits. Low forest fees for forest concessions generate
the potential for excess profits. These potential profits in turn encourage wasteful and disruptive lobbying efforts, bribery, and corrupt practices by those seeking to obtain concessions, an excess demand for concessions, overexpansion of concessions, and an overexpansion of logging, which can lead to increased deforestation.

There is scope for greater use of, and emphasis on, area-based fees on forest concessions and other forest tenures to collect a greater share of forest revenue. Area-based fees on forest concessions and other forest tenures are easier to administer than fees based on measured volumes of wood and are less subject to avoidance and abuse. So far, they are not widely used and thus generate little forest revenue: only 1 percent or 2 percent of total forest revenues in most countries. However, area-based fees can be too low, making it cheap to hold forest concessions. This encourages acquisition of large timber concessions, logging of extensive areas, high-grading or creaming of the forests, and widespread forest depletion (Grut, Gray, and Egli 1991). Concession fees that reflect the value of the concession put a scarcity price on holding excess concession area and encourage better use of the timber and more intensive forest management on concessions.

In addition, forest revenue systems should include a minimum level of forest fees on timber and forest concessions. Very few countries have minimum forest fees. In the countries that do have minimum forest fees, they often are so low that they are inconsequential. Minimum forest fees should be designed to reflect the nonmarket value of the forest for the environmental and nontimber benefits, the opportunity cost value of the timber (the environmental and nonmarket values lost in harvesting the timber). Minimum forest fees that reflect these values will prevent timber and concessions from being essentially given away.

In these ways, better designed forest revenue systems can contribute to and support improved forest management and administration (Gray 1997a). Appropriate forest pricing policies can contribute to the biological and economic sustainability of tropical forest resources by deterring overexploitation, and providing economic incentives to use timber more efficiently.

Higher forest fees also can make forest management financially sustainable. Higher forest fees and improved collection rates can provide funds to manage, protect, and regenerate the forest, and help finance the strengthening of forestry administration and revenue collection systems.

Finally, if tropical forests become more valuable and generate more revenue, they will generate greater interest in their maintenance and conservation. Financially sustainable forests will become financially and politically worth preserving.

**Basis for Forest Fees: Values of Timber and Concessions**

Forest fees break down into timber values and concession values.

**Timber Values**

Stumpage value is the value of the standing timber for marketable wood products (logs, lumber, plywood, pulpwood, fuelwood, poles). Stumpage values, or economic rents, are the price a willing buyer would pay for the standing timber, the price that would prevail in a competitive market of many buyers and sellers and free of distortions (Gray 1983; Landell-Mills and Ford 1999).

Stumpage values can be derived from the market price of the logs or forest products produced. Where there is a competitive log market, stumpage values are derived from log prices.
minus logging and transport costs (including a normal return on logging investments). Lacking a competitive log market, stumpage values can be derived from prices of processed forest products (sawnwood or other products), minus (a) logging and log transportation costs and (b) the costs of processing (including a normal return on logging and processing investments).

These derived stumpage values approximately reflect the value of the timber. Stumpage values will be captured either (a) as forest revenues (stumpage prices, fees, or taxes) by the owner of the timber rights (landowner, government, community or traditional owner), or (b) as above-normal (extra) profits collected by the forest industry. If stumpage prices, fees, or taxes are low, a large share of stumpage values will be captured by the forest industry as above-normal profits. However, these profits will not necessarily show up in high profit levels of the forest industry or a high rate of return by the industry. Profits may be dissipated in industry inefficiency or overexpansion; they may be transferred out of the country through transfer pricing (as discussed); or they may become capitalized into the value of the company.

**Concession Values**

Timber concessions and other forest tenures also have a value in addition to the stumpage value of standing timber (Gray 1983). Forest concessions or other forest tenures provide a guaranteed, secure supply of timber to the concessionaire or tenure holder. This security of timber supply represents a value created by the government upon granting the concession or other tenure. Hence, timber rights and forest concessions can become corporate assets and often are sold or traded, either as part of the company, or separately.

Concession values can be captured by separate concession fees, that is, fees on forest concessions in addition to fees on the timber harvested (initial concession fees, annual area-based concession fees, bonus bidding on concessions). Concession fees have a number of forest management and environmental advantages discussed below.
Forest Revenues and Pricing in Tropical Forests

The following sections survey the forest revenue experience of selected tropical countries in West and Central Africa, and in Southeast Asia, including among them some of the major tropical timber-producing countries.

Forest Revenues in West and Central Africa

A 1991 study of forest revenue and systems and concessions management in West and Central Africa found that, in countries throughout the region, forest revenue systems generated low forest revenues (Grut, Gray, and Egli 1991). In the study, individual country case studies, low forest revenues resulted from a combination of low levels of forest fees and weak revenue collection. Over the last 10 years, forest revenue systems in several of these countries have been strengthened, but progress has been disappointing, slow.

In the 1991 forest revenue case study of Cameroon, total forest revenues (the total of both area- and volume-based fees) were only 2 percent to 4 percent of log prices, well below the estimated stumpage value of the timber (Grut, Gray, and Egli 1991). An earlier study that surveyed forest policies in several African countries in the 1980s also found forest revenues to be consistently low in almost all the countries of the region (Gillis 1988b). The earlier study also found forest revenues to be a declining share of both log prices and stumpage values from the 1970s through the mid-1980s.
In Guinea, a 1989 World Bank forestry report found forest fees were less than 1 percent of the local price of the sawnwood produced (Harou 1989; World Bank 1989). A 1990 World Bank report on Côte d'Ivoire found that forest fees represented about 0.5 percent of the freight-on-board (FOB) price of logs (World Bank 1990).

In Ghana, a 1988 study found that total forest revenues collected were less than 0.5 percent of the delivered price of logs at processing plants. Forest revenues collected were only one-sixth of the revenues that should have been collected (World Bank 1988). Ghana subsequently raised forest fees and tightened collection, but a more recent study found forest royalties still collected only US$4–5 million, less than 4 percent to 5 percent of the stumpage value (economic rent) of the timber harvested (Sargent and Kotey 1993). Forest revenues were sufficient to finance only half of the cost of forest management, making forest management financially unsustainable (Sargent and Kotey 1993).

A very early, but well done, study in Ghana derived stumpage values (economic rents) of standing timber, and then compared forest revenues to these stumpage values (Page, Pearson, and Leland 1976). Stumpage values averaged 26 percent of log prices. Forest revenues collected represented 38 percent of stumpage value, and about 10 percent of log prices (26% \times \frac{38}{100} = 9.88\%). The forest industry therefore appropriated 62 percent of stumpage values as extra (above-normal) profits. Thus, between the mid-1970s and the mid-1990s, forest revenue collection declined from a 10-percent share of log prices to 4 percent to 5 percent of log prices. The reasons are several, complex, and endemic. Forest legislation that was slow to change; interest group pressures resisting legislative changes and revisions to forest fees; an underpaid, underfunded, and understaffed forestry department without field inspection capacity all provided the climate for under-measuring and under-reporting of timber harvested, and for cheating, bribery, and corruption.

Subsequently, a number of West and Central Africa countries have restructured their forest revenue systems and raised forest fees. However, many countries have not had the resources to implement the changes. In addition, forest industry interests have pressured governments, weakening the changes and delaying implementation (Essama-Nssah and Gockowski 2000; Seymour and others 2000).

In Cameroon, forest fees were raised under the 1994 forest law. Forest revenues rose 2½ times—an increase from 10 billion CFA francs in 1990 to 24 billion CFA francs in 1997 (Seymour and others 2000). However, wood production also rose, from 2 to 3 million cubic meters over the same period, so that the effective increase in forest fees was only about 80 percent (Seymour and others 2000). Forest revenues amounted to only 3.3 percent of government revenues, while the forest sector accounted for 8.9 percent of the monetary economy (in terms of GDP) (Essama-Nssah and Gockowski 2000).

Area fees in Cameroon were raised substantially between 1994 and 1999 (Essama-Nssah and Gockowski 2000). Yet in 1997, area fees still generated only 3 percent of forest revenue (World Resources Institute 2000b). Over the same period, stumpage fees were reduced from 5 percent to 2.5 percent of the valeur mercuriale reference price (subsequently changed to FOB prices), and export taxes (the major source of forest revenue) reduced to 17.5 percent on logs and 3 percent to 4 percent on processed wood (Essama-Nssah and Gockowski 2000). Apart from the level and structure of forest fees, forest revenue recovery and collection remain a major problem in Cameroon (Essama-Nssah and Gockowski 2000; Seymour and others 2000).
Gabon, where forest fees have not changed in 25 years, generates substantially less revenue from its forests than Cameroon (box 9).

Gabon's forest revenue system is illustrative of the forest revenue system in many countries and of the problems faced by many countries. Gabon's forest revenue system is complex and difficult to administer and collects little revenue.

**Box 9 Gabon: Forest revenue system in need of change**

In Gabon, forest fees have not changed for 25 years. Thus, in real terms, they have declined steadily. There are up to 25 different forest fees, making the revenue system complex and difficult to administer and collection difficult to monitor. Forest policy reform began in 1996. A new forest law was drafted and submitted to the national assembly in 1998. However, by the end of 1999, it had not been passed.

Initial fees on concessions are very modest and therefore generate little revenue. They include an exploration tax, a transfer tax, and a repurchase tax. Area fees on concessions vary by forest zone, and vary between 4 and 20 CFA francs per ha per year (US$0.006 to US$0.003 per ha per year). They generate only 0.3 percent of forest revenue. Other fees on concessions include allocation tax (a volume-based fee), a timber-marking tax, and a reforestation fee (applied only to exported wood).

Processed wood pays a sawing tax of 200 CFA francs per cubic meter (US$0.30 per cubic meter) on sawnwood, or a veneer and plywood tax of 400 CFA francs per cubic meter (US$0.60 per cubic meter).

Export taxes are the major forest fee. They account for 88 percent of Gabon's forest revenue. Export taxes are 11 percent of the FOB price on logs, and 5 percent of the FOB price on processed wood products. In addition, there is a port tax of 545 CFA francs per cubic meter (US$0.90 per cubic meter), and a treasury tax of 0.2 percent of the export taxes and duties.

**Forest Revenues in Southeast Asia**

Most countries in Southeast Asia also collect only a small share of stumpage values as forest revenues (Gray 1983). Sabah, Malaysia, is one exception.

**Forest Revenues in Malaysia**

The forest revenue system of Sabah, Malaysia has been more effective than that of most other jurisdictions and more effective than the forest revenue systems of other Malaysian states (Gillis 1988a; Vincent 1990). Until recently, Sabah's timber royalty was set by a formula based on average export log prices. The formula incorporated an "industry operating cost" allowance designed to reflect logging costs plus a return on the capital invested (Gray 1983; Kumar 1986; Gillis 1988a; Gray and Hadi 1990). Royalty rates were established by formula for 10 log classes and recalculated every 3 months.

Based on stumpage value calculations for 1979 through 1982, Gillis estimated that Sabah's forest revenue system collected 78 percent of the stumpage value (economic rent) of timber. Using somewhat higher estimates of stumpage values, Vincent estimated that Sabah collected between 42 percent and 60 percent of potential stumpage values in forest revenues between 1966 and 1985. Even with these higher estimated stumpage values, Sabah still collected a much higher proportion of stumpage values than other jurisdictions in Southeast Asia.

