

Sustainable Forest Management: Allocation of resources and responsibilities

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1) Introduction

The purpose of this volume (referred to here, for simplicity, as *the Policy Volume*) is to provide a summary of the main issues underlying forestry concession policy and practice in developing countries. The document is therefore best thought of as a companion to the more field-practice oriented *Manual of ...*[what title did we decide to give it in the end?].

The *Policy Volume* is intended primarily, but not exclusively, for the staff of the developing countries' government departments most concerned with allocation of forest land and formulation of rules guiding the land's subsequent use. It is hoped, however, that by explaining the context and providing suitable illustrations or case studies, the review of the main arguments and a cross-country comparison of policies and practices will make the volume also of interest to those forest managers who are actively involved in the task of policy interpretation and implementation.

The method adopted to produce the *Policy Volume* has been relatively straightforward. Topics, considered central to the subject of sustainability-oriented forestry, are identified. The headings of each of the *Volume's* section makes it clear what these topics are. Where the topic selected is of the kind where a given policy goal can be attained through a number of different policy tools (for instance, where sustainability of forest management is influenced by different ways of charging for the forest resource), each policy tool or procedure is first described, examples given of its use, and its effect on sustainability described and --in relevant cases-- further elaborated on or qualified. Simple recommendations are provided in those cases where no major risk of oversimplifying exists. Finally, a number of case studies are provided to provide situation- and country-specific illustrations.

2) Forestry and land use planning in the national perspective

2.1 Introduction

It will be intuitively clear that sustainability has its basis in the degree of political commitment to its tenets, translated first and foremost into policies each country adopts to land categorisation and the predominant use and type of management assigned to each category.

It is not our purpose to discuss in detail the many different definitions of sustainability, as applied to forestry (the *Manual* contains a summary). Nevertheless It is worth reminding the reader that in most countries, regardless of the stage of economic development, official commitment to sustainability as the overall principle of land management needs to coexist with an evolving, non-static, land use. Sustainability or lack of it will typically not be a matter of ensuring that a particular pattern of land use undergoes little or no change. Rather, it is a matter of ensuring that whatever changes in land use there may be, they represent a change from an unsustainable to a sustainable use, or from a low-social-value sustainable use to a higher-social-value sustainable use.

That principle applies as much to changes in the pattern of use *within* the broad category of forestry (i.e. changes from one type of forestry to another type of forestry) as well as those *across* the broader spectrum of land uses (from forestry to non-forestry or vice versa). On this interpretation, the cause for concern is less that, say, an area under forest is set aside for a non-forestry (agricultural, urban) use but that such non-forestry use may generate lower social values, may be unsustainable or a combination of the two. Sustainability is desirable only if the land use that is being perpetuated is socially superior to any other.

The example above makes it clear that a rational approach to land use at the national level will require an estimate of what the social values of different land uses are. In practice, these estimates are often implicit (i.e. the decisions taken imply the value the society and its government representatives place on different uses the land can be put to without actual estimates of these values being attempted or available). Increasingly, however, attempts are made to allocate land to different uses on the basis of explicit estimates of these uses' social worth.

The term social value, sometimes used interchangeably with "economic value", is used by economists in preference to simple "value" or "financial value" to capture that portion of the value (or cost) of particular land use not expressed by observable market prices. An area of land will typically generate some values that are easily determined by reference to existing prices (e.g., the current and likely future value of commercial logs produced and sold) and some that cannot be so determined (e.g., the value people place on the forest's recreation use, the value of forest products gathered by the local population without payment, possible cost to third parties resulting from logging, etc.). The financial and the economic value of a given land use may therefore diverge, and sometimes substantially so.

The financial value of a particular land use will be relevant to private decision making, the economic value of the same land use will be relevant to social, economy-wide, decision making. The theoretical goal of rational land use management at the economy-wide level can then be simply stated as maximisation of the aggregate economic value of the total land endowment. The challenge to policy --a theme running through this volume-- is to correctly identify those cases where actual or potential economic values of land-uses depart from corresponding financial values and formulate policies that make it possible to achieve a rational land use at the lowest cost. Depending on circumstances, this may require that certain types of land uses be removed from private-sector management or that particular operating regimes be imposed on those managing the land resource.

2.2. *Who owns forests ?*

Let us move from land use in general and turn to forest land use, considering the existing pattern of its ownership first.

In terms of area, between 80 and 90 per cent of forest resources world-wide are currently owned by governments [Johnson and Cabarle (1993)]. This includes nearly all of Africa, Asia, Russia, most of Latin America, and a varying proportion of the forest land of industrialised countries. Notable exceptions are found in Brazil, Papua New Guinea (PNG), USA, Sweden, Japan, Finland, UK, and other European countries,

where part or most of the forest land is privately owned [Cubbage et al. (1994)]. The mere existence of government ownership does not, however, guarantee trouble-free custody and in many developing countries, the government ownership is contested and ineffective.

Viewed over a sufficiently long period, government tenure is a relatively new feature. Traditionally, with most forests originally located in remote areas, land ownership did not need to be defined. Forest use was based on customary rights of those who depended on the resource for subsistence (e.g., *adat* rights in Indonesia, stool systems in Ghana). The concept of a spatially delineated and legally sanctioned land tenure in most cases dates back to the colonial times when all land considered “unappropriated” was brought under the control of the respective “crowns”, later superseded by national governments. However, some of this “unappropriated land” had been home and a source of livelihood to people. In these cases, the forests’ appropriation by governments was therefore done at the expense of such customary rights. Some of the present-day conflicts between the customary owners and the government over the rights to forest resource (e.g., in parts of South-East Asia) therefore have a long history.

Conceptually different is a situation (common, e.g., in most of Melanesia, parts of Nigeria, Ghana, or PNG) where forest land belongs to local people, but is managed by governments. This situation has presented its own specific problems [Barnett (1989)].

While government ownership of forest remains the norm world-wide, there have been several cases of modern governments returning forest land to private ownership through sale (e.g., USA or, more recently, UK and New Zealand) or distribution. Brazil and Nepal provide the most important examples of the latter. On a smaller scale, a number of countries where governments encouraged agricultural development of their forested frontiers (the case of Mindanao in the 1950s or several Latin American countries are fairly typical) belong to the same category.

Fairly or not, the role of governments as the sole or main guardians of forest land has come under increasing scrutiny in recent years. The debate has been fuelled by the widespread perception of ineffectiveness of government stewardship of the resource in most developing countries. Continuing deforestation or degradation of the resource, coupled with bureaucratic abuses, are cited in support of the growing scepticism regarding if not the government ownership *per se*, at least the manner of exercising such ownership. The arguments have been increasingly grounded in economic reasoning and often made complex by simultaneous ascendance of conservation concerns that, at least superficially, would seem to require *more* government ownership, not less.

This *Volume* tries to unravel some of these complexities or at least systematically present the main arguments. Arguing the case for one or another type of forest land ownership, however, is not our main objective. Instead, the government-controlled forest land and its management will remain the focus of this document simply because it corresponds to field realities in most countries.

Box 1 : Forest land ownership: the theory

What does the theory say about the nature of resource ownership and the pattern of its subsequent use? Briefly, it holds that where markets operate efficiently in the sense of ensuring that market prices reflect all private and social costs, such markets will ensure socially efficient allocation of resources. Applied to forests, reliance on the market would then ensure that the rate and pattern of forest utilization is socially optimal. Any abandonment of forest land in favour of other uses would be indicative of a socially higher valuation placed on such alternatives rather than considered an undesirable outcome. Although the State could in theory mimic such a market, efficient markets have in practice tended to be associated with the private enterprises, not State management.

The economic case for State management of forests rests largely on a perceived failure of markets to allocate resources efficiently. This might be so, for instance, if the forest provided mainly public goods (such as beautiful views) rather than mainly timber or if production of timber were always associated with high off-site cost (such as might happen if logging were to move to the steepest slopes). In the former cases, the private owner would tend to supply too little (visual enjoyment), in the latter case, too much (timber). This view has not been seriously challenged: it tends to be widely accepted that environmentally the most fragile areas should not be made available for commercial logging and, similarly, unique areas of natural beauty are usually expected to be reserved for the broad public (whom, it is hoped, the State adequately represents).

Though not necessarily rationalized by reference to economic arguments, the State has usually divided the forest estate into production forest and other type of forest and dealt with the two categories broadly in line with the normative prescriptions mentioned above. The productive forest is leased to private enterprises for log production (under terms and conditions that will continue to occupy us) while the latter category is held in reserve, or treated as a protected area under direct management by the State. The quality of the initial classification (and subsequent re-classifications) of forest land is of major importance. Decisions are not necessarily based only on economics. In reality, some forest areas "deserving to be a park" have been allocated for commercial logging in and, at the other end of the spectrum, state logging enterprises have in a number of cases demonstrated the limitations of the State trying to act as an entrepreneur.