Gillis and Vincent both found the forest revenue systems of Sarawak and Peninsula Malaysian States to be less effective than Sabah's in collecting forest revenues. Gillis found that in the 1980s, for similar logs, Sarawak's royalty system collected less than one-third of that collected by Sabah's royalty system. Vincent estimated that, between 1966 and 1985,
Sarawak collected 16 percent to 30 percent, and Peninsular Malaysian States 18 percent to 42 percent of the potential stumpage values. This was about half the proportion collected by Sabah. These studies and their results are now somewhat dated. Royalty systems and royalty rates in each jurisdiction have since been revised.

In addition to timber royalties and other forest fees, the Peninsular Malaysian States now auction timber under short-term forest concessions. These auctions have generated bonus bids of 5 to 6 times legislated forest fees, and up to US$16,000 per ha (Vincent, personal communication).

**Indonesia Forest Revenues**

Recently, Indonesia has shown interest in improving its forest revenue system and revenue collection (Gautam and others 2000; Seymour and others 2000). In the past, Indonesia’s forest revenue system has been heavily criticized for not reflecting stumpage values, not capturing the substantial economic rents involved, and therefore not collecting sufficient forest revenues (Repetto and Gillis 1988). Changes began in the late 1980s and accelerated in the 1990s. Forest fees, which had remained relatively unchanged from 1980 through 1988, were raised by US$3.00 per cubic meter (roughly

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**Box 10 Indonesia: Stumpage values and forest fees**

In the 1990s, several studies estimated Indonesian stumpage values and the share of stumpage value collected by forest revenues, and calculated the efficiency of forest revenue collection. The results of these seven studies are presented in table 1. Results of a number of these studies were presented and discussed at a 1992 seminar on forest revenues held in Jakarta: Aspek Ekonomi Pengusahaan Hutan (Seminar on Economic Aspects of Forest Revenues). The estimates of stumpage values collected by the government as forest

**Box table 1 Indonesia: Estimates of stumpage values (economic rents) and forest revenue shares, 1990–1993**

<table>
<thead>
<tr>
<th>Stumpage value (economic rent) (US$/m$^3$)</th>
<th>Share of stumpage value collected</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>By government—</td>
</tr>
<tr>
<td></td>
<td>as forest revenue (%)</td>
</tr>
<tr>
<td>APHI—Association of Indonesian Forest Concession Holders (1992)</td>
<td>21</td>
</tr>
<tr>
<td>Tim Dep-Hut—  average of five provinces (1992)</td>
<td>—</td>
</tr>
<tr>
<td>Sutopo and Darusman—  Riau Province (1992)</td>
<td>48</td>
</tr>
<tr>
<td>Gray and Hadi (1990)—  Meranti species, easy to moderate terrain</td>
<td>52</td>
</tr>
<tr>
<td>Reid Collins (1993)</td>
<td>40–45</td>
</tr>
<tr>
<td>WAHLI Wahana Lingkungan Hidup Indonesia Environmental NGO (1992)</td>
<td>—</td>
</tr>
</tbody>
</table>

— = Not available.

*Note: Data from Jaakko Poyry and Reid Collins represent country averages; all other data are for specific locations or species.*

*Sources: All references in table except Reid Collins are sourced to Darusman 1992; Reid Collins and Pt. Citra Teknik Nasional Sejati 1993.*
revenues ranged from a low of 17 percent in a study by WAHLI (Wahana Lingkungan Hidup Indonesia), an environmental NGO, to a high of 84 percent in a study commissioned by APHI (Assosiasi Pengurus Hutan Indonesia), the Association of Indonesian Forest Concession Holders. Estimates from the other studies ranged from a low of 19 percent to a high of 51 percent of stumpage values collected as forest revenues. Most of the other studies suggested that between 25 percent and 35 percent of stumpage values were collected in forest revenues.

Tim Dep-Hut’s study (Darusman 1992) of five provinces found that forest fees collected an average of only 51 percent of the stumpage value. The study by Sutopo and Darusman (Darusman 1992) based on data for Riau Province estimated that forest revenue collection ranged from 26 percent to 36 percent of stumpage value.

Gray and Hadi (1990) evaluated the stumpage value (economic rent) and the proportion collected in forest revenues for high- and low-valued species, under company and contract logging, and for different logging conditions and terrain. For the major species, under the more general logging conditions, 29 percent of stumpage value was collected in forest revenue. The percentage of stumpage values collected varied from a low of 22 percent for the more valuable species on more accessible, easier-to-log sites, to a high of 75 percent for lower-valued species under more remote and difficult logging conditions (Gray and Hadi 1990). Their calculations also suggested that the royalty structure provides a strong incentive to log the higher-valued (and more profitable) species.

The study by Jaakko Poyry Consultants estimated forest revenue collected at between 19 percent and 33 percent of stumpage values. This was noted in a study by Reid Collins and Pt. Citra Teknik Nasional Sejati (1993) done for the Indonesian Ministry of Forestry. That study estimated that forest revenues collected at between 25 percent and 35 percent of stumpage values.

Much of the variations among the studies in the share of stumpage values collected is explained by differences in the log prices used, and by differences in the logging conditions, logging costs, and species considered and in the provinces studied.

A much earlier study of stumpage values and forest fees in Indonesia was based on detailed company cost data for 1972–1977 from concessions in timber-rich East Kalimantan (Ruzicka 1978, 1979). Ruzicka estimated that, in the mid-1970s, forest revenues captured 25 percent of stumpage values, leaving the timber companies with 75 percent of the stumpage value as additional, above-normal profits. From this it would appear that the share of stumpage value collected by Indonesia in forest revenues changed very little from the mid-1970s through the early 1990s.
Forest Revenues in Cambodia

In 1997, legitimate log production of about 0.45 million cubic meters, generated forest revenues of US$12.4 million for the Cambodian government, approximately US$27 to US$28 per cubic meter (ARD Inc. 1988). About 4 million cubic meters, or 90 percent of forest production, was produced illegally so was not taxed formally by the Cambodian government, a huge loss of potential revenue (ARD Inc. 1998; Ruzicka 1998). Without control of logging activity, sustainable forest management is impossible, and Cambodia’s forests became totally depleted (Global Witness 1999a).

Informal and unofficial, “facilitation payments” and bribes paid on legal and illegal log production to provincial and district authorities amounted to between US$14.50 and US$50.00 per cubic meter. These payments supplement provincial and district authorities’ meager budgets, and the army’s salaries (ARD Inc. 1998; Ruzicka 1998; World Bank 1999b).

Cambodia’s forest revenue system is complex. It includes a least half a dozen charges (box 11). Forest royalties are the major forest fees. Royalties vary by species class. In addition, since 1994, royalties were negotiated for each concession. From 1995 to early 1999, royalties on logs ranged from US$43.50 per cubic meter for grade 1 species to US$14.50 for the fourth grade: the “out of grade” species class. Luxury species paid higher royalties. The schedule of royalty rates on export logs was roughly 50 percent higher, although log exports are banned (Ruzicka 1998).

Royalties on sawnwood were roughly 50 percent higher, from US$63.70 per cubic meter for grade 1 species to US$21.2 per cubic meter for lower-valued species to US$36.00 per cubic meter for luxury species.

Box 11 Cambodia’s forest revenue system: Complexity with weak enforcement

The official forest revenue system is complex. Broadly, it consists of around 10 different categories of charges including the following:

- Royalties: Volume-based royalties are the major forest fee. Royalties vary by species grade (grades 1 to 4, and 3 luxury species groups), as well as between logs and sawnwood, and between export and domestic logs. Royalty rates for export logs are roughly 50 percent higher. The schedule has a total of 21 different rates.
- Different, generally lower, royalties have been negotiated for each concession signed since 1994. Some, but not all, concession agreements specify royalty rates for export logs. Thus, each concession could have up to 21 different royalty rates.
- Because of the complexity of the royalty rates and the weakness of supervision and monitoring, much of the timber officially reported apparently is classified to lower-valued, lower-royalty timber classes.
- Protection and maintenance tax: another volume-based fee payable on timber harvested outside concessions, varying by species group, from US$0.30 per cubic meter for lower-valued species to US$36.00 per cubic meter for luxury species.
- Reforestation tax: yet another volume-based fee on forest concessions. The rates are set separately for each concession, ranging from US$2.00 to US$2.60 per cubic meter.
- River transport levy: a charge on timber transported by raft.
- Service fee: an export license fee set at 1 percent of the FOB reference price.
- Export tax: payable on log and processed forest products exports and set at 10 percent of the FOB reference price.
- Customs and other fees: Minor export fees include an inspection fee of US$0.085 per cubic meter. These fees total about US$9.00 to US$11.00 per cubic meter.

Taxes on other forest products: There is a wide range of fees on other forest products, from fuelwood and charcoal, bamboo, and rattan, to sandalwood oil, elephant tusks, and python skins. However, only a small percentage, perhaps 10 percent to 20 percent of non-timber production is taxed.

or the fourth grade. Again, luxury species royalties were substantially higher (Ruzicka 1998).

Based on figures of the official cut and government forest revenues, it appears that most of the timber reported must have been classified to the lower valued, lower royalty species classes (ARD Inc. 1988; Ruzicka 1998; World Bank 1999b).

In early 1999, the government raised royalty rates to US$54.00 per cubic meter regardless of species or location of the concession; presumably the rates apply to all concessions (Fraser Thomas Partners and Associates 2000).
Few countries price forests properly and employ economic incentives to encourage efficient use and sustainable forest management. Therefore, most countries will derive significant benefits from even modestly improving their forest revenue systems and pricing policies.

**Issue 1. Low Forest Fees and Revenues**

The issues of low forest fees and low revenues were raised in chapter 2. Problems of low forest fees for tropical timber and concessions are common to many developing countries (Gautam 2000; Grut, Gray, and Egli 1991; Repetto and Gillis 1988; World Resources Institute 2000a, 2000b, 2000d).

Forest pricing can be an important conservation tool, supporting and reinforcing the policy objectives of sustainable forestry. Proper forest pricing of timber and concessions can discourage acquisition or retention of large concession areas. Proper pricing can discourage extensive logging activities and creaming extending over large forest areas. In contrast, proper forest pricing can encourage more intensive and sustainable forest management, and direct timber production to more productive and accessible forest areas, leaving other forest areas for non-timber uses and conservation and preservation (Landell-Mills and Ford 1999).

Forest prices that reflect the values of the forest and forest outputs can discourage overcutting and encourage conservation, forest management and renewal, efficient
use, and reduced waste. Forest pricing reflects the values of timber and forest concessions also can contribute to the financial sustainability of tropical forestry, generating revenue to finance the management and protection of forests (Landell-Mills and Ford 1999).

Low forest revenues can result from low forest fees, set well below the stumpage values of the timber. Low forest revenues also commonly result from low collection rates, inefficient or ineffective wood measurement and revenue collection, corruption, evasion of fees, and illegal logging. These issues are considered below.

Forest fees may be low for several reasons. In many countries, forest fees were set years ago and are fixed in legislation that is not easily changed. In Gabon, for example, forest fees have not been changed for 25 years (World Resources Institute 2000a). Over time, inflation reduces the real value of forest fees to a fraction of what they were initially. Even under inflation of just 5 percent per year (with an additional 1-year data lag and a 1-year implementation lag), fees will shrink, in real terms, to almost half (54 percent) of their original level at the end of a decade. After 10 years of inflation at just 5 percent per year, fees would have to be nearly doubled just to get back to their previous real value. Such increases can raise outcries from a forest industry that has quietly enjoyed declining real fees. Powerful industry pressures may prevent, or further delay the adjustment of forest fees; and the longer the delay, the greater the benefit to industry (Grut, Gray, and Egli 1991).

**Options for Setting the Level of Forest Fees on Timber**

The appropriate level of forest fees is not easily determined. The diversity of factors affecting stumpage values of timber and the practical problems of collecting reliable price and cost data make precise estimates of stumpage values difficult.

Where there are sufficient buyers to create competition, sale of timber by short-term competitive sales, sealed tender, or oral auction can provide direct, market-based measures of stumpage values, based on the buyer's willingness to pay (Landell-Mills and Ford 1999). Competitive timber sales in a few selected areas can provide important information on stumpage values for adjustment of forest fees elsewhere (Gray 1983).

Where competitive timber sales are not feasible, stumpage values can be derived from market prices of logs sold in competitive log markets, or from market prices of the processed products (sawnwood, veneer, plywood). As mentioned, until recently, Sabah, Malaysia established timber royalties by a formula based on quarterly log prices of species groups, and an "operating cost factor" derived from estimates of industry logging costs. Timber royalties were set at 90 percent of the difference between these log prices and the industry operating cost factor (Gray 1983; Kumar, 1986; Gray and Hadi 1990).

Stumpage values derived from log prices rather than processed product prices are simpler, easier to calculate, and therefore more reliable, provided log prices are determined in a competitive market. Encouraging competitive log markets will benefit any country. Competitive log markets provide information on log prices to buyers and sellers, government and the public, making it easier to set forest fees that better reflect stumpage values. The encouragement of log markets also can bring market efficiencies in the allocation of logs among processing plants and uses (Karsenty 2000). With the diversity of species, sizes, and log qualities in tropical forests, the potential gains in use and the economies in processing can be significant.

Logging costs and log transportation costs can be estimated from contractor and subcontractor rates for felling, skidding, logging, and trucking. If competitively established, these
rates provide reliable measures of costs, including normal profits.

Allocation of concessions by sealed tender or oral auction, as proposed here, would allow estimation of concession values from the prices bid and would capture the value of the security of timber supply provided by concession agreements.

**Options for Adjusting Forest Fees**

Automatic inflation adjustment procedures can be written into legislation establishing or amending forest fees. Adjustment might be based on consumer price indices, wholesale or industrial price indices, GDP price deflators, a survey of forest products prices, or on international forest product commodity prices series published by the World Bank, the FAO, and timber trade organizations (Gray 1983; Landell-Mills and Ford 1999). As mentioned, timber royalties in Sabah, Malaysia, until recently, were based on a formula that included average log prices and was recalculated every three months (Gray and Hadi 1990).

In principle, forest fees, timber royalties, and export taxes levied at ad valorem (percentage of value) rates can more easily reflect inflation in product prices. Many francophone African countries use valeur mercuriale (posted prices based on FOB prices) as a base for forest fees. However, in practice, valeur mercuriale prices have not always reflected market prices, have often lagged behind market prices, or are changed infrequently (Grut, Gray, and Egli 1991).

**Issue 2. Poor Forest Fee Collection Rates**

Weak forest governance and poor forest revenue collection rates direct individual efforts away from productive activity and toward avoidance and evasion, rent seeking, bribe taking, side payments, and other unofficial payments as well as toward illegal logging (box 12).

In Ghana, a World Bank study found that forest revenues collected were only about one-sixth of the forest revenues that should have been collected (World Bank 1988). In the Congo, about one-fifth of volume-based forest revenue was collected (Grut, Gray, and Egli 1991). Illegal logging, log measurement, revenue collection, and forest governance are problems in Cameroon, Gabon, Indonesia, and many other countries (Essama-Nssah and Gockowski 2000; Gautam 2000; World Bank 1999a; World Resources Institute 2000d). As mentioned, in Cambodia, it was estimated that royalties are paid on only 10 percent of the timber cut (Ruzicka 1998) (box 12).

When forest fees are avoided or evaded, revenues are lost, along with the opportunity

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**Box 12 Cambodia: Poor forest revenue collection and illegal logging**

A recent study of the forest revenue system in Cambodia estimated that no royalties or fees were paid on 90 percent of all timber harvested (Ruzicka 1998). The study further estimated that extra budget charges, facilitation fees, bribes, and other unauthorized payments were in the order of US$50.00 per cubic meter on logs, plus an additional US$25.00 per cubic meter on illegal log exports and US$40.00 per cubic meter for illegal sawnwood exports (Ruzicka 1998).

Global Witness, the British environmental and human rights group, has documented Cambodia's illegal logging, illegal exports, and the involvement of the army and officials (Global Witness 1999a). Illegally harvested timber is exported illegally to Laos, Thailand, and Vietnam.

The need for independent monitoring of Cambodia's forest sector was identified at the Consultative Group of Donors meeting in 1999. In December 1999, the Royal Government of Cambodia appointed Global Witness as an independent monitor of the forestry sector (Global Witness 1999b).
Forest Concession Policies and Revenue Systems

to use forest fees as incentives in forest management or conservation. Timber becomes, in effect, a zero-priced, free good to the forest industry. If timber is free, there is no incentive for efficient use in harvesting or in processing. If evasion is widespread, even with low rates, there is little possibility to raise rates without encouraging evasion.

The reasons for low revenue collection are many. Most often, they arise from problems of log measurement. Log measurement is carried out in the forest, where supervision is difficult. Government log measuring staff are left on their own, poorly paid, and dependent on the concessionaire for transportation and accommodation, vulnerable to pressure, persuasion, or bribery. These problems are exacerbated by weak or inefficient forest administration and revenue collection systems. Where concessionaires do the measuring, they are placed in an untenable and unfair position, being expected to police themselves.

Undermeasuring volumes, underinvoicing export volumes, and misgrading species as lower values all may be used by timber exporting firms to avoid forest fees as well as to transfer profits to a parent or related company in another country (box 13). Logs or finished products are sold ostensibly at a low export price, but then are resold outside the country to a related company at a higher price. The difference, or part of it, is deposited to the exporter’s foreign bank account. Timber values and profits leave the country.

Improving Fee Collection

There are several ways to improve log measurement procedures and the collection of volume-based stumpage fees. However, because none is perfect or easy to implement, it is recommended that emphasis be put on easier-to-collect area-based fees.

Some recommendations for improving log measurement procedures and fee collection are given below:

- Scaling system options. A reliable system of numbering and marking logs can provide a basis to improve log measurement procedures and revenue collection and strengthen

Box 13 Under-reporting log exports: Comparing exports and imports

Discrepancies between a country’s exports and imports in other countries provide a measure of under-reporting and illegal trade. While there may be legitimate reasons for discrepancies in trade flows (different measurement systems and timing of exports and imports), analyzing trade flow discrepancies is a first line of attack in identifying and assessing the magnitude of under-reporting and illegal trade. Box 2 compares log exports of several log-exporting countries with the imports in other countries.

Box table 2 Trade in tropical logs, 1998 ("000 m³")

<table>
<thead>
<tr>
<th>Log-exporting country</th>
<th>Log exports from the country</th>
<th>Log imports to log-importing country</th>
<th>Exports as percentage of imports</th>
</tr>
</thead>
<tbody>
<tr>
<td>Malaysia</td>
<td>3,308</td>
<td>3,356</td>
<td>101</td>
</tr>
<tr>
<td>Cameroon</td>
<td>718</td>
<td>693</td>
<td>96</td>
</tr>
<tr>
<td>Papua New Guinea</td>
<td>1,050</td>
<td>991</td>
<td>94</td>
</tr>
<tr>
<td>Gabon</td>
<td>847</td>
<td>691</td>
<td>82</td>
</tr>
<tr>
<td>Congo, Republic</td>
<td>181</td>
<td>129</td>
<td>72</td>
</tr>
<tr>
<td>Myanmar</td>
<td>188</td>
<td>43</td>
<td>23</td>
</tr>
</tbody>
</table>

Source: Johnson 2000.
supervision. Given the increasing availability and power of microcomputers and software and their declining cost, computer-based systems for forest fee billing are now feasible in many countries. Computer-based systems can facilitate independent cross-checking of scaling and log tracking. However, if it is to work effectively, such a system must be carefully designed and thoroughly tested.

- **Using subcontractor production.** Logging crews and logging subcontractors, fellers, tractor and skidding teams, and logging truck drivers commonly are paid on a piece rate basis, most often based on the measured volumes of logs at roadside. If the same log measurements and volumes are used for payment to subcontractors and for forest fees, forestry departments will have allies in the forest, looking out for their mutual interests.

- **Incentive payment of log measurement staff.** Log measurement, check-measurement, and inspection could be improved by paying log measurement staff on a piece rate basis, per cubic meter measured, or check-measured. Log measurement staff would then have incentives to measure and report the full volume of logs harvested.

- **Contracting out log measurement.** The government might contract out the entire log measurement operation to an independent third party. Contractors paid a fee per cubic meter measured then would have an incentive to ensure that all logs are fully and properly measured. Contracting out can be introduced and tested in one or two areas to refine procedures.

- **Measuring logs at processing plants and processed forest products at export ports.** Measuring logs before they enter the sawmill or plywood mill, rather than in the forest, usually allows for more reliable log measurement and closer supervision. However, this procedure would generate incentives for diversion of logs to illegal processing.

- **Independent monitoring of wood measurement.** Another option is to hire an independent organization to monitor wood measurement operations, perhaps paid from log measurement fees. The Government of Cameroon hired the Swiss company SGS to control log exports through the port of Douala. SGS has had monitoring experience in the forestry sector in other countries (World Resources Institute 2000b).

### Issue 3. Minimum Forest Fees

In the United States, below-cost timber sales have been criticized as wasteful of the forest resource, inefficient, and distorting (Repetto and Gillis 1988). Similar situations are found in other countries in which forest fees are set without regard to the value of the timber, the administrative and management costs incurred in selling the timber, or the value of the forest in alternative, nontimber, uses. Few tropical forest countries have minimum forest fees on timber or on concessions.

Minimum forest fees establish a floor level, preventing a country from “giving away its forests” at prices well below the value of the forest, the cost of administering or managing the forest, or the value of the forest in non-timber uses.

Minimum forest fee levels also should reflect reserve timber values, that is, the value of holding timber in reserve for potential future use as timber becomes increasingly scarce. Therefore, minimum forest fees can help to ensure that timber that may become more valuable tomorrow is not harvested today at low forest fees. Finally, minimum forest fees also should reflect the values of the forest for non-timber forest outputs such as foods, nuts, and medicines, as well as watershed protection, biodiversity, and conservation and preservation values.
**ISSUE 4. FOREST CONCESSIONS FEES**

Forest concessions fees of various types (initial concessions fees, annual area-based concessions fees) are fees levied on forest concessions in addition to volume-based fees levied on the timber cut (stumpage prices, royalties, export taxes).