As always, life is more complex than the extremes might suggest and the ownership divide becomes blurred. In a large number of cases, forest provides, in different proportions, public goods and "ordinary" outputs of timber. Also, production of timber may be accompanied by a wide range of environmental repercussions rather than being associated either with none or with an unacceptably high environmental cost. Furthermore, sensible management of a country's forest estate needs to explicitly consider the cost of the management itself. Like in most other forms of spatially based activities, economies of scale tend to be important in forest management. Fragmentation of forest land into different ownership- or management parcels, though possibly conforming to theoretical ideals, might turn out to be impractical and costly.

2.3. Forests and national economic development

Forests on public lands are normally administered through one or another type of administrative structure, incorporated within (or coinciding with) a government department (forestry, natural resource, environment or the like), sometimes taking the form of a board or an agency with varying degrees of autonomy. In this document, a general term "forest service" (FS) will be used to describe this structure. It is the FS that is normally charged with defining forest and forest land and categorising the latter into broad categories such as permanent forest, protection forests, unclassified land, or conversion areas for agriculture or other uses. In some countries where tenure has been disputed, the FS's demarcation functions may go further and include indigenous peoples reserves (e.g., Indonesia) and the like.

In selecting forest land classification and formulating the management regime to be assigned to each of the forest land categories, governments pursue a number of objectives, often overlapping and in some cases conflicting. A broad list is given below:

- I. *generation of revenue* - most governments associate public ownership of production forests with a right if not an obligation to raise revenue. Revenue is generated either through own production and sale of forest products (a situation prevailing, e.g., on the Asian sub-continent), or through fees charged to third parties (normally private enterprises) for the right to exploit the forest. In either case, norms are developed to regulate the production and the collection of revenue. The emphasis on revenue generation often relegates other functions of forests to a secondary place and makes timber harvesting --rather than forest management-- the focus of attention [see Gray (1983)]. If so, generation of revenue in the short-run may come at the cost of forest revenue in the long run. Related to (I) is
- II. *development of the economy* - in most cases, the revenue collected from state-owned forests is "recycled" through the fiscal system to support the development of the national economy. The revenue either accrues to the treasury as general income or is earmarked for specific purposes. In the process, the temptation is often created to treat the renewable resource as a non-renewable one, i.e. as a mine, and effectively convert forest assets into non-forestry assets considered more deserving
- III. *encouragement of local wood processing* - existence of abundant wood raw material whose commercial utilisation needs to overcome the drawback of high transport cost confers a significant locational advantage on local producers. This, coupled with the prospect of increased value added and local employment, has led many countries to see wood-processing as a natural engine of local industrialisation. The locational advantages have often been considered sufficiently high to offset existing weaknesses such as poor infrastructure or level of skills. Throughout the peak years of wood production in many countries (e.g., the Philippines, Ivory Coast, Indonesia, etc.), the industrialisation objective was translated into a policy of allocating forest land for exploitation only to those leaseholders committed to local processing. This was often accompanied by tax and other incentives extended to local wood-processing industry as well as, in a large number of cases, by blurring of state and company responsibilities for local development (the state relying on the industry to provide facilities such as local schooling, health care or infrastructure maintenance in exchange for tax exemptions). The role that the policies designed to encourage local wood processing have had on the state of the forest resource is a much discussed topic but the broad conclusion seems to be that these policies, in general, have contributed to forest resource depletion in the producer countries and the hoped-for benefits of wood-based industrialisation have often been illusory.
- IV. *perpetuity of forest cover and the flow of forest goods and services* - this could be regarded as the "bread-and-butter" task of modern forest administrations in the majority of developing countries, pre-dating more recent concerns with sustainability. Success the FSs have had in maintaining the extent and quality

of forest cover tends to be regarded as the most useful criterion of the overall effectiveness of the state forest stewardship

- V. *environmental soundness of forest land use* - it is usually the FS or its umbrella ministry that are expected to be the “environmental conscience” of the nation in addition to being expected to be effective managers of the national forest estate. The classification of forest land, zoning decisions and mandated management rules all impinge on environmental outcomes and typically come into conflict with revenue-raising objectives of the government.
- VI. *rural development* - often an aspect of II and III above. In some cases, government wishes to assign forest revenue directly to specified social programs. Thus in Sabah, the State government granted a large area of its forest to a foundation set up with the mandate to carry out social programmes “to enhance the quality of life” of local population. In other cases [e.g., the *Bina Desa* programme in Indonesia], forest revenue has been directed to support specific rural development programs in areas affected by forestry operations.
- VII. *employment and income generation* - depending on the degree of mechanisation, timber production, processing and trade create jobs, directly and indirectly. This is an important consideration in those areas where alternative employment opportunities are few, and often limited to environmentally damaging forms of extensive farming.
- VIII. *land redistribution and development of remote areas* - allocation of forest land for conversion to farming may be considered a suitable vehicle to develop remote areas of the country, meeting, at the same time, the aspirations of the landless. This was the case, for example, of Brazil’s National Integration Plan under which a large number of landless were settled along the Transamazonian highway in the 1970s [Browder (1988)], or the Transmigration Program to relocate people from over-populated Java to less populated islands in Indonesia [Gillis (1988)]. Worth noting in passing is the need to estimate carefully the full costs and benefits of such programs. On several occasions, resettlement programs have proven to be cost-inefficient means of reaching development objectives [Repetto (1988)]. In some cases, distribution of forest land in remote areas has been encouraged for national security reasons [e.g., the Polo Noroeste program in Northwestern Amazon; see Browder (1988)].

Successful management of the country’s forest in support of national development will then be judged by reference to how it meets all or some of the above objectives (and quite possibly, in specific cases, additional ones). It will be the quality of the public owner’s policy in the sector that will largely determine the outcome.

Appropriate policies would be relatively easy to formulate if forest management had a single objective rather than several. Thus, managing the forest to generate maximum revenue is easier than managing it to generate an optimum mixture of revenue and environmental services (say, recreation). This is in part because the outcomes under one or more policy objectives (here, environmental services) cannot be readily compared with other outcomes (here, revenue) presented in conventional, money, terms. Once again (please return to Section 2.1), policy formulation and evaluation will

require the services of an economist and an estimate of monetary values of possibly disparate outcomes, or estimates of the same or similar outcomes materializing at different points in time.

Box 2: Approaches to optimal use of forest land: economics once more

Optimality in economics requires that any activity be expanded as long as the extra value of doing so remains above the value of additional resources needed. Thus more wheat (say) will be grown (either by expanding the area cultivated or by intensifying production) as long as the price obtained for the last bushel, P , is greater than its production cost (MC , marginal cost). If production of wheat were to be accompanied by undesirable environmental repercussions (inflicting an environmental cost EC on the rest of the economy), optimality would require that production of wheat be reduced to the point where P equals $MC+MEC$. Unless this is done, the true cost to the economy of wheat production, i.e. the sum of MC and marginal environmental cost (MEC), will be greater than the worth of the extra output.

Production of logs will be like that of wheat with two important additions: First, forest is in principle a renewable resource but it shares with other renewable resources the potential risk of depletion. Current rate of log output will determine future output and its cost. The increase in future production cost brought about by excessive current output is referred to as depletion cost (or user cost). Sustainably managed renewable resource implies a zero depletion cost. Secondly, production of logs may be associated with an environmental cost, borne by third parties.

It is a standard result of economics that optimality in the use of renewable resources requires that the worth of the marginal unit of output be equal to the sum of marginal production cost (MPC), marginal environmental cost (MEC) and marginal depletion cost (MDC) or, in symbols, $P = MPC+MEC+MDC$. Using a more complete definition of production cost, the identity becomes $P = (MLC+MMC)+MEC+MDC$ where MMC is the marginal forest maintenance cost.

The equality makes it possible to formulate a rational approach to forestry and forest land use in general and adopt a more practical approach to sustainable forest management rather than exempting it from any critical inquiry. Forest lands are not always used optimally as long as they grow trees and conversion to non-forestry uses can be socially optimal. In some cases, non-sustainable forestry in the form of "timber mining" may be considered desirable. This would be the case if logging had no adverse environmental consequences and if logging profit were to be greater than the depletion cost at all levels of output. This could happen, for instance, if timber prices were expected to decline over time and the area concerned enjoyed particularly easy and uniform logging conditions. There would then be little merit in attempting to renew the resource even if the land in question had not had an alternative use superior to tree growing. The closest parallel would be with guano-producing islands of the Pacific just before synthetic fertilizers dramatically changed the prospects for the commodity. Quick and efficient exhaustion of the mine, guano or timber alike, would then represent the socially optimal response..

Still assuming no environmental repercussions, timber is worth renewing if true (long-term) profit of timber production (equal to $P-MLC-MMC$) lies below the marginal depletion cost. It is then socially preferable to go on sustainably producing timber rather than incurring a higher depletion cost. The higher the depletion cost (because, for instance, of the likelihood of rising future timber prices), the stronger will become the case for managing the timber resource sustainably.