**Types of Concessions Fees**

Concessions fees include initial concessions license fees—paid on a one-time basis upon application or the granting of a forest concession—and annual concessions fees paid yearly and based on the area of the concession, the inventory volume, or the annual allowable cut of the concession. Bonus bids, paid when concessions are allocated by competitive bidding (oral auction, or sealed tender) represent a third form of payment on forest concessions.

Forest concessions fees can be a much more significant source of forest revenues than volume-based fees. Concessions fees can reduce dependence on fees based on the volume of the timber cut, which are more difficult to collect. The former also provide potentially useful incentives for improved forest management and efficient use of tropical forest resources.

**Prevalence of Concessions Fees**

Currently, forest concessions fees are levied in only a few countries and generate little revenue. Initial concessions fees are levied in several West and Central African countries including Cameroon, Côte d'Ivoire, Central African Republic, and Gabon, (Grut, Gray, and Egli 1991). They are modest, even token, fees and generate less than 1 percent of forest revenues. Most are too low to have any effect on the acquisition or operation of concessions. Indonesia levies a modest initial concessions fee, the Forest Concessions License Fee, based on the entire area of the concession (Gray and Hadi 1990). In Nicaragua, the initial concessions contract fee based on the area of the concession represents only 1/100 of 1 percent of the fees paid on concessions (Gray and Hägerby 1997).

Annual concessions fees are levied in a few West and Central African countries, including Cameroon, Côte d'Ivoire, Central African Republic, Congo, and Gabon (Grut, Gray, and Egli 1991). In Gabon, annual area fees on concessions are 89 CFA francs per ha (US$0.30 per ha) (World Resources Institute 2000a), only 0.3 percent of forest revenue.

In Cameroon, annual area-based concessions fees are higher than in Gabon but still not a major forest revenue source. Annual area-based fees were raised to 1,500 CFA francs per ha per year (US$2.40 per ha per year) on one type of forest concession (Convention d'Exploitation) and to 2,500 CFA francs per ha per year (US$3.90 per ha per year) on another type of concession (Vente de Coupe) (World Resources Institute 2000b). In Cameroon, concessions are now allocated by auction, with bonus bids based on top of the area fees (World Resources Institute 2000b). Nevertheless, annual area-based fees in Cameroon still generate only 3 percent of forest revenue (World Resources Institute 2000b).

In Nicaragua, the annual concessions fee is US$0.70 per square kilometer per year. It represents only about 2/10 of 1 percent of the fees paid on concessions (Gray and Hägerby 1997).

In most countries, annual concessions fees are based on the total area of the concession. In the Congo, annual concessions fees have been based on the annual allowable cut. In Indonesia, the Land and Improvements Tax is an annual property tax that is levied on concessions. Concessions fall into the lowest of the 50 land classes. Tax rates per ha vary by forest class (Gray and Hadi 1990).
Role of Concessions Fees

With no concessions fees, or with low concessions fees there is little or no cost to the industry in acquiring and holding large concession areas. As a result, companies and individuals will seek to acquire vast areas of forest areas, beyond their needs, and perhaps for speculation rather than for the supply of processing operations. After acquiring large areas as forest concessions, companies then face little or no scarcity of forest area to exploit. Consequently concessionaires have little or no incentive to utilize the timber efficiently, to manage the forest, or to control encroachment.

Concessions fees set at reasonable levels can serve a number of forest management functions (Gillis 1992; Gray and Hägerby 1997; Hyde and Sedjo 1992). Concessions fees can reflect the security value of a guaranteed timber supply provided by forest concessions and capture such values as revenues. Concessions fees that put a price on this security value will help to discourage or reduce the speculative acquisition of concessions. By putting a price on holding concessions, they discourage the acquisition of large concession areas, encourage more efficient use of concessions and more intensive forest management on concessions. Moreover, concessions fees set to reflect the conservation and preservation values of forest areas, the value of alternative uses, and the opportunity cost of logging an area, will further discourage the acquisition and retention of such areas.

Concessions fees are much easier to collect than the volume-based stumpage fees, an important practical advantage in most countries. Concessions fees have been recommended to replace or supplement difficult to collect, easily evaded, volume-based stumpage fees in a number of countries (Gray 1983 and 1997b; Grut, Gray and Egli 1991; Gray and Hadi 1990; Palmer and Marshall 1996).

Issue 5. Bidding on Concessions and Bonus Bids

As pointed out in chapter 2 (Issue 7), bidding on concessions is not common. In most countries, concessions are allocated administratively, a slow process with many administrative hurdles that invite bribery, corruption, and other forms of "facilitation payments" (Grut Gray, and Egli 1991; Gray and Hadi 1989). Thus, the full value of the concession and of the timber on it is dissipated by inefficiencies and unproductive rent seeking activities of individuals and companies seeking concessions.

There has been increased interest in introducing competitive allocation of concessions (Laarman 1999; Salim and Ullsten 1999). Greater use of bidding in allocation of concessions has been widely recommended (Gillis 1992; Gray and Hadi 1989; Gray and Hägerby 1997; Grut, Gray, and Egli 1991; ITTO 1996; Karsenty 2000; Klein 1998; Sizer 1996). Experience with bidding on concessions was reviewed in chapter 2 and box 4. Proposals to introduce competitive allocation of concessions by bidding were presented in chapter 4, under Steps 3-8.

Bidding has another important advantage. It provides market-based information on timber and concession values for use in setting the level of forest fees. If forest fees are low, profits from harvesting timber will be large, timber and concessions financially attractive, and bids high. If, on the other hand, forest fees fully reflect the value of the standing timber on concessions, then bids on timber and concessions will be lower, reflecting only the security of timber supply value of concessions.

Bidding should be applied first in areas of the country where competition can be expected. Where competition is inadequate, forest fees on timber and concessions set administratively could be based on fees established elsewhere through bidding.
A forest revenue system should function through mechanisms that meet the forest policy objectives, forestry situation, and revenue needs of jurisdictions. Revenue mechanisms should (1) be chosen based on their individual merits and (2) reinforce and complement one another, that is, work together.

**Types of Forest Revenue Mechanisms**

The choice of forest revenue mechanisms is important for an efficient and effective forest revenue system. The forest revenue system agreed upon will be based on revenue mechanisms chosen for reasons of the kind listed below:

- One forest revenue mechanism can complement another. For example, bonus bidding on timber sales can reflect timber values not captured by volume-based stumpage prices. Per-hectare ground rentals can allow lower volume-based charges on timber cut.

- Differing forestry situations within the country may call for different revenue mechanisms. For example, lump-sum timber sales or per tree stumpage charges may be suitable for plantation forests or for small blocks of timber, but not for unevenly aged forests. Bonus bidding can work in areas with tight timber supply and many forestry firms, but not where competition is not possible or timber is in surplus supply.

- The forest revenue system is called on to contribute to several forest policy objectives. This requires several forest revenue mechanisms, at least as many revenue
mechanisms as the number of objectives. To satisfy several policy objectives requires at least one mechanism, or instrument, for each objective. With fewer revenue mechanisms, it may not be possible to satisfy all policy objectives. In practice, it may be desirable to choose fewer fees and charges for simplicity, and to forgo satisfying all objectives.


**Structure of Forest Revenue Mechanisms**

The forest revenue system chosen should include both charges on timber and charges on forest lands (tenures). Both timber and tenures contribute to forest values. Economic efficiency in use and conservation involves both timber and forest land. The final choice for a forest revenue system should include revenue mechanisms that complement and support one another. A satisfactory forest revenue system will meet the forest revenue objective, while balancing simplicity for the system.

**Forest Fees on Timber**

The following are likely to be significant considerations in setting future revenue systems:
- **Volume-based stumpage prices** are likely to continue as significant components of the forest revenue system in most jurisdictions. It is the roundwood (primary forest products, such as logs, cut from the stump) that is the source of timber values, and volume-based stumpage prices most closely reflect that value. Volume-based stumpage prices also are able to reflect those characteristics that differentiate timber values: species, size, grade, location and access, stand density, and logging conditions.
- Other revenue mechanisms can usefully support, supplement, or substitute for volume-based stumpage prices in particular situations. Where there is competition for timber, in areas with a number of potential timber buyers, and without a surplus of timber, **competitive bonus bids** can supplement volume-based stumpage prices or other revenue mechanisms. Competitive bonus bidding can capture at least a proportion of remaining timber values, even when volume-based stumpage prices or other charges do not adequately reflect those values.
- **Per-tree charges** can substitute for volume-based stumpage prices, for example, in the sale of plantation thinnings or the final harvest, but not for timber from unevenly aged tropical high forests. Plantation timber is of uniform size and per-tree charges will encourage full use of the trees.
- **Export taxes** on logs can supplement volume-based stumpage prices in certain circumstances. However, **charges or export taxes** on processed timber products are to be avoided because of their disincentive effects on use of timber and logs and on recovery of processed products, as noted in the appendix summary of charges. In addition, they can distort the use of roundwood and production within the forest industry.
- The **corporate income tax** is not an appropriate substitute for volume-based stumpage prices or for other timber based charges, as noted in the appendix.

**Fees on Forest Tenures**

Area-based and other charges on forest tenures can reflect the additional values generated by these tenures. Charges on forest tenures can serve to reflect the value of the security of timber supply provided. They also can cover the
Developing an Integrated Forest Revenue System

administrative costs involved in granting tenures and the costs of fire protection and other forestry services provided, and can take some of the revenue burden off stumpage prices. The following fees are likely to play a significant role.

- Initial license fees and renewal fees on forest concessions and other long-term tenures can reflect the administrative costs in the granting of licenses. They also can deter, although not prevent, the speculative acquisition of long-term tenures. Initial license fees on timber sales and other short-term tenures can serve the same function.

- Area-based annual ground rentals, or allowable cut fees, reflect the value of security of timber supply provided by the tenure. For most jurisdictions, they can become a much more significant revenue source. In addition, they will have important efficiency and utilization incentives. Annual ground rentals, or allowable cut fees, put a scarcity price on the holding of large areas or allowable cut volumes. They can encourage the release of excess area or allowable cut. Area-based annual ground rentals also can encourage more intensive use and forest management on the remaining tenure areas.

- Annual ground rentals can be supplemented by area-based and other service fees for fire protection, insect and disease protection, nursery stock, or other forestry services. If set to reflect and recover the costs of providing the services, these service fees also will help to ensure efficient provision and encourage the development of private alternatives. Service fees also ensure that forestry tenures are not subsidized form other revenues.

- Where competition for tenures exists, competitive bonus bids can generate revenue, reflect the value of the security of timber supply provided by the tenure, and allocate tenures in a fair and impartial way to their most valuable use.
It is useful to separate issues of forest revenue system structure and level and to deal with each in turn. A poorly designed forest revenue system easily can increase industry costs, discourage recovery and use, reduce competitiveness, and in the end diminish the timber values and potential revenues available. The first step, therefore, is to establish an efficient and effective structure of forest fees, charges, and prices, and only then to determine the level of those fees, charges, and prices.

The structure of fees, charges, and prices should first of all encourage efficient use of timber, be relatively simple to administer, and achieve easy compliance for the forest industry. The forest industry is concerned to have such a system, which is a key step toward maintaining the industry’s competitiveness. Agreement on an efficient structure is possible, if dealt with separately from the levels of fees, charges, and prices. Obviously, the levels are more contentious, but they can be resolved more easily and straightforwardly, with arguments that are less cluttered, once the structure of fees, charges, and prices is agreed upon.