More than the prospect of increasing future prices of tropical timber (which we consider unlikely, at least for the majority of species now harvested), it is the environmental value of tropical forest that provides a more solid rationale for forests' sustainable management. Existence of environmental benefits of continued forest cover naturally makes it less likely than non-sustainable forestry might be socially optimal. Where environmental benefits exist, it will be important in practice to distinguish between those cases where private timber production is compatible with the continued provision of such services and those where private logging conflicts with forest's environmental functions (e.g., in areas particularly rich in biodiversity or areas of exceptional recreational value). In the former case, a mixed (unified) management of the forest in question is possible, in the latter it will require a zoning decision separating the logging areas from the rest. Finally, where environmental values dominate (i.e. where, in terms of our identity, $P-MLC-MMC-MDC < MEC$ at all levels of output), only a public-park mode of operation will be compatible with social efficiency.

In practice, policy tends to be formulated without such formal analysis and explicit valuation. Most valuation is implicit or masked by decisions considered to be "above

economics". Although sound instinct guiding the trade-offs between various policy objectives can be an acceptable substitute for formal analysis (and will be preferable to second-rate economics), there is no reason to expect sound instinct to be more widely available than sound economics. In short, good policy for publicly owned forests will tend to benefit from solid application of economic valuation and methods.

3) Forest tenure systems and types of forest utilisation contracts

Who manages forests ? A spectrum of models of administration of forest resources exist world-wide distinguished mainly by the degree of government involvement in the actual running of forestry operations. This ranges from simple harvesting contracts, carried out by private operators, through to intensive management and harvesting by the FS itself.

3.1 State ownership and full management

In this model, the government undertakes all the management activities including inventories, planning, harvesting, post-harvesting scaling, and sometimes log transport out of the forest. The FS then sells timber through fixed prices, tenders, or auctions. This is the main method currently utilised in Myanmar, in Nigeria's Forest Reserves, in parts of Finland, Germany, Tanzania, and previously in Thailand (before the national ban on logging). This system requires a large government structure, which is often not existent or otherwise not as efficient as the private sector. The trend in industrialised countries is to reduce the responsibility of the government in forests management, as illustrated by the privatisation of forests in Sweden and New Zealand, or subcontracting activities to specialised companies, as done in Germany. Decentralisation of forest management responsibility has also been tried in some tropical countries, such as Mexico, Costa Rica [Richards et al. (1996)], and Nepal [Ingles et al. (1996)].

3.2. State ownership with different degrees of management devolution

This is the most common method of forest management world wide. The forest estate remains the property of the Government, which allocates management rights and responsibilities to the private sector or communities. Whenever third parties are involved, governments allocate forest resources according to certain rules and impose or negotiate certain operating and financial conditions with the party in question. We will use the general term "forest utilisation contracts" to denote such arrangements [see Schmithusen (1977) for a wider discussion] and the term "forest tenure" as the general label to capture the entire spectrum of arrangements. The characteristics of the most common types of forest utilisation contracts are listed below, in order of increasing government involvement.

- *forest concessions* - under this model, the government grants an area of land to an individual, company or group of people to utilise it for forestry purposes. Forest concession is therefore a form of *lease*. The land remains the property of the government, which imposes a series of management conditions, as well as charging certain fees. The length of the lease as well as the method of granting the concessions vary widely, and these aspects are discussed in further detail in the following sections. Concession agreements are the most common form of tropical

forest allocation world wide, being the method utilised in most of Asia and Africa, and parts of South America. Approximately 90% of industrially-produced timber is harvested from areas under concession agreements [Schmithusen (1980), Johnson and Cabarle (1993)].

- *local or community management agreements* - these can be thought of as variations of the systems of concession agreements, but with communities instead of companies as the licensees. In some cases, communities have used the forest for a long time, and retain customary rights over this land. The agreement then typically deals with matters such as boundary demarcation, management principles to be adopted by the contracting community, the technical assistance possibly provided by the Government owner, etc.
- *management contracts* (forest management licenses) - in some cases, these are forest concessions by another name, in other cases they are associated with somewhat greater government involvement. The principle is similar to that governing the award of forest concessions: the government retains the ownership of the forest resource, but allows companies or individuals to manage the forests subject to owner-imposed conditions. The management license is granted for a given area and length of time, and entitles the license-holder to produce a specified volume of timber. The licensee is charged prevailing forest fees. The conditions imposed on the license-holder usually include the type of management to be practised, annual harvestable volume ("annual allowable cut"), etc., all of which can be checked periodically for compliance. Compared to particular variants of the concession method, licensing systems result in tighter control by government, and a larger proportion of the revenue reverting to government rather than individuals or companies. At the same time, increased government involvement requires greater administrative capacity and higher costs. Variations of this system are currently utilised in most Canadian provinces [Grut et al. (1991)], and in Peninsular Malaysia.
- *logging contracts* - in this system, the government has even greater control of the timber resource, since it owns and manages the forest, only contracting out the actual harvesting (and possibly silviculture) activities. It is utilised in Japan, parts of Myanmar, Canada, and the US. However, it requires a forest service fully staffed and funded to undertake all the activities related to forest management, which include area demarcation, inventories, road construction, timber marking, etc. Logging contracts can be awarded administratively or competitively. In the latter case, they are usually referred to as *stumpage sales* [common, e.g., in US Forestry Service practice, and partly that of the US Bureau of Land Management; see Sedjo (1996)].

3.3. Customary rights and community leaseholds

In this case, the rights of indigenous people to use of land, forest, or both, are legally recognized. In a general way, recognition of customary rights is a moral issue, devolving land to its legitimate users. From the forest's point of view, this often has positive effects. As in the case of long term agreements with concessionaires, assurance of tenure results in a much higher sense of responsibility and care for the forest resource. A variety of different types of recognition of customary rights exists. In Brazil, 80 million ha of

indigenous reservations were finally demarcated, so that Indian communities now have full ownership of both land and forest use. In Ghana, there is the “stool system” of customary use of land and forests. In some states in Nigeria, most of the forest outside government reserves are controlled by local communities. In the Malaysian states of Sabah and Sarawak, local communities have rights to a certain area of forest for their traditional uses. In Papua New Guinea, most forests belong to local communities who rent the rights of forest use to private companies or government. Discussion on the processes of devolution and management of forest resources by traditional users is found in Carter (1996).

3.4. Private ownership

While unusual in Asia and Africa, private forests exist in many European countries, and North and South America. Ownership may be to individuals or companies. In Finland, most of the land belongs to individuals, in small holdings of an average of 50 ha. Sweden has a combination of small family holdings, combined with very large companies which own forest areas of more than 1 million ha. In these Scandinavian countries, it is common that small forest owners group themselves in co-operatives which assist with management and marketing of forest products. While management is mostly done by the private sector, there are examples where government assists in the management. This is the case in Finland where a well prepared government department provides a subsidised inventory service, and management service to small holders.

Private ownership is a fairly common feature in many countries in Latin America. In these countries, the concept of forest land is not differentiated from agricultural land, and it is often the case that a same property may include a combination of farming, ranching and logging activities at the same time. This may also lead to the excessive deforestation, since in many cases the returns from farming exceeds those derived from timber harvesting. An interesting system of government incentives has been developed in Costa Rica, with the objective to increase the attractiveness of forestry activities in relation to other forms of land use (see case study, Section 9).

3.5. Discussion

Large variations exist in relation to tenure systems in different countries, and sometimes within countries [see, e.g., Canada, where a variety of tenurial variations exist]. This reflects the extreme complexity of land and forestry issues, and the need to be flexible to adapt situations to different conditions.

The trend of decentralisation of control over forest resources, devolving most of the direct management to private sector, be it companies, individuals or communities, appears promising. In this case the State only retains the tasks of general administration, revenue collection and supervision/enforcement.

Among the tasks often retained under government responsibility is the delimitation of different types of forest use. This process, however, needs to be done in a planned manner, taking into consideration the full potential and limitations of land, and involving full stakeholder participation, particularly people with any degree of dependency on the forest. Advantages can be found in a strong Forest Administration centralising forest

inventories and the calculation of forest output (annual allowable cut) based on the forest state as a whole, as is the case in Malaysia, Sweden, and Finland.

Government should also remain responsible for the enforcement of the forest legislation and revenue collection. However, it is often the case that FSs are not properly equipped to undertake this supervisory role, which remains inefficient and ineffective. Some countries have chosen to subcontract this supervisory role to independent contractors (e.g., Cameroon and Congo governments have subcontracted the duties of customs inspection to the private company SGS Forestry, resulting in huge increases in collection of export duties). Another possibility is to promote higher community participation in verification/enforcement (e.g., revenue collection in Cross River state, Nigeria, or the CAMPFIRE Program in Zimbabwe). It is uncommon that governments are well prepared to take care of direct administration of the forest estate.

4) Methods of allocating public forest land

4.1. Introduction

A notable feature of public forest management, especially in developing countries, is a wide variability in the performance of existing leaseholders. Where the Government owner concludes that management by third parties is preferable to his own (a situation normally assumed to apply to production forest), it will naturally want to lease the public forest to the “best tenant”. Allocation of public forest land is conceptually little different from the process of any landlord attempting to lease his property on the best terms possible. If the object of the lease were to be a garden rather than a house, the parallel would be complete.

The search for the “best tenant” may be based on the quality of the potential tenant’s references, almost certainly be a matter of the price the tenant is prepared to pay, the tenant’s willingness to assume maintenance obligations or undertake property improvements, etc. In some cases, the landlord will prefer a smaller lease payment by a more “solid” tenant to a larger rental by an “untested” party. Sometimes, it will be to the landlord’s advantage to let the potential tenants compete among themselves for the right to lease the property, in other cases, the landlord will prefer to exercise a more personal right of tenant selection. The former situation can be described as competitive, the latter, as administrative.

Let us consider how these two broad approaches apply to allocation of public forest land.

4.2 Administrative allocation

Administrative allocation of public forest land for management is the more common of the two main broad approaches found in the tropical timber-producing countries. It involves selection of potential leaseholders according to administratively determined criteria such as the applicant’s experience of forest management, the quality of the management plans submitted, intended extent of local processing and infrastructural development, (usually translated into investment commitments), employment projections, etc. Under this method, the potential leaseholder does not compete on the

basis of price offered for each unit of timber. Instead, existing (also administratively-determined) forest charges apply equally to all applicants and leaseholders. Whatever competition there is takes forms other than price and is therefore more difficult to evaluate impartially.

The system is rarely transparent; the evaluation criteria and evaluation results other than the final decision not normally made public. The approach creates conditions inviting favouritism (other than the officially sanctioned one) and other abuse.

The other drawback of the approach is that it tends to award areas more on the basis of various commitments than “hard cash”. It is often difficult to estimate whether the value of the disparate commitments (even if they could be assumed to be enforceable) approximates the applicants’ willingness to pay.

The potential advantage of the method over the competitive one (especially the poorly designed variant of competitive allocation) is that it removes the incentive for the prospective leaseholder to recoup a high price bid by a neglect of forest maintenance and other concession obligations.

4.3 Competitive allocation

Although, despite its name, administrative allocation of forest land also in principle contains elements of competition, the term competitive allocation is normally reserved to those cases where it is the price offered --rather than non-price elements-- that determine the allocation decision. In most cases, competitive allocation takes the form of an *auction*. The forest land (with attached management obligations) is leased to the applicants offering the highest price per unit of standing volume or per unit of concession area. The efficiency of this mode of land allocation (and auctions in general) is a matter of several factors the most important of which is the existence of genuinely competitive conditions (and, hence, absence of possible collusion among bidders).

The rights being competitively allocated can be variously specified. The most common auctions in forestry are *stumpage sales* i.e. rights to harvest a specified volume or area of standing timber. These are best known from the US Forest Service practice but used also in the tropics (e.g., Malaysia, Ivory Coast or Venezuela) and in other areas of temperate forestry (e.g., in some Canadian provinces). The rights being auctioned are here limited to harvesting rights, and they normally have limited duration. The forest owner retains direct control over forest management. Competitive allocation of long-term rights to harvest timber or auctioning off the entire bundle of long-term concession rights and obligations is less common.

The stumpage sales have become a well established, almost standard, method of allocating harvesting rights in large parts of North America and elsewhere. They tend to maximise revenue for the owner and, coupled with intensive preparation, monitoring and enforcement, they have efficiently complemented the owner’s management objectives. In other cases, where management oversight is weak and auctions are resorted to precisely to make up for the deficiencies of administrative weaknesses, a risk is created that auctions may accentuate a short-termist approach by potential leaseholders to forest management. High price is offered to the owner for the resource

because the bidder expects to escape future cost of his lease obligations (such as the cost of forest maintenance).

The often-heard objection to price-based approaches to forest land allocation citing the unfairness of the method said to favour those with sufficient financial resources over the financially weaker (yet, possibly, technically more competent) applies only in those cases where financial markets are non-existent. Where they do exist, potential bidders can raise the necessary finance in the same way that, say, an entrepreneur might when borrowing money from a bank.

Auctions are clearly not suitable for allocating rights to forests whose management objectives are not to generate revenue (i.e. conservation areas). In this case, however, it is doubtful that allocation to a third party for management, whether administrative or competitive, is appropriate to start with.

4.4 Sales of forest land/privatisation of forest assets

Competitive approaches to allocation of forest land have also featured in recent attempts, world-wide, to *privatise forest assets*. These may vary from privatisation of concessions (effectively perpetuating the duration of the concession), privatisation of the forests (as done for *P. radiata* plantations in New Zealand), or privatisation of land and forest, as done in Chile, Brazil and parts of British Columbia. The privatisation option is resorted to by some governments in those cases where no compelling conceptual reasons (such as important externalities associated with forest management) exist to justify continued state ownership, and where political priority is assigned to reducing the state involvement in an activity believed to be more efficiently performed by the private sector.

A purist may question the inclusion of land sales in the list of mechanisms that seek best to allocate public forest land for management. Once sold, government forest land leaves the public domain. However, the transfer into public ownership does not necessarily eliminate the State's say in how trees on the now private land are to be managed. For instance, following a series of forest land sales, much of the accessible forest land in Brazil is now privately owned, and can be freely bought and sold. Yet the owners of the land, while having essential freedoms to manage the land as they see fit, are nevertheless bound by certain minimum requirements (e.g., the minimum percentage of the total landholding that must not be cleared) laid down by the FS of each State of the Federation.

4.5 Performance- related systems of forest land allocation

This is a system of allocation of public forest land that provides for an economic incentive for the leaseholder to comply with the owner's management objectives that may run counter to the leaseholder search for private profit. The incentive takes the form of a financial guarantee deposited by the potential leaseholder and returned to him (with interest) at the expiry of the period of lease if the terms of the lease agreement are certified met. The best documented variant of the scheme is the performance guarantee bond scheme piloted in the Philippines [see Paris et al. (1995) and the case study in Section 9 of this document].

4.6 Mixed systems of forest land allocation

In certain cases, the mechanism chosen may combine the political-administrative element with a competitive or performance-related components. This might be the case, for instance, in those cases where auctioning of the forest is restricted to a group of bidders selected according to administrative criteria. Not unlike the risk-return relationship in finance, mixed systems trade some of the potential forest revenue for other objectives.

4.7 Planned conversion of forest land to alternative uses

In this case, forest land is deliberately set aside for a conversion to socially more highly valued non-forestry uses which, depending on the individual circumstances of each location, may include agriculture, infrastructure, housing, etc. Forest conversion can be either “reactive”, i.e. be sanctioned under increasing pressure by those seeking alternative uses, or be planned. The latter is often conceived to promote redistribution of urban population to less populated areas and to give access to land by the landless as in the earlier-mentioned examples of the Polo Noroeste program in Brazil, or the Transmigration Programs of Indonesia.

5) Features of management agreements

This section discusses how various features of forest management agreements influence the manner in which forests are utilised. We defined forest management agreements (which receive a variety of names such as “concession agreements”, “forest utilisation contracts”, etc.) as any contract regulating the conditions for forest utilisation. Those granted concession agreements are referred to as the “forest concessionaires”.

5.1 Duration of the concession agreement

The duration of a concession agreement influences both the degree of control that the government retains over the forest, and the perception of ownership, and therefore responsibility, of the concessionaire. It is often argued that concession periods should be longer than a rotation period, so that the concessionaire has a direct interest in investing in long-term sustainability of the forest. It is very rare, however, that concession periods are equal to or longer than rotation periods or even cutting cycles (examples in Table 1), with the notable exception of the 100-year concession of the Sabah Foundation in Malaysia [Burgess (1989)]. More commonly, concession agreements range between 1 and 20 years [e.g., Poore et al. (1989)].

The allocation of short term concessions often results in the extraction of high timber volumes or “creaming” (removal of only the most valuable species), with poor harvesting techniques and no follow-up silviculture. Sometimes agreements are so short [1 - 2 years, as for instance in Sarawak; Burgess (1989)] that concessionaires are forced to “rush” for the extraction of resources. Examples can be seen throughout the tropics. In many cases, concession agreements are theoretically renewable, although there is little certainty that renewal will be granted. This uncertainty results in generally poor management and short term objectives.

Conversely, it has also been argued that long contracts would reduce the amount of control by the state's Forest Services (FSs), which would have less capacity to intervene [Grut et al. (1991)]. FSs argue that shorter renewable contracts enable better control, since they can be cancelled at the end of a period if the conditions of the contract have not been met. While it is important that the licensee has the long-term tenure of the land, it must be clearly stated in the contract that such tenure will be revoked in case that contractual obligations are not fulfilled.

Table 1. Average duration of concession agreements and recommended/legal cutting cycles in selected countries.