The forest pricing policies and fees suggested here represent a contribution toward improving the performance of forest concessions, the sustainable management of forests on concessions, and the financial viability of sustainable forest management. The policies and fees can make improvements by (1) structuring fees to provide incentives for improved use and forest management, (2) raising fees to reflect the value of the forest, (3) generating the revenue to make forest management a worthwhile investment for governments, and (4) providing the revenue to
finance improved forest management. The proposals include the following six elements, which are then discussed in detail.

1. **Annual concession fees.** Annual area-based concession fees at rates that generate a significant proportion of forest revenues and provide incentives for forest management are recommended. Annual concession fees should become a major revenue source. They can supplement, or partly replace, volume-based stumpage prices and export taxes, which are difficult to collect. To this end, the annual area charges should be introduced at significant levels, and present area fees should be increased substantially.

2. **Initial concession fees.** A modest, one-time, initial concession fee is recommended. It is designed to generate sufficient revenues to cover administrative costs in granting concessions and to discourage frivolous or speculative concession applications or acquisition of concessions.

3. **Bidding on concessions.** It is recommended that concessions be allocated by bidding (preferably by sealed tender) based on bonus bids, by a carefully designed, impartially administered auction process, initially on a limited basis, in selected situations, and under competitive conditions, to ensure success. Bonus bids would reflect and capture the security value of the secure timber supply provided by the concession. As well, bonus bids can capture a share of the stumpage values of timber not reflected in the volume-based forest fees on timber harvested.

4. **Minimum volume-based stumpage prices.** Minimum volume-based stumpage prices are recommended. These should be high enough to reflect (a) the administrative costs in supervision, inspection, forest renewal, and forest management, log measurement, and collection of revenues, and (b) the environmental and other nonmarket values—the opportunity cost values precluded by harvesting tropical timber. Minimum volume-based fees can improve efficiency and prevent below-cost or below opportunity cost harvesting of tropical forests.

5. **Minimum area-based forest concession fees.** Minimum area-based forest concession fees are recommended to reflect the environmental and nonmarket opportunity cost values of alternative forest land uses involved in allocating tropical forest areas to timber production.

6. **Fund to finance forest management, supervision, and monitoring of concessions.** It is recommended that a substantial proportion of forest revenues from concessions be allocated to a forest management fund and used to finance the supervision and monitoring of logging and forest management activities on concessions.

Discussion of these fees follows.

**Increased use of annual area-based concession fees.** For most countries, volume-based fees (stumpage fees, royalties, export taxes) account for 90 percent to 95 percent or more of forest revenues. Yet, as has been noted, volume-based fees are notoriously difficult to collect and are subject to abuse. Stumpage fees and other fees based on log volumes require the forest department to have the field capability to measure log volumes; or, if log measurement is done by forest industry companies, to independently check log volumes and scaling records. Many forestry departments do not have the field capability to perform these tasks.

It is recommended that stumpage fees and other volume-based forest fees be supplemented by easier-to-collect annual area-based fees set at sufficiently high levels to become a major forest revenue source. They should generate 50 percent or more of forest revenues and could be set on the total concession area and/or on the annual cutting area. The former is the simplest and easiest to administer. However, it may penalize concessionaires responsible for protection and management of large areas within their concession for other, nontimber, environmental uses. To overcome this inequity and
introduce incentives to manage areas for non-
timber benefits, the area fee might be levied
on the entire concession area, with a partial or
full rebate of fees for areas protected and man-
gaged for other nontimber uses. The rebate could
be made conditional on performance in man-
aging and protecting these areas.

Simplification of volume-based fees and
improvement in collection. Many countries
have several volume-based forest fees. For sim-
plicity of administration and collection, it is
recommended that the various volume-based
fees be combined in a single volume-based fee.
Other steps can be made to improve the col-
lection of volume-based fees. However, the
details are likely to be specific to the individu-
al country, the forest situation, and institutions.

Initial concession fees. A modest initial
concession contract fee should be levied on con-
cessions. It should be high enough to cover all
of the administrative costs involved in granting
the concession. This initial concession fee
should be based on the total area of the conces-
sion. Area-based initial concession fees provide
some discouragement to concessionaires seek-
ting too large an area, beyond their needs. Where
a government carries out the forest inventory
prior to inviting tenders and bidding, the initial
concession fee also should reflect and recover
the cost of the forest inventory.

Bonus bidding on concessions. Bonus bid-
ing is recommended in the allocation of con-
cessions. It is recommended that bonus bids
be in the form of annual payments, and on an
area basis of so much per ha for the entire area
of the concession. These annual area-based
bonus bids would be paid in addition to the
regular annual area charges. Such bonus bids
would capture the additional value, over and
above regular area-based fees and volume-
based stumpage prices, of both the timber and
the concession.

The level of these bonus bids will, of course,
depend on the extent of competition. If there is
little competition, bonus bids can be expected to
be minimal. Without competition, bonus bids
cannot be expected to reflect the full value of the
timber and the concession. Thus, in areas or situa-
tions in which competition for concessions is
weak or nonexistent, area-based concession fees
will need to be administratively set. However,
they should be set based on the bonus bids in
more competitive areas or situations.

Minimum forest fees on concessions. Min-
imum annual area-based fees on concessions
and minimum volume-based stumpage prices
should be established to set floor levels for both.
Minimum forest fees ensure that timber and conces-
sions are not given away at very low pric-
ies with little or no return to the country. Mini-
mum forest fees on timber and concessions
should reflect the highest of (1) the future val-
ue of the timber if reserved for future cutting
(that is, the present discounted value of this pro-
jected future value), (2) the administrative and
forest management costs involved in the
concession, or (3) the value of the timber or
concessions in other nontimber uses (environment-
mental protection, environmental tourism poten-
tial, wildlife, forest foods and game, watershedy
protection). These nontimber values have been shown to be significant in forest val-
uation studies, often equal to, or even greater
than, the timber values (Bishop 1999; Chomitz
and Kumari 1998).

Fund to finance forest management, su-
ervision, and monitoring of concessions. In
most countries, forest revenue from concessions
and stumpage fees goes directly into govern-
ment general revenues. Forestry departments,
dependent on annual appropriations, commonly
do not have the funds to undertake the
supervision and monitoring of logging and for-
est management on concession, or for reinves-
tment in forest management and reforestation.
Unless investments are made in the supervision and monitoring of forest concession operations, and in forest management and reforestation, forests will continue to be depleted, deforestation will continue, forest revenues will decline, and the country’s valuable forest resources will be lost. To ensure adequate funds for monitoring and supervision, forest legislation should guarantee that a fixed portion of the revenues obtained by the state or region is directed into a fund used to finance monitoring and supervision of concessions. This fund should then be used to monitor management of the present forests from which the revenue originates. Finance ministries are likely to resist this proposal. However, given the long-term requirements for forest management and supervision, adequate stable funding is essential to achieve sustainable forestry.

**Forest Fees on Public Forest Lands Outside Concessions**

Outside forest concessions, the responsibility for forest management on public lands normally rests with the government rather than the concession operator.

Stumpage prices and area fees for timber on public lands outside concessions should be higher than those on forest concessions, reflecting the companies’ reduced responsibility for forest management and protection. Higher stumpage prices and area fees outside concessions would provide an incentive for concessionaires to use the forest within their concession more intensively. In many countries, once concessionaires have acquired a forest concession, the secure supply of timber from the concession has allowed them to buy timber from outside the concession at lower prices (box 14).

Area fees and volume-based stumpage fees for forests outside forest concessions should be high enough to fund forest management by the forestry department or agency responsible for forest management. It also is recommended that a substantial proportion of forest revenue from timber outside concessions be allocated to a fund and used to finance the supervision and monitoring of logging, forest management, and reforestation.

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**Box 14 Cheap timber from outside concessions**

In Nicaragua, because of low forest fees outside concessions, concession owners have been able to purchase timber and logs more cheaply from indigenous communities than from their own concessions, and illegal logs even more cheaply (Gray and Hagerby 1997). As a result, the communities have not received a reasonable price for their timber or logs, and uncontrolled illegal logging has been encouraged.

In Cameroon, problems with lower fees outside the larger concessions caused forest fees to be restructured and raised under the 1994 forest law, with unexpected results (Seymour and others 2000).

Higher area taxes have had two effects. First they have made large concessions more expensive to log than ventes de coupe [shorter-term tenures]. The minimum [annual] area tax on ventes de coupe is more than on concessions, but the former requires no management plan and can be paid in a year [that is, paid only once], whereas the latter requires management plans, and the area tax is payable on the whole concession for 30 years. As a result, the area tax burden on wood cut from concessions is three times that on wood cut from ventes de coupe on a volume basis. Not surprisingly, loggers prefer cutting in ventes de coupe. (Seymour and others 2000)

Second, higher area taxes and inadequate government control mean that illegal logging is both easy and profitable. (Seymour and others 2000)
Area fees outside forest concessions are recommended. As on concessions, they should be set at a significant level and be a major fee on forests outside concessions, equal to or more significant than volume-based stumpage fees. They should be applied to the entire area.

It is recommended that cutting rights on public forest lands outside concessions be sold by competitive bid and under short-term timber sale contracts (Gray and Hägerby 1997). Bonus bids would be in the form of an annual area-based fee levied on the entire timber sale area.

**FOREST FEES ON COMMUNITY AND PRIVATE LANDS**

Timber on community lands and private lands is the property of the owners. They are free to sell the timber, subject to any forest management conditions prescribed by the government. Usually, stumpage prices on standing timber or felled timber are negotiated between buyer and seller. However, in most countries, there are only a few buyers and many land owners. As a result, the market for standing timber and felled trees is not competitive. Communities and land owners usually must take the prices offered. Often, low forest fees on concessions are used by timber buyers as the basis and justification for the low prices offered to private landowners and communities. Therefore, raising forest fees on concessions would strengthen the position of community and private forest owners in negotiating stumpage prices.

Thus, to compensate for the lack of competition for timber on private and community lands, governments can play a role by establishing timber prices as floor prices to counterbalance the monopoly power of timber buyers, support the interests of landowners and communities, and ensure fair prices. The setting of minimum prices for private and community sales of timber is analogous to establishing a minimum wage rate in industries in which there are many sellers of labor (employees) and few buyers (employers).

Because the timber buyer has no forest management or protection responsibilities, these minimum prices on private and community lands should be higher than the forest fees on forest concessions. Otherwise, timber from private or community lands becomes a cheap substitute for timber from managed forest concessions. It is recommended that the schedule of forest fees applied to public forest lands outside forest concessions be used as minimum prices for timber from private and community lands.

**ESTABLISHING THE LEVEL OF FOREST FEES**

Setting the appropriate level of forest fees for the timber sold or area fees on concessions is an important issue. Of course, the forest industry would prefer low forest fees. Governments should seek to establish forest fees that reflect the full competitive value of the timber and forest resource.

If forest fees are too low, then timber is cheap; and cheap timber encourages poor use of the forest and waste in timber processing. The resulting extra (above normal) profits from low forest fees will encourage overexpansion of the forest industry. This, together with poor use of timber, will lead to rapid exploitation of the forest and deforestation.