Country	Average duration of concession agreement (years)	Prescribed or legal cutting cycle (years)
Sabah	1-20	60 (Malaysian uniform system)
Sarawak	1-30	25 (Malaysian Selective system)
Peninsular Malaysia	1-25	30 (Selective) or 55 (Uniform system)
Indonesia	20	35
Philippines	5-25	30 - 45
Ghana	20-40	40
Gabon	10 (temporary concessions)	25-40
Costa Rica	permanent (land ownership)	12-20
Canada	20	60-120 (site and species specific)

5.2 Size of concessions

Linked to the issue of contract duration is that of concession size. Concessions vary from a few hectares to more than a million hectares in area. It is generally acknowledged that the allocation of concessions which are too large may have undesirable consequences, where "too large" is defined as "a size beyond the capacity for optimal utilisation". Allocation of an area which is too large, relative to the capacity of the concessionaire in conducting forest management, is likely to lead to poor and wasteful management. Examples of wasteful utilisation of large forest tracks are found throughout the tropics [e.g., Reppeto and Gillis (1988)].

There may be attempts to screen forest concessionaires for their ability to conduct forest management. One example is found in the Forestry Department of Peninsular Malaysia, which assesses applicants partly on how much forestry machinery they own. Another method has been suggested by Grut et al. (1991), who recommend that concessions operating under 80% of their annual allowable cut (inefficiently) should be subdivided into smaller concessions. It is noticeable that both examples refer to the capacity of the concessionaire in cutting and removing trees from the forest. It is extremely important, however, that concessionaires are selected for the quality of their harvesting practices, such as by requiring technical certificates from logging machinery operators.

Another undesirable consequence of allocation of large concessions is that it leads to the concentration of resources in the hands of a few groups which may then gain very powerful political influence. This has been seen in Papua New Guinea, where there are on-going struggles between politicians and foreign timber companies, which have been implicated in a variety of illegal practices such as bribery, undervaluation of export logs, and transfer pricing [Barnett (1989)].

On the other hand, especially in the case of commercial forestry companies based in one concession, a small area poses problems linked to economy of scale and the minimum size required for enabling a sustainable cycle. It is necessary that the timber volume in the concession is large enough to justify the investments in logging equipment, technical assistance, and management costs. Therefore, it is necessary that the size of the concession is equivalent to a minimum annual allowable cut multiplied by the number of years for a cutting cycle recommended according to the ecological requirements of the forest in question (regeneration capacity). For example, it has been estimated that the minimum feasible size for sustainable commercial forestry in Ghana is around 5,000 ha, although much smaller concessions are currently granted [Rietbergen (1989)]. In Indonesia, the new KPHP system has been developed based on the smallest units of production forest which can be economically managed on a long term basis, which are around 100,000 ha in that region [Fraser et al. (1995), and case study 3 in this Volume]. In Germany, the government requires small land owners to group themselves in co-operatives with at least 10,000 ha in order to be allowed technical and financial support.

Smaller forest units may be feasible when forestry is not the main source of income. This is the case in Sweden or Finland, where many forests are owned by families which see forest revenue as an additional source of income on top of salaries earned outside the forest [Larsson (1990), Hannelius and Kuusela (1995)]. In this case, forest units are around 25 to 100 ha, and small holders make forestry feasible by association into co-operatives [Olsson (1990)]. This is also the case of agriculturally-based rural communities in the tropics whose main forest use is as sources of fuel wood, non-timber forest products, construction materials, or extra income [see examples in Carter (1996)]. Forest unit sizes used by *colonos* living in *comunas* in Ecuador are around 250 ha [Lawrence and Godoi (1996)]; the average forest area used per farmer in Mexican *ejidos* is around 400 ha [Lawrence and Sánchez Román (1996)]; forest user groups in Nepal are given forest patches between 1 and 500 ha [Ingles et al. (1996)]; in Brazil rubber tappers divide the forest between themselves in *colocações* of approximately 250 ha each.

5.3 Location of the forest concession

It is becoming more evident that the process for deciding the location of concessions is inadequate in many cases. It is often the case that allocation is not based on any structured land use plan, and that insufficient information about the resource is available. In many cases, the delimitation of concessions is done in an office, following straight lines drawn in a map. One obvious problem of this approach is the difficulty in locating the area in the field and maintenance of the boundaries. More important however, is that concessions often encroach on land traditionally used by other groups, which in turn results in dispossession and land conflicts.

It is essential that the process of allocation of forest land includes consultation with traditional users if such conflicts are to be avoided. This is particularly important in the

case of defining boundaries between the land which is used by local communities and that used by outsiders, as demonstrated in experience with the KPHP system in Indonesia [e.g., Fraser et al. (1995)]. As described in Ingles et al. (1996), from experience in Nepal, an ideal procedure for allocation of forest land should comprise of three phases: investigation, identifying all forest users and forms of use; negotiation, devising management plans acceptable for all parties involved; and implementation, taking into consideration the participation of different groups.

A variety of examples now exist demonstrating the benefits of having a participatory process for defining the process of concession allocation [Carter (1996), ODA (1996)]. Furthermore, in many cases, once the local communities have their rights acknowledged and defined, they play an important and positive role in the control of the resource. A parallel can be drawn to the very successful CAMPFIRE program of community management of wildlife resources in Zimbabwe [Child (1993)].

5.4 Management requirements

Management requirements can be defined as any activities which are requested from the concessionaire as part of the concession agreement. This often includes the elaboration of a management plan, compliance to harvesting guidelines, observance of volume and girth limits, respect for protection areas such as riverine buffer zones and steep slopes, pre- and post-harvesting inventories, silvicultural treatments, etc. [see, for instance Dykstra and Heinrich (1995)].

Different countries have different requirements, which may depend on the type of the forests and terrain, as well as on the tradition and dependence on forestry. More elaborate guidelines for forestry operations are found in countries which have a stronger forestry industry, such as Malaysia, Indonesia, Philippines, Ghana [see Poore et al. (1989)], as well as in most European countries, USA, Canada and Australia.

In many tropical countries, timber harvesting has only recently grown in importance as an economic activity. However, in many cases this new activity is growing ahead of the necessary development of the controlling infrastructure and forestry expertise. An important initiative has been the development of national level Tropical Forest Action Plans in many countries, which have been promoted by the FAO as a means to build forest management capacity in tropical countries [Poore et al. (1989)]. This is now called the National Forest Program and includes approximately 60 tropical and 20 temperate countries, in different stages of engagement in the program.

Most countries impose a series of management requirements for granting of forest utilisation contracts. However, in many countries these requirements are neglected to a greater or lesser extent. This may be due to a number of reasons. Firstly, it is important that the requirements are compatible with the ability of the concessionaire to comply. Often, concessionaires are not technically qualified or financially able to conduct the activities requested. Secondly, management requirements must be compatible with the duration of the concession agreement, since concessionaires will be reluctant to conduct activities which only result in benefits after termination of their agreement. Thirdly, the state forest departments must be able to verify compliance to regulations in order to ensure their enforcement.

5.5 Financial terms

Most forest utilisation agreements include some sort of financial terms. Forest revenue systems are very important in that they have a strong influence on the behaviour of those utilising it. Most countries charge a certain fee for the utilisation of forest resources. A notable exception is Brazil, where government does not charge for utilisation of the forest, reflecting in a perception that forests are worthless, which results in waste and mismanagement. On the other hand, in certain countries forest fees may represent a substantial part of the government revenue. For instance, timber royalties may provide up to 70% of the revenue of Sabah, Malaysia; Indonesia raises around US\$ 400 million per year from forest fees. In some cases, where the government owns and manages its forests, it may pay for certain services such as logging, inventory, and silviculture (e.g., Finland), subcontracting private companies to carry out specific services.

Forest charges should reflect the costs of the forestry resource to the government, as well as to society and the environment. Usually, however, the social and environmental externalities are not accounted for, resulting in undervaluation of the resource [Pearce et al. (1989)]. Forest fees may take a variety of forms, names and values (Table 2). Extensive discussion in alternative ways for charging for forest resources can be found in Gray (1983), Grut et al. (1991), Repetto and Gillis (1989), Richards (1995), and Mayers et al. (1996). A wider discussion about forest revenue systems is given in Section 7.

Table 2. Predominant types of forest fees and average values charged in selected countries.

Country	Type of main fee	Value (US\$)
Malaysia	Volume-based royalties	48/m ³
Indonesia	Volume-based royalties	10/m ³
	Reforestation fee	10/m ³
Ghana	Royalty per tree	50-60/tree (1-4% FOB price)
Gabon	Export taxes and area fees	10% FOB price
Cameroon	Export taxes and area fees	2% FOB price
Guinea	Stumpage fees	0.6/m ³
Nigeria (Cross River state)	Stumpage fees	15-30/m ³
Senegal	Royalty per tree	40-60/tree
Kenya	Volume-based royalty	25/m ³
Brazil	none	0
Costa Rica	Farmers are paid incentives for forest management	50/ha/yr
Bolivia	Volume-based royalty	5-7/m ³
Finland	Royalty on standing timber	2-6% price
Canada	Stumpage fee	4-17/m ³ , depending on many factors

5.6 Other obligations

Apart from financial terms, many concession agreements may also include conditions such as minimum employment generation, investment in manufacturing, road construction, etc. The merits of these conditions have to be analysed individually, trying to identify advantages and disadvantages for the forest industry and society as a whole.