The value of standing timber—stumpage value—represents the economic value of the timber, the price that would prevail in a competitive market (Gray 1983; Landell-Mills and Ford 1999).

In situations and locations that have competition for timber and forest tenures, the allocation of timber or forest tenures by oral auction or sealed tender provides a direct, market-based measure of stumpage values, based on buyer's willingness to pay or a good measure of the value of the timber or of tenures. Prices bid on
timber and concessions in areas with competition can provide a market basis for administratively set charges in other, less competitive situations or regions.

However, competitive markets for standing timber are rare. Usually, there are only one or two, or at best a few buyers and many sellers. The prices offered by the few buyers reflect their market power and will therefore underestimate the full value of the timber.

**Deriving Stumpage Values of Standing Timber**

If competitive timber sales are not feasible, stumpage values can be derived from market prices of logs sold in competitive log markets. Stumpage values are derived by deducting logging and transport costs. Costs should include depreciation on capital equipment and a normal profit or opportunity-cost rate of return on the capital invested. So as not to reward inefficiency, costs should be based on averages of costs of operations of normal efficiency.

In the absence of a competitive market for logs, it may be necessary to determine stumpage values from the prices of the processed products (sawnwood, veneer, plywood), less the cost of processing. Deriving stumpage values from log prices, rather than from the prices of processed product, is considerably simpler and therefore more reliable. Starting from processed product prices involves additional data, a greater chance of unreliability from poor data, and more calculations.

Logging costs and hence stumpage values will vary with location, stand conditions, and terrain. Stumpage values of nearer, more accessible, forest areas and stands will be higher, reflecting the lower transport costs. Stumpage values of stands with high volumes per ha and those on dry ground and easy slopes will be greater than for stands in adverse situations.

Although conceptually stumpage values are simple, in practice, stumpage values are not easy to estimate. Log prices vary considerably with species and grade. Thus, stumpage values also will vary widely with species, grade, logging costs, transportation costs, and distance from market. Stumpage value of higher priced species or grades can be several times that of lower priced species or grades.

There are practical considerations in estimating stumpage values. There are inevitable problems of price and cost data. Log or product prices may not be accurate, or they may not be competitive. Prices may reflect market power of buyers or sellers. Underinvoicing or transfer pricing may be common, or other noncompetitive factors may distort prices. Given the variability in processing efficiencies, costs, and recovery rates, processing cost estimates may be inaccurate. Logging cost estimates may be uncertain because of the variability in logging conditions, stand conditions, and weather. In addition, costs may be higher than they should be because of low forest fees that shelter inefficient logging and processing operations.

**Estimating Stumpage Values**

Estimates of stumpage values of standing timber can be derived in several ways. The applicability of each is examined in turn.

- **Stumpage values from sales of standing timber.** The simplest and most direct measure of stumpage values is the price paid in a competitive market to landowners, private owners, or communities for standing timber. These prices are likely to underestimate stumpage values. As already noted, most countries count few forest companies to buy timber, often only one or two in any one area, but many sellers and private owners and several communities. It is a buyer's market, and owners are eager to sell. Buyers can offer "take it or leave it" prices. In addition, if land ownership is unclear and title to the timber uncertain, sellers will be willing to sell the timber at almost any price.
Suggested Forest Pricing Policies for Tropical Forests

- Prices paid for felled trees and logs at roadside or riverbank. Landowners or communities also may sell trees in the forest felled and cut into logs, or as logs at roadside or at river bank. Stumpage values can be derived from prices of felled trees by deducting felling costs, or from the prices of logs delivered to roadside or riverbank by deducting felling and skidding costs. However, stumpage prices derived by deducting felling and skidding costs from these prices likely also would underestimate stumpage values. The same market imperfections apply to stumpage values based on prices paid for felled trees or logs. There are usually few buyers and many sellers. Often, ownership of the timber is uncertain, and some of the timber may be cut illegally.

- Prices paid for logs delivered to the mill. The price paid for logs delivered to the sawmill is another starting point in estimating stumpage values. Log transportation costs, loading costs, and logging costs are deducted to arrive at the stumpage value of the standing timber in the forest. However, with few sawmills, forest owners or loggers will have only one or two sawmills to buy their logs. Again, with so few buyers, the market for delivered logs will not be competitive. It will be a buyer’s market, and delivered log prices will likely underestimate stumpage values.

- Domestic and export prices of forest products. Stumpage values can be estimated from prices of the processed forest products, sawnwood, or plywood. Stumpage values are derived by deducting processing costs, log transport costs, and logging costs from the FOB prices of the processed forest products. Using processed product prices involves more steps and is more complicated than the methods previously discussed, but the market for sawnwood is much closer to a competitive market.

None of these methods is ideal. It is a matter of choosing the method that will best fit the circumstances and provide the closest estimate of stumpage values.

Adjusting Level of Forest Fees

To ensure that forest charges remain current in the face of inflation and changing costs, regular formal review processes are required. In addition, the indexing of forest charges for inflation and/or forest product price changes can ensure that charges remain current. If undertaken at frequent intervals and based on recent price data, indexing of fees, charges, and stumpage prices can adjust forest charges and compensate for cyclical as well as secular product price movements. If the lag in the adjustment of charges is short, fluctuations in forest product prices will be compensated for by adjustment of forest charges, and risk and uncertainty to the forest industry reduced.

Concessions Values and Concessions Fees

Timber concessions, which represent a guaranteed access to publicly owned timber, also have value in addition to the stumpage value of the timber. Concessions confer rights to the annual allowable cut on the concession area. Concessions values include the value of the security of timber supply provided by the concession. Concessions values will also reflect, in part, the extent to which forest fees understimate the stumpage values of the timber. Where concessions are allocated by competitive bidding (by sealed tender or open auction), the bids will provide a measure of how closely forest fees reflect stumpage values, as well as a measure of concessions values themselves. Concessions values derived through competitive auctions of concessions can then be used to establish the level of concessions fees for other concessions.
Forest Pricing Policies: Summary

Forest revenue systems are a key tool of forest policy (Landell-Mills and Ford 1999).

An important theme of this study has been that forest pricing policies can contribute to the sustainability of tropical forest resources by deterring overexploitation, providing economic incentives to use timber more efficiently, and generating the revenue to make forest management financially sustainable. Sustainable management of tropical forests requires improvements in present forest management practices and institutional changes in forest administration. Economic incentives and better designed forest revenue systems can facilitate and support improved forest management and administration.

Pricing policies can ensure that forest fees reflect both the value of the forest resources and the opportunity costs involved in their harvest, including market and nonmarket values. In other words, concessions fees and fees on the timber cut should reflect the value of the concession in terms of the access to timber and the security of timber supply. Forest fees on the timber cut should reflect the value of the timber to processing plants and in markets. Forest fees also should reflect the opportunity costs in harvesting the timber.

Concessions fees that put a scarcity price on concessions area can slow the acquisition of large areas of tropical forest concessions, or even result in the return of excess concessions area. These same fees can encourage better timber use and better, more intensive forest management on concessions. Minimum fees on concessions and on the timber harvested can reflect these values and provide economic incentives for forest land uses.
If these pricing policies were adopted by a majority of tropical timber producing countries, timber-producing countries would not have to compete with one another for forest industrialization. Higher forest fees could slow the harvest, reduce the supply of tropical timber on the world market, and raise world prices of tropical timber. These results would benefit tropical timber-producing countries through higher prices for their exports and better terms of trade for forest products. In industrialized countries, higher prices for tropical timber would, in turn, dampen demand and reduce consumption of tropical timber. For tropical timber-producing countries, the higher forest fees and higher export prices on timber products would offset the reduced sales of tropical timber to industrialized countries.

Higher prices and values of tropical timber would make improved forest management economically attractive. Tropical forest resources then would become worth conserving and managing as a renewable resource rather than being treated as a depleting resource.

Finally, higher forest fees would make forest management financially sustainable. Higher forest fees and a higher collection rate would provide funds for management, protection, and regeneration of the resource. They also would finance a strengthening of forestry departments and of more effective revenue collection systems. Sustainable forests would become financially and politically worth preserving. If tropical forests become valuable, and are used and managed well, there will be greater interest within tropical countries in their maintenance and conservation.
his appendix presents a comprehensive summary of a range of alternative forest fees. A full discussion on the World Bank Forestry website provides the basis for recommendations on forest revenue systems in Part Two of the main body of the study. See http://essd.worldbank.org/rdv/rdvWeb.nsf/Forestry/ExternalLinks.

Revenue mechanisms include a variety of payments to the owner—in this study, the government—for timber or for the use of forest lands. These mechanisms have various names, such as prices, fees, charges, dues, taxes, royalties, severance taxes, license fees, user fees, bidding and auction arrangements, and bonus bid payments. They can be broadly divided into volume-based fees—payments levied on the measured volume of timber, timber rights, or other forest products—and area-based fees—payments levied on the area of forest tenures. Each is discussed in greater detail below.

Fees, charges, dues, taxes, and royalties have slightly different meanings and interpretations, differing historical roots, and differing applications among jurisdictions. For example, stumpage prices on public forest timber are called forest dues in some jurisdictions, stumpage fees or charges in others, timber royalties in still others. It is easy to become mired in semantics. No matter what their name, forest revenue mechanisms levied on the timber, associated with the transfer of property right to timber, or on other nontimber forest outputs are all essentially prices, prices of the timber, timber rights, or other forest outputs sold. Fees and charges on forest land, such as area fees or ground rentals, are the prices of the right by the
concessionaire to a secure timber supply or to other forest land uses.

**Revenue Mechanisms and Funding Mechanisms**

Forest revenue mechanisms are distinguished from forestry funding mechanisms. Forest revenue mechanisms are designed primarily to generate revenues. They include prices, fees, and taxes. Forestry funding mechanisms are designed to finance forestry activities, such as reforestation, stand tending, and the provision of nonmarketed forest outputs including recreation, wildlife, and watershed protection.

Forestry activities can be funded by (a) revenues generated through forest revenue mechanisms or from elsewhere in the government budget, or (b) financial incentives such as tax deductions or expensing of expenditures, grants, cost sharing arrangements, and subsidies designed to encourage and finance private sector activities. Revenue mechanisms contribute to the government’s budget. Funding mechanisms often result in a reduction of revenues or are a drain on the government’s budget. This study focuses on revenue mechanisms.

**Types of Revenue Mechanisms**

Forest revenue mechanisms commonly are classified by their name, historical roots, or intended purpose, or by the use to which the funds are directed. For example fees include a diverse range of revenue mechanisms: license fees, area fees, stumpage fees, reforestation fees, and others. Volume-based charges on the timber cut are called stumpage prices in some jurisdictions, stumpage fees in others, royalties in others. Reforestation fees, intended to finance reforestation, are levied in various countries on areas logged, volume of timber cut, the processed products, or exports. Reflecting the government’s interest in timber output, royalties may be levied in various jurisdictions as a per-tree charge, on the volume of roundwood (logs, pulpwood, poles and other unprocessed timber), on the forest inventory volume of standing timber, on the output of processed products such as lumber or plywood production, or on the volume or value of exports.

Forest revenue mechanisms also may be classified based on whether the revenue mechanisms are levied on anticipated values of timber, for example, the values of timber rights (ex ante rent collection); or on timber values determined later (ex post rent collection), for example, stumpage prices.

The diversity among jurisdictions in the names, intended purpose, or use to which the revenues are put makes any classification complex and comparisons between jurisdictions difficult. In addition, in any one jurisdiction, there may be several charges with different names, all levied on the same base, for example, on the volume of roundwood harvested.

This study classifies forest revenue mechanisms in terms of the economic activity and the base on which they are levied and reviews them in that order. Public finance takes this same approach to classify and analyze various taxes and to compare taxes interjurisdictionally. Revenue mechanisms for nontimber outputs are listed in section 2 below.

**Revenue mechanisms for timber production and forest lands.** Twenty-three revenue mechanisms related to timber production are identified in table A1. They cover a broad spectrum of charges itemized in the next three sections and grouped in the table under the following headings: charges for timber harvested, charges for logging and forest operations, and charges for forest lands and tenures.

1. **Charges for timber harvested.** Charges levied on the timber cut represent the prices charged for the marketed timber output
of the forest. Volume-based stumpage prices are the most common forest revenue mechanism and are equivalent to the selling price of standing timber. Alternative fees and charges include per-tree charges, charges based on the area logged, lump-sum timber sales, competitive bonus bidding, charges on minor forest products, charges on processed products, and export taxes on logs and forest products. Each is described and analyzed below.

2. Charges for logging and forestry operations. Charges, fees, or taxes on capital equipment, labor or other forest operations inputs, corporation income taxes, logging taxes, profit based royalties generate revenues from the forest sector. Government ownership of, or joint venture participation in, logging or processing operations also can generate revenues from the forest sector, but as profits rather than as fees or taxes. Each of these is discussed below. However, as argued below, none is a very effective substitute for fees on timber or forest tenures.

3. Charges for timber lands and tenures. Fees and charges on various forest tenures, including forest concessions, can reflect the security value of a guaranteed timber supply or the value of forest lands in other uses, or cover the cost of fire protection and other forestry services provided.

For forest concessions, revenue mechanisms can include initial license fees, renewal fees, bonus bidding, annual ground rentals, allowable cut fees, and area-based and other service fees. Revenue mechanisms on shorter-term forest tenures can include initial license fees, bonus bidding, annual ground rentals, and area-based and other service fees (table A1).

Revenue mechanisms for nontimber forest outputs. To indicate the potential for equal and parallel treatment of timber and nontimber forest outputs, a selection of potential revenue mechanisms for nontimber forest outputs is listed in table A2. The nontimber revenue mechanisms again are classified, first, by the resource.

Table A1 Revenue mechanisms for timber production and forest lands

<table>
<thead>
<tr>
<th>Charges levied on timber harvested</th>
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</thead>
<tbody>
<tr>
<td>I. Volume-based stumpage prices</td>
</tr>
</tbody>
</table>

**Description**
- Fee per unit of timber harvested (cubic meter, cubic foot, hoppus feet, cords, metric tones) based on the measured volume of logs, pulpwood.
- Represents the selling prices of the standing timber.
- The most widely used revenue mechanism in developed and developing countries.
- Base: measured volumes of timber cut, as logs or other primary forest products. Can be varied by species, size, grade, and location, to reflect differences in timber values.
- Level: can be administratively set, negotiated, set by appraisal, or set by bidding.
- Administration: complex, requiring strong field capacity, log measuring and billing
- procedures, often subject to abuses.

**Analysis**
- Are most closely related to the values of the timber.
- Can reflect differences in timber values by species, size, quality, location.
- Setting the level to properly reflect timber values is difficult. In many countries, stumpage prices are well below timber values.
Forest Concession Policies and Revenue Systems

Table A1  Revenue mechanisms for timber production and forest lands (cont’d.)

- Administration: difficult. Requires strong forest administration to set prices to reflect values.
- Log measurement is subject to abuses. Requires strong field capability to measure logs.

2. Per-tree charges

Description
- Price per tree cut.
- In some situations, can be a simple substitute for volume-based stumpage prices. Used in a few countries but not common.
- Can be varied by species and location to reflect differing values of trees.
- Level: can be administratively set, negotiated, or set by appraisal or bidding.
- Administration: easier than volume-based stumpage prices, avoids measuring logs. Can be easily checked by counting stumps.

Analysis
- An alternative to stumpage prices for many countries and situations. Have the advantages of simpler administration and field inspection.
- Are particularly useful for plantation forests of uniform size trees.
- Encourage use of the full tree.
- In marked stands, possible to charge for the timber before logging.

3. Charges based on area logged

Description
- Based on the area logged.
- Paid prior to cutting, with prices based on the area approved for cutting.
- Not common but are of potentially greater use in many countries.
- Base: area (ha) of the annual cutting permit.
- Level: administratively set, negotiated, or set by appraisal or by bidding.
- Administration: simple, but requires on-the-ground supervision to ensure that logging is confined to the approved area.

Analysis
- Key advantage: administrative simplicity.
- Useful supplement to volume-based stumpage prices or per-tree charges.
- In natural forests, per-ha charges cannot properly reflect the value of the timber.
- Useful for plantation forests. Per-ha charges generate revenue prior to logging but require on-the-ground supervision to ensure logging is within the designated area.

4. Lump-sum timber sales

Description
- Sale of all timber, or all marked timber, on a cutting area as a block.
- Used in several developed countries, on private lands, and for plantation timber.
- Payment is required prior to logging or by interim payments during logging.
- Level: administratively set, negotiated, or by bidding.
- Administration: require field capability for presale inventory and on-the-ground supervision of logging to be sure that logging is within the area, and/or only marked trees are cut.
Appendix: Forest Revenue Mechanisms

**Table A1 Revenue mechanisms for timber production and forest lands (cont'd.)**

### 4. Encourage full use of the area and marked timber.
* Are appropriate for sale of marked timber in natural forests, particularly for plantation timber.
* Can work well in conjunction with competitive bidding (5 below).

### 5. Competitive bonus bidding

**Description**
- Sale of timber by oral auction or sealed tender.
- Can be used along with other revenue mechanisms to set the level of the fees or charges.
- Used in a number of developed and developing countries in which competition exists, but requires competitive conditions among timber buyers, which are not always available.
- Level: where competition is strong, can adequately reflect the value of the timber.
- Administration: requires significant administrative capacity to designate areas for sale, carry out a detailed inventory, organize and carry out the sale and bidding, and supervise logging.

**Analysis**
- Has many advantages, both in establishing the level of charges to reflect timber values and in allocating timber among buyers.
- Provides an independent market-based measure of timber values.
- To be effective, competition among buyers is required.

### 6. Charges on minor forest products

**Description**
- Charges on forest products (poles, posts) and on nontimber forest products (foods, fruit, nuts, medicinal plants) based on the quantity of these diverse forest products.
- Many jurisdictions have separate fees for each minor forest product, but others have no fees.
- Charges vary for each product. Schedule is often lengthy and complex.
- Level: charges vary with the value of the products, but often are very low or token. Because charges for minor forest products are difficult to collect, to discourage evasion, charges are best kept low.
- Administration: because minor forest products are usually produced or gathered by individuals at scattered locations throughout the forest, administration and collection of fees is difficult. Given the wide range of products and an often lengthy schedule of charges, administration can be complex.

**Analysis**
- With the diversity of minor forest products and wide range in uses and values, the charges are complex; administration, supervision, and collection are difficult.
- However, to indicate that forest products have value and as a basis for future control, at least token charges for all minor forest products are recommended.
- A simple system is to issue permits to collect up to a certain quantity within a specified time.

### 7. Charges on processed forest products

**Description**
- Charges on processed forest products (lumber, veneer, plywood, pulp, paper) are used as substitutes for stumpage prices on standing timber logs, or unprocessed forest products.
- They are widely used in developing countries and several developed countries.
Forest Concession Policies and Revenue Systems

Table A1  Revenue mechanisms for timber production and forest lands (cont'd.)

- Base: the volumes of processed products produced or shipped from wood processing plants.
- Charges can be varied by species and grade as well as by product (lumber, plywood).
- Level: most often administratively set as an ad valorem (percentage of value) charge, but can be set by negotiation or appraisal.
- Administration: charges on processed products often are used because they are easier to collect at centrally located processing plants than charges on logs at remote locations in the forest.

Analysis
- Main advantage: easier to collect than stumpage prices levied on logs.
- Disadvantages: discourage efficient use of timber, penalize processing plant efficiency, and reward processing plants that waste wood.
- Not recommended. Alternatives are possible.

8. Export taxes on logs or processed products

Description
- Used (1) as an easier-to-collect substitute for volume-based stumpage prices, and/or (2) to provide an incentive for domestic processing of logs.
- Used as an alternative to charges on processed products.
- High rates of export taxes on logs or processed products are used to raise revenues, to discourage the exports of logs or processed products, or to encourage further processing.
- Base: the volume (cubic meters), or value (FOB) of exports.
- Level: almost always set administratively, usually as an ad valorem (percentage of value) rate.
- Administration and chief advantage: easier to collect than either stumpage prices or charges on processed products.

Analysis
- Can encourage domestic processing or further processing.
- However, can generate significant distortions in using and marketing forest products. Need to be designed with great care and attention to coverage, rates, and details.
- Export taxes on logs can encourage domestic processing but also can encourage waste and inefficiency in the domestic industry. However, they are better than a log export ban and can generate revenue.
- Export taxes on logs, if combined with equivalent charges on log inputs to processing plants, can be substitutes for stumpage prices on logs. At equal rates on logs exported and used domestically, the incentive for domestic processing is neutral.
- Export taxes on processed products may be easier to collect than charges on processed products (7 above). However, they discourage export of processed wood products.

Charges for Logging and Forest Operations

9. Charges, fees, and taxes on capital equipment, labor, or other inputs

Description
- Some jurisdictions have special forestry charges, fees, or taxes on capital equipment, chain saws, labor, or other inputs in the forestry sector, in addition to economy-wide charges on labor, capital equipment.
- These include sawmill licenses, special charges on logging trucks and tractors, licenses for chainsaws.
- They are usually only a minor revenue source. However, revenues can help cover costs of licensing, control, and inspection.

(cont'd.)
Appendix: Forest Revenue Mechanisms

Table A1  Revenue mechanisms for timber production and forest lands (cont’d.)

### Analysis
- Used primarily as tools to control sawmills, chain saws, and logging equipment. For example, some countries have used chainsaw licenses and fees to monitor and control the use of chainsaws as a step in controlling their use in illegal logging.

### 10. Corporate income taxation

#### Description
- Most countries have a corporate income (net profits) tax on the profits of all corporations.
- Base: net profits = gross revenues less manufacturing, sales, administration, and other costs.
- Level: in most countries, statutory rates are 40 percent to 50 percent of net profits. However, effective tax rates are substantially reduced through distortions created by tax avoidance, evasion, tax holidays, investment incentives, and transfer pricing of inputs and sales.
- Administration: require accurate accounting by corporations and reliable auditing. Government administration requires the government to have the accounting and auditing capacity and staff to audit the corporations.

#### Analysis
- Should not be considered a replacement for stumpage prices or other forest fees. Replacement of these forest fees would give forest companies "free" timber and encourage overcutting and waste.
- Functions best as part of an economy-wide tax system, not as a substitute for forest charges, fees, or taxes.
- Transfer pricing problems of inputs and products can transfer profits out of the country and therefore lead to substantially reduced income tax revenues.
- Accounting opportunities to avoid or evade income taxes in forestry, as in other industries.