Many countries have requested that concessionaires invest in manufacturing as a condition for granting forest concessions (e.g., Indonesia, Cameroon, Canada). This policy in the first instance has the positive effect of promoting the development of a local industry, adding value and generating employment. Similar effects may derive from bans on export of raw logs, practised in many tropical countries. However, in certain cases it may lead to negative results [Repetto and Gillis (1989)]. Grut et al. (1991) and Rietbergen (1989) have argued that if such protectionist measures are kept for too long, they may lead to inefficiency in the manufacturing process, which reflects in excessive degradation of the forests. A domestic monopoly of wood purchase results in low internal prices for timber, which may lead to lowering the perceived value of forest against other forms of land use, or reduce the feasibility of long term forest management.

6) Concessionaire obligations

Most forest land globally is currently under government control, which grants exploitation rights to persons or companies according to some sort of forest utilisation agreement. While the merits of government ownership may be argued (see Section 2), it is unquestionable that companies or individuals which are granted the rights of forest use should follow procedures which take into account the importance of forests to national economy, the environment and society. It is often the case that governments may not have the interest or means to enforce contractual obligations, resulting in forest degradation in many parts of the world. Voluntary forest certification schemes, such as the ones by the Forest Stewardship Council (1994) or Initiative Tropenwald (1994), and non-government organisations are currently filling this gap, voicing the requirements of sectors of society which usually do not have much say on governments decisions.

A part of any forest utilisation agreement relates to the rights and duties of the concessionaire. In a general way, the main rights of the concessionaire is to harvest and sell timber from the concession. In exchange, they are expected to follow a series of management, legal and fiscal requirements which are imposed by the FSs. The following topics relate to the duties of the concessionaire:

6.1 Technical requirements

Ideally, timber rights agreements should be conditional upon compliance with management guidelines and forest laws formulated by FSs. These should require that the concessionaire provide management plans, conduct pre- and post-harvest inventories, use silviculture systems prescribed for the forest type, and specify which species can or cannot be harvested. Silvicultural specifications may include pre- and post harvesting treatments, as well as the harvesting system allowed (selective, clear cutting, use of fire, etc.). Numerous silvicultural guidelines are available [e.g., the FAO Model Code of Forest Harvesting Practice Dykstra and Heinrich (1995); ITTO (1990 and 1991); the guidelines of the Queensland Forest Service (1991); the CELOS system for Surinam, de Graaf (1986); or the methods developed in Sabah, Pinard et al. 1995], which could be adapted for use in different countries.

Most tropical countries have provisions in their legislation requiring compliance to some sort of forestry code. In practice, however, these forestry codes are extremely broad and do not specify exactly which, how and when activities should be conducted, with the result

that it is done at the discretion of the concessionaire. An exception is found in Australia, where the Queensland Forest Service developed very detailed guidelines for rainforest management [Queensland Forest Service (1991), Poore (1989)].

Even when such specifications are appropriate, it is often the case that they are not adequately implemented in the field. This is due to a variety of reasons. Firstly, there is the lack of incentive or interest from the concessionaire's point of view. It is often the case that the extra costs of silviculture and low impact logging will not revert to the concessionaire. This is either because the length of the concession agreement is not long enough, or because the marginal timber volume in the future derived from these techniques do not justify the investment in the present, if discounting is applied. Longer concession agreements and different methods for accounting forestry companies, taking into consideration not only the streams of revenues derived from timber but also appreciation of the timber stand, may provide incentives for long-term management [for a wider discussion see Chapter 4 in Schmidheiny (1992)].

A second constraint for the wider adoption of good forestry practices is the actual lack of technical skill of many logging contractors or concessionaires in low impact logging techniques and silviculture. Although management plans can be elaborated including all the necessary jargon, it is often the case that they are written by sub-contracted consultants, while their implementation will be carried out by unskilled field staff. Furthermore, there is also a generalised lack of training schemes to provide field and technical staff the necessary knowledge for conducting good forestry. While most countries require drivers a driving licence, most tractor drivers and chainsaw operators in the world have never received any formal training. From a concessionaire's point of view, training of field staff may not only benefit the forest, but also result in improvements in efficiency and profitability derived from reduced use of heavy machinery, fuel and staff time [Jonkers and Mattsson-Marn (1980), Moura-Costa and Tay (1996)].

An important factor related to the implementation of good forestry practices regards lack of verification and enforcement by the FSs. Generally, FSs in the tropics are poorly funded, understaffed, often corrupt(able), and inefficient. As shown in Johnson and Cabarle (1993), the area of forests per FS staff in tropical countries varies between 1,000 and more than 100,000 ha. Coupled with usually low fines for non-compliance, forest concessionaires often find it easier and cheaper not to follow regulations.

As forest certification arises as an alternative for poor government enforcement of good forestry practices [Upton and Bass (1995)], the standards of forest management expected from concessionaires would tend to rise. According to most forest principles and criteria, a condition *sine qua non* for good forestry is the elaboration of comprehensive management plans, and the adoption of a series of technical guidelines for forest management [see Nussbaum et al. (1996) for a review of current forest standards].

6.2 Ecological and conservation requirements

In very few countries forestry legislation require concessionaires to include environmental considerations in their management plans. Environmental concern has grown enormously in the last two decades, and the current trend is to regulate the environmental effects of any economic sector. This has led to the creation of national or international

regulations and standards, such as those of the International Standards Organisation [ISO (1994 a and b)]. Environmental impact assessments (EIA) are now requested for the implementation of all sorts of projects in a large number of countries [refer, for instance, to the IIED/WRI/IUCN Directory of Impact Assessment Guidelines, which lists a wide range of EIA guidelines; Roe et al. (1996)].

In the forestry sector, environmental concern has focused on the impacts on plant biodiversity, wildlife, soil erosion, water quality, and the effects of loss of forest cover on climate change [e.g., ITTO (1992 and 1993)]. Standards of good environmental practice for forestry, consequently, must include requirements to conduct environmental impact assessments, strategies to minimise environmental impacts, erosion control, delimitation of riverine buffer zones and areas of permanent reserves, adoption of maximum slope thresholds for harvesting, maintenance of seed trees, conservation of endangered species, effects on wildlife populations, protection of areas of special ecological value, etc.

Increasingly, concessionaires are expected to include environmental considerations into their management plans. While concessionaires may argue that appropriate methodologies for quantifying and minimising many environmental impacts are still under development [e.g., definitions of biodiversity value and sustainability are extremely varied -- see, for instance, Johnson and Cabarle (1993)], it is imperative that forest managers utilise their best knowledge and common sense to minimise environmental impacts. For instance, considering that logging is, perhaps, the activity with most impact in the forest, it is obvious that well-planned harvesting operations would result in a reduction in environmental effects compared to traditional logging methods [see, for instance, Pinard and Putz (1996)].

Of particular value to a concessionaire, is the utilisation of environmental management systems [such as for instance the ISO 14,000, ISO (1994a)] as a means for continuous improvement of their environmental performance. Coupled with benchmark performance standards, such as those of the Forest Stewardship Council, these tools help forest managers to improve their environmental performance [Nussbaum et al. (1996)]. Furthermore, the development of national standards in a series of tropical countries would greatly contribute towards this objective.

6.3 Social requirements

Another central aspect of sustainable forestry regards the social benefits derived from forest utilisation. It is becoming ever more evident that the traditional unilateral methods of concession allocation and forest utilisation are often inadequate from a social point of view. These often disregard the rights of local communities and forest users, creating dispossession and social inequity, which lead to both poverty and forest degradation. Participatory approaches to definition of forest use and users are becoming ever more important as a method to ensure the rights of local people and forest users. A series of examples are listed in Carter (1996).

Concession regulations should include conditions for ensuring the rights of people working, leaving in, or using forests. Some important points are:

- *Employment conditions* - concession agreements should regulate the employment conditions of people involved with forestry operations, in accordance with the employment regulations of the country. However, in some cases this does not reflect the conditions under which employers are actually working. Forests are usually in remote places, with poor communication with urban centres or employees from other companies, and the fact that many countries do not have organised forest labour unions, make it easy for unscrupulous forestry companies to adopt their own employment regimes. One strategy that is commonly used is that of subcontracting labour providers which accept to have direct responsibility for the labour force provided, therefore reducing the risk of the logging company in bending employment regulations.
- *Rights of forest use by local populations must be ensured* - This includes a variety of aspects such as rights of transit and recreation, access to areas of traditional cultural importance, subsistence hunting, fishing, collection of non-timber forest products or fuel-wood. This is particularly important for people with some degree of dependence on the forest, such as indigenous communities, hunter gatherers and migrant populations. Although concessions are, supposedly, located outside the lands legally belonging to these groups, some communities are traditionally migrant or depend on hunting for their survival, and should have the right of access use of natural forests.
- *Consultation with local communities during the process of allocation of forest concessions.* - It is often the case that concessions are delimited arbitrarily, without identifying current users and their needs from the forests. This approach not surprisingly generates much tension between the existing and the new users. On the other hand, experience with participatory decision making and management has shown very positive results [ODA (1996); Carter (1996)], where local users assume more prominent rights and also more responsibility for maintenance of the forest. It is important however, to define exactly what are the rights and responsibilities of each actor. Misinterpretation may lead to situations in which the concessionaires are faced with uncontrolled use of the resources under their responsibility. This may be particularly problematic in areas with high population pressure, and high demand for fuelwood and wildlife. Uncontrolled hunting pressure, for instance, is leading to the reduction or even extinction of wildlife populations in many parts of the world.

6.4 Legal requirements: procedures for legalisation

This consists of all the documentation and procedures related to fulfilling the administrative requirements for legalisation of a forest management or concession agreement. It varies from country to country, from reasonably simple procedures to extremely costly, complicated and bureaucratic processes. In order to maximise compliance and avoid negligence, it is generally preferable that such procedures are as simple and objective as possible. In some countries, the process is so complicated and the licensing offices so distant from the forests that loggers do not bother to comply with regulations, and the chance of been caught is reasonably low. This is the case in the Amazon, where in some cases forest owners do not even have the money to go to the town to license their operations (see case study in Section 9.5).

Licensing procedures should also attempt to be reasonable quick, in order not to delay the implementation of management plans. This aspect may have particular relevance in areas where logging operations are limited to dry seasons, in which delays may force harvesting in rainy seasons. In other instances, whole operations may be halted due to delays by FSs to examine and approve annual harvesting plans, leading to undesirable consequences for all involved in the wood processing and commercialisation chain. Furthermore, unnecessary complication and delays are often dealt with through corruption of government officials, resulting in demoralisation of the whole system.

An important development may derive from the use of independent auditing of forest operations. While this has been, somehow, fulfilled by forest certification, governments could adopt this approach as a means to maintain control over forest resources without having to increase much their staff numbers. In this way, forest concessionaires could be given more responsibility and procedures could be simplified, while still maintaining control of forest operations.

7) Financial terms of access to forest and forest revenue systems

7.1 Introduction

The financial terms on which public forest land is leased or sold to third parties --both the *level* of forest charges and the *manner* in which they are imposed-- have obvious (as well as less obvious) consequences for the amount of revenue collected by the owner. They also have consequences for the way in which the leased forest asset is managed.

The subject is of greater direct relevance to the management of *production* forests than to protection or other forests not managed primarily to generate revenue and the account here will be directed primarily to pricing of access to production forests . It does not mean that the topic is irrelevant to the non-production forest: First, if the forest combines productive and protective functions (as it typically does, in the tropics), the financial regime affecting the former will simultaneously affect the latter. Second, depending on the arrangements made for possible cross-subsidisation (here, transferring funds from profitable categories of forest to finance the management of unprofitable --but valuable-- categories of forest land), the prospects of continued management of vital parts of the forest estate can be enhanced. Third, well-developed pricing of timber facilitates improved land use by providing information required to estimate the value of production forest and continuously compare it with the value of the same land managed differently (for recreation, as a wildlife reserve, etc.). Fourth, even when not managed for timber production, forest can be managed with other for-sale-outputs in mind (biogenetic prospecting, recreation, hunting, carbon sequestration, etc.). The question of the “right price” is then as relevant as it is in the context of timber production.

7.2 What is the “right” price?

In market-based economies, the price of any commodity or resource is determined by how much the buyers are willing to pay for it. This is true as much of plantation timber as it is of products originating in the old-growth forest. How much the owner of the

resource truly earns when selling or leasing the resource is then determined as a *residual* after production cost is deducted from the price received. Where timber is sold as *standing* timber, its market value is usually referred to as *stumpage value*.

The principle of market value being determined as a residual is important. It means, among other things, that the value of the resource will change if market conditions themselves change. Where *immature* forest is being sold or leased, both the vendor and the buyer (of the lessor and the lessee) therefore face uncertainty regarding the ultimate financial outcome. It also means that any attempt to value the resource by reference to the amount of money spent on its production up to the time of harvest (an instinct surprisingly common in plantation forestry, and not only in the former planned economies) is misconceived. For a given class of forest land, rather than rewarded by a higher price, an inefficient (high-cost) producer of plantation timber must be penalised by a lower net return.

The determination of stumpage value as a residual requires that production cost be deducted from the market price of the resource. The practical difficulty lies in correctly calculating the production cost.. In the case of selectively logged tropical forest, the temptation is to equate the production cost with the sum of: (1) logging cost; (2) cost of transporting logs to the point of final sale; and (3) normal return on the capital employed by the logger. The stumpage value is then said to be the difference between the market value of the logs at the point of sale minus the sum of (1), (2), and (3). If the mature stand were to be auctioned off in ideal competitive conditions, this indeed would be the price offered by the winning bidder. Many government forest owners have been berated for charging prices well below this theoretical amount.

However, because the formula omits the cost of forest regeneration, maintenance and protection (or makes untenable assumptions that amount to saying that regeneration of tropical forest is costless), the price overstates the mature timber's true stumpage value. The calculation of this category of cost in tropical forestry is inherently difficult (see Box 3 below) and so will therefore be an *ex ante* calculation of the "right price".

Box 3: Financial terms of access to forest and the length of the lease period

If forestry were more like crop farming, the issue of what price the state owner (of crop land) should charge a third party for the right to harvest the standing crop or grow it (say, sugarcane) would be relatively simple: The owner would sell the mature sugarcane at its "stumpage value" (equal to the value of the cane in the market minus the cost to potential leaseholder of harvesting and delivering the cane to the market, minus the normal return on invested capital, minus the cost of returning the land to the owner in its original state, i.e. minus the cost of replanting the cane and making it ready for the next harvest). If the owner himself assumed the cost of replanting, the price of sugarcane charged the leaseholder would be correspondingly higher. If the land were to be leased for several seasons for sugarcane cultivation, the fee charged to the leaseholder would be the discounted value of net profits expected by the leaseholder over the duration of the lease.

If we were to substitute "fast-growing eucalyptus" for "sugarcane", and "government owner" for "owner", this principle would not change. If eucalyptus-growing were a marginal activity financially and if no use of land existed that was financially more rewarding than eucalyptus, the owner of the land would be barely able to lease the land in question. If, instead of a "competitive allocation", the owner tried to charge for each stem of eucalyptus produced, the effect would be to "kill" eucalyptus growing, i.e. make forestry unsustainable¹. Even if God smiled particularly hard at our state owner and scattered mature eucalyptus on his land holding, this one-time financial advantage would be dissipated once the mature

trees were cut and sold and a humdrum cycle of eucalyptus growing and harvesting became the order of the day.

Tropical forestry is not like crop farming or plantation forestry for only two main reasons. One of them is related to the forests' environmental functions and this aspect is dealt with elsewhere. The other is the fact that tropical forestry is an activity traditionally associated with logging of old-growth forest. Unlike an owner of mature sugarcane or mature stand of common tree plantation species, the owner of old-growth forest has little experience in growing such a "crop" (the rotation is too long, the growing conditions and maintenance-cum-protection cost uncertain, etc.). Because he does not know how much to set aside to ensure future harvests of the crop called "old-growth forest", he cannot estimate reliably how much the harvest of mature trees in the old-growth forest is really worth. If tropical forest regenerated without cost ("naturally"), and if a lease to third parties contained an obligation to ensure that subsequent harvests are unimpaired by the initial harvest, the lucky owner would be able to lease the right to harvest for more than would be the case if cost-free regeneration were only wishful thinking. This is no different from saying, in the earlier example, that if sugarcane grew "by itself", the owner of a mature sugarcane crop would be able to charge a higher price for the crop than he would if potential leaseholders, responsible for perpetuating the production of sugarcane, knew that, alas, sugarcane cultivation requires costly land preparation and replanting and much else besides.

If, for no particular reason, a lease to sugarcane land were to last for less than the cane's full growing cycle, it would make the calculation of the "right price" of the lease more difficult but not impossible. Sufficient experience exists to determine how far the replanting activities of the leaseholder should normally proceed by the time the lease expires if optimal and sustainable production of sugarcane were to be ensured. Any shortfall (underspending) by the leaseholder would most probably result in the owner invoking a penalty clause of one kind or another. Naturally, making the period of lease shorter than the cane's growing cycle would needlessly complicate things and not surprisingly, is not normally found in practice.

Yet, such impractical disassociation of lease duration from the length of the growing cycle is common in tropical (non-plantation) forestry where it has consequences far more serious than in the hypothetical example of sugarcane growing. Despite improving knowledge of tropical forest ecology, it is not easily decided whether in a forest believed to have an optimal growing cycle of, say, 60 years, a forest stand 10 years after the initial harvest is in as good condition as needed to achieve an undiminished second harvest fifty years later.