### 11. Logging profits tax

#### Description
- Three Canadian provinces have used special logging profits taxes levied at 10 percent of net profits of logging operations.
- These logging profits taxes are in addition to corporate income taxes.

#### Analysis
- A logging profits tax might be considered as a replacement for stumpage prices or other forest charges. However, they can, at most, collect only a percentage of the value of the timber (10 percent under the Canadian logging profits taxes).
- The logging profit tax should not be deductible from corporate income taxes (as in Canada). This defeats the purpose of the tax.
- Transfer pricing of inputs and outputs can inflate deductible costs, deflate sales prices of logs, and thus incorrectly reduce taxable logging profits. Tax accounting provides opportunities for tax avoidance and evasion because of the complexity of the accounting and tax calculations.

### 12. Economic-profit-based royalties: resource rent tax

#### Description
- Differ from the corporate income tax or logging profits tax by attempting to measure and tax the value of the natural resource itself (the forest, ore body, oil and gas pool).
- Originally developed for mineral development projects. First applied to the Bougainville copper mine in Papua New Guinea. The Uranium Royalty system in the Canadian province of Saskatchewan is another example.

(cont’d.)
Table A1  Revenue mechanisms for timber production and forest lands (cont’d.)

- Base: resource profits are calculated by allowing deduction of operating costs and a normal rate of return on capital invested. Remaining resource profit is taxed at a high rate.
- Administration: can use the existing corporate income tax system and tax auditing. However, because of the high tax rates, accurate and reliable accounting is required. Transfer pricing, tax accounting, and auditing problems can cause distortions and loss of revenue.

Analysis
- Applicable only to large, integrated forest development projects. Successfully applied to mining projects but not yet to forestry projects.
- Could be a potential replacement for stumpage prices and other forest fees.
- Should operate alongside corporate income taxes. Not a replacement for corporate income taxes.
- Transfer pricing problems can seriously weaken their effectiveness. As in other industries, tax accounting and auditing difficulties can lead to tax avoidance and evasion.

13. Government ownership or participation in the forest industry

Description
- Government ownership or participation (joint ventures or shareholding) in the forest industry are sometimes suggested as substitutes for forest charges.
- Ownership or participation can take a variety of forms: government-owned and -operated concessions, logging operations, and processing plants; joint ventures through equity participation, production sharing, or options on production.
- Administration: government ownership by itself is not enough. Government needs to have the management and accounting abilities to monitor its operations for efficiency.
- Government also needs the skills to negotiate joint ventures and to participate in, supervise, evaluate, and scrutinize the operations.

Analysis
- Government ownership or participation is not a substitute for an effective forest revenue system. It is an indirect and not very effective way to capture timber values.
- Government forest firms and joint ventures should still pay forest fees; otherwise, they will be receiving “free wood,” distorting their decisions and wasting resources.
- If government firms and joint venture forest operations are to operate efficiently, they must be allowed to operate independently, free from political involvement.
- Government ownership or participation can provide the knowledge and experience to supervise the private sector forest industry operations, and cost data to set forest fees.

Charges for forest lands and tenures

14. Initial license fee on forest concessions

Description
- Levied by only a few countries.
- In most of these countries, the fee is very low and does not cover even administrative costs.
- Base: a fixed fee, or a per-ha fee.
- Administration: easy, as either a fixed fee or a per-ha fee.
Table A1  Revenue mechanisms for timber production and forest lands (cont’d)

Analysis

- Initial license fees are recommended to cover administrative costs of evaluating and granting concessions. Fees should be high enough to cover administration costs of granting concessions.
- Advantage: if set high enough, initial fees will discourage frivolous or speculative concession application and acquisition.
- A per-ha fee is recommended.

15. Renewal fees on forest concessions

Description
- Levied by a few countries.
- Base: lump-sum or per-ha fee.
- Administration: easy.

Analysis
- A renewal fee can be used to cover administrative costs in evaluation of performance and renewal of concessions.
- Covers costs and helps discourage speculative applications or renewals by noncommitted concession holders.

16. Competitive bonus bids on forest concessions

Description
- Not common for forestry concessions. Widely recommended.
- Common for other natural resources (oil and gas leases and exploration permits, mineral leases and exploration permits).
- Base: can take the form of initial or annual bonus or premium payment. Can be on a lump-sum basis, per ha, per cubic meter of annual allowable cut, or per cubic meter of actual annual cut.
- Administration: government forest agency must have the capacity to establish forest concession area, organize and supervise auction and bidding, encourage competition, and supervise forestry operations on the concession. To avoid graft, corruption, and influence, the agency must be independent.

Analysis
- Can provide a measure of the value of concessions and of timber values for use in setting fees on other parameters. Recommended as forest areas become increasingly scarce worldwide. Recommended when competition for forest concessions exists or can be encouraged.

17. Annual ground rentals on forest concessions

Description
- Have been used successfully in a number of developing and developed countries. However, in most countries rates are low, and ground rentals generate little revenue.
- Base: rental is usually total area of the concession; in some countries, the area of productive forest or the annual allowable cut (18 below).
- Administration: administratively easy and simple, especially if based on the total area.

Analysis
- Opportunities for much more widespread use as key components of forest revenue systems if rates are increased to more significant levels.

(cont’d.)
Table A1 Revenue mechanisms for timber production and forest lands (cont'd.)

- Rate increases are recommended (1) to reflect the value of the concession and the value of the security of timber supply and (2) to generate more revenue and reduce reliance on difficult-to-administer and collect stumpage prices.

18. Annual allowable cut fee on forests concessions

**Description**
- Annual fee, based on the annual allowable cut of the forest concession. Can be an alternative to annual ground rentals (17 above).
- Used in a limited number of countries, primarily developed but also a few developing countries.
- Base: calculated annual allowable cut of the concession.
- Administration: can be levied only after completion of the forest inventory and calculation of the annual allowable cut.

**Analysis**
- An alternative to annual ground rentals that can more closely reflect the value of forest concessions.
- Annual allowable cut fees are the only feasible concession fees for volume-based forest tenures.
- However, area-based annual ground rentals are preferable for most area-based forest tenures because of their simplicity.

19. Property taxes on forest concessions

**Description**
- Annual taxes based on an assessed value of the property or concession.
- Widely applied to private forest lands in developed countries and to forest concessions in some developing countries, for example, Indonesia.
- Base: assessed value of the property, forest, or concession. Assessed value may be based on market values, on some percentage of market values (for land and buildings), or on some formula (for forests and other less marketable assets).
- Administration: requires establishing assessment procedures, which can be complex and expensive where there are no property tax assessment procedures in place for private lands.
- If property taxation and assessment of private lands is already established, it may be possible to extend the system to forest concessions on public lands, using a simple assessment formula.

**Analysis**
- Alternative to ground rentals.
- May be feasible in some countries, if assessment procedures for private lands are well developed.
- If property tax assessment systems for private land already exist, could provide the basis for simple assessment formulae to be used on forest land.
- Forests are slow growing; therefore, forestry is very capital intensive. As a result, property taxation often discriminates against forestry. Therefore, adjustments to assessment formulae for forestry are required.

20. Area-based or other service fees on forest concessions

**Description**
- Include fees for such services as fire protection, insect and disease control, inventory, log measurement, tree seedlings, inspections.
- Used in only a few jurisdictions.
Table A1  Revenue mechanisms for timber production and forest lands (cont’d.)

- Base: like user fees, are based on the amount and level of the services provided. Per-ha may be the simplest way to charge.
- Administration: relatively easy. If related to the amount of the service provided, can facilitate cost recovery and efficiency in provision of forestry services.

Analysis
- In most cases, set too low and do not cover costs. As a result, the services are subsidized and often used inefficiently.
- Area-based or other fees for forestry services that reflect the cost of provision can help to ensure that costs are recovered, encourage efficient provision and use of the services, and avoid unintended subsidies.
- Should be keep simple and easy to administer and collect.

21. Initial license fees on short-term forest tenures

Description
- Initial, one-time fees levied on applications for timber sales and other short-term tenures. However, few jurisdictions use them.
- Base: fixed or per-ha fee.
- Administration: simple, as either a fixed fee or a per-ha fee.

Analysis
- Modest initial fee recommended to cover the costs of processing the sale and discourage frivolous applications.

22. Annual rentals on short-term forest tenures

Description
- Annual fees (fixed or per ha) levied on timber sales contracts and other short-term tenures.
- A few jurisdictions levy an annual rental on short-term tenures.
- Base: fixed annual or per-ha annual fee.
- Administration: simple.

Analysis
- Recommended for timber sales and other short-term forest tenures to cover costs of supervising or providing forestry services to these operations.
- Also can capture part of the value of the timber, reducing reliance on stumpage prices on the timber cut, which are difficult to administer and collect.

23. Area-based or other service fees on short-term forest tenures

Description
- Include fees for such services as fires protection, insect and disease control, inventory, log scaling, tree seedlings, and inspections. Are used in only a few jurisdictions.
- Base: like user fees, based on amount and level of services provided. Per-ha may be simplest way to charge.
- Administration: relatively easy if related to amount of services provided. Can facilitate cost recovery and efficiency in providing forestry services.
output (economic activity) and, second, by the base on which they are levied.

Pricing policies and revenue mechanisms are more difficult to design and to implement for nontimber forest outputs than for forest revenues. There are two reasons for this. First, nontimber outputs represent a much more diverse range of forest uses. Second, many nontimber outputs involve nonmarket values. These nonmarket outputs include public (or collective) goods and services, such as recreation and wilderness values; externalities (or spillover benefits and costs), such as watershed benefits; or common property resources and outputs, such as wildlife and fisheries.

Because many nontimber forest outputs involve nonmarket values, establishing prices for all nontimber forest outputs is not expected. Nevertheless, it is often possible to develop imaginative pricing policies and revenue mechanisms for a number of situations and to use pricing policies as a tool of resource management. Table A2 suggests potential pricing revenue mechanisms for nontimber outputs.

### Table A2 Revenue mechanisms for non-timber outputs

#### Recreation
- Annual and daily entrance fees for parks and recreational facilities
- Campground fees, picnic site fees, other facilities fees
- Differential fees between facilities to encourage use of less crowded or underused facilities
- Peak and off-peak fees to encourage off-peak usage and ration peak usage
- Differential fees between provincial residents and nonresidents, on the grounds that provincial residents finance part of the cost through a lump-sum share of provincial general revenue funding
- Voluntary contributions to specific uses and special funds.

#### Hunting and fishing
- License fees, annual and daily
- Differential license fees by region, location, or species
- Tags for each animal or fish
- Voluntary contributions to specific funds to finance management or enhancement

#### Subsistence resource use
- Prices or fees not appropriate for most subsistence resource uses for a variety of reasons

#### Watershed management outputs
- Annual water use licenses based on licensed volumes of withdrawals or in situ usage
- Water power rentals for hydroelectricity

#### Accounting prices for nonmarket resource outputs and values
- Variety of accounting prices could be used, not as revenue sources but as internal prices for forest management, multiple use management, land management, departmental budgeting, and planning.

*Source: Author.*


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