This will be not be easy where the owner himself manages the forest and substantially more difficult if the forest is managed by a third party on the owner's behalf.

By accepting a ten-year lease as the norm in the example given, the owner implicitly believes either that (1) there is only one way in which forest regenerates between harvests regardless of the manner in which the first harvest is conducted and the subsequent care, protection and maintenance exercised by the lessee; or that (2) the cost of post-harvest management is zero; or (3) both. Only then, and if in addition he knows the "standardised" cost of post-harvest maintenance in the case (1), can the owner be indifferent to the length of the lease for only then will he be able reliably to estimate the excess (taxable) profit of the leaseholder for any lease duration. Naturally, the price charged in case (1) will be lower than that in case (2).

The harder it is to make the forest ready for another harvest in the face of human and natural depredation, i.e. the more costly it really is to practice sustainable forestry of the selective-logging type, the lower will be the taxable profit of the leaseholder contractually bound to practice sustainable forestry and the lower will have to be the tax ("forest charge") compatible with sustainable forestry. By genuinely believing, or pretending to believe, (1), (2) or (3), the forest owner positions himself to achieve the dubious feat of extracting more tax from the lessee than is compatible with sustainability. Unlike in the above case of sugarcane, contractual obligation to manage the resource sustainably in selective-logging forestry can be effectively verified perhaps only at the end of the rotation period, i.e. in year 60, rather than in year 10, 20 or 40. Under standard, short-lived, forest concession arrangements, the lessee has ample opportunity to deflect the owner's attempts to extract maximum revenue onto the resource itself, since neglect of the leased forest is difficult to prove during the period of lessee's short tenure

1. If the markets were to suddenly "discover" eucalyptus making its production more profitable than before, the owner could increase the price charged to potential leaseholders for the use of eucalyptus land or for standing eucalyptus wood. If, like the best areas of Burgundy's Cote d'Or, land suitable for eucalyptus cultivation were strictly limited, the owner would be earning economic rent. When leasing the land, he would recover this rent from the leaseholder. If land suitable for eucalyptus cultivation were in ample supply, the price-induced increase in eucalyptus production would eventually erode the above-normal profitability of eucalyptus growing and with it, make it necessary to adjust the prices charged to leaseholders downwards. The fate of eucalyptus would then be similar to that of kiwi fruit (to use a recent example).

More fundamentally, in an environment where *sustainable* forestry is to be practised, the cost of growing “natural “ tropical timber --the uncertain element in the calculation of the true stumpage value-- will depend significantly on the presence or not of incentives to safeguard future harvests. Where these incentives are weakened by inappropriate structure of lease conditions (please refer back to Box 1), expenditure on forest maintenance between harvests will be lower than it should be and the profitability of tropical logging wrongly overstated. Only when owners themselves, or leaseholders placed in a situation closely resembling that of the owner, manage the resource, will the incentive to underinvest in resource maintenance be removed and only then, in principle, will it be possible to calculate the “right price”.

7.3 Types of forest charges

The price charged by the State owner for the resource takes the form of a forest charge. This general term denotes a variety of taxes and fees listed further below. In the majority of cases where the resource is priced administratively rather than auctioned off, more than a single charge is levied and the forest taxation regime becomes a mix of different charges. Combined with the fact that (as we shall see below) different taxes can be levied at different stages of the production process, this complicates the estimates of what the total price charged by the owner actually is. Like all prices, forest charges and the method of their levying have incentive and disincentive effects on profit-minded leaseholders.

The main categories of forest charges are the following:

- *Royalties* - the term is a general one denoting prices charged by the owner of a natural resource for access to the resource. In the case of tropical timber, royalties can be levied for a unit of timber volume (*volume royalty*) or levied as a percentage of the timber’s market value (*ad valorem royalty*). In the former case, the royalty can be levied on produced (harvested) volume or on estimated standing volume. A simplified version of the last-mentioned variant is a royalty levied per tree. Royalty on standing volume (rather than felled volume) encourages greater utilisation of the available wood volume. Whether referred to as “royalties” or simply “forest charges”, similar payments are applied to forests’ non-timber products (rattan poles, resins, etc.)

Royalties can be *uniform* or variously *differentiated*. In tropical forestry, the differentiation is by timber species, log grades, origin of logs (reflecting differences in the cost of production), or some combination of the three.

In general, imposition of a royalty increases the logger’s average and marginal cost of production and normally will lead to lower cutting intensity as some mature trees profitable to harvest without royalty become unprofitable to cut once the royalty is imposed. In a forest characterised by species and quality differentials, application of a uniform royalty will bias the production towards the more profitable species and grades, i.e. will lead to “creaming” (“high-grading”) of the stand. Its extent will be lessened if a well-calibrated system of differentiated royalties is adopted. Such a system offers the prospect of a higher revenue per unit of area but is administratively more complex.

- *Area fees* - these are in the nature of land taxes and are levied per unit of concession area either as a lump sum or as an annualised payment. Where it is the main component of the forest taxation regime, its levels need to reflect the differences in accessibility and stocking, and therefore, must be based on a reliable forest inventory. Its adoption requires effective enforcement of annual allowable cut if over-harvesting is to be avoided. The area fee has been a component of the forest taxation regime in, e.g., Ghana, Nigeria, Thailand, Cameroon, Gabon, and Ivory Coast.
- *Export taxes* - normally expressed as a percentage of the market (usually, FOB) prices and usually levied at different levels on logs and processed wood. In this way, export tax has often been used as a means of encouraging domestic processing of logs. In circumstances where domestic sales are dwarfed by exports, the administrative ease with which export taxes can be collected has in some cases (e.g., the Congo) made them the principal source of tax revenue. In these cases, export tax can be differentiated by species, grades and locations like the royalty which it largely replaces.
- *Administrative fees* - there are a large number of fees that are in the nature of taxes rather than representing payments for services rendered (and therefore being part of ordinary production cost) . The boundary between the two is often blurred. Thus customs inspection fees in the case of timber exports, for instance, could be considered as either as could a variety of other inspection fees, road- or harbour levies, etc..
- *Non-returnable deposits* - these are used either as a straightforward taxation device or a means of raising the cost to the leaseholder of premature abandonment of operations.
- *Reforestation fees* - In the best known case of Indonesia, reforestation levy accounts for more than a half of all direct forest charges. Its level is normally based on the volume of timber cut and its proceeds earmarked for reforestation purposes. Where the introduction of deforestation tax is a response to forest depletion by the leaseholder, the tax amounts to shifting the obligation for sustainable management from the leaseholder back onto the owner.

In addition to the these categories of charges that could be considered *direct*, there are *indirect* ways of charging leaseholders for access to timber . The most common tools used are

- *Corporate taxes* - here, the profits made by forest leaseholders are captured at the end of the production cycle. They can be the most important element of forest taxation [e.g., in Surinam; see Rice (1995)] or be used in combination with direct forest charges as practised in a large number of countries.
- *Turnover taxes* or *value-added taxes* - often resorted to in those cases where accounting and auditing resources of the State are considered insufficient to counter large-scale corporate tax avoidance (e.g., ICMS in Brazil).

- *Local development taxes* - Logging often takes place in remote areas poor in social infrastructure. In some cases, access to the resource is tied to an obligation by the leaseholder to undertake certain local development activities (e.g., provision of basic health facilities for the local population, establishment of local school, maintenance of roads not strictly connected with log production, etc.). In most cases, these obligations are very loosely if at all contractually specified and their existence obscures the true terms on which the resource is made available to the leaseholder as well as creating a major opportunity for abuse.

7.4 At what stage to tax ?

The forest charges can be levied at different stages in the cycle of production. Some can be payable ahead of the actual production (e.g., some of the quasi-tax administrative fees, non-returnable deposits, portion or all of the royalty, part or all of area fees, etc.) and some at various stages during production or sales (part or all of royalty, part or all of area tax, export tax, etc.). Other still (e.g., corporate tax) may be payable after the forest products are sold.

The most important in practice will be the stage at which royalties are paid, in particular whether they are paid the moment the allowable cut is determined by the owner, i.e. before the harvest, or following the cut (at roadside, at log depot, etc.). In the case of domestic log processing, a subsidiary question is whether the tax should be paid before logs are processed or after processing. The latter has merits in places where illegal logs are believed to reach the mills, the former encourages greater efficiency of processing (higher recovery).

In general, the closer is the collection of royalties moved to the beginning of the logger's operation, the smaller will be the room the producer will have to shift the burden of the royalty onto the resource itself, i.e. the higher will tend to be the utilisation of standing tree.

7.5 Efficiency of tax collection

Selection of the type of taxation instrument used by the State owner will normally take into account the expected efficiency of tax collection. That, in turn, requires (among other things) that the tax be reliably assessed. In tropical forestry, accurate measurement of the volume and quality of the standing stock is substantially more difficult than in plantation forestry. It requires the FS to correctly identify different species, do the scaling, and in some cases to carry out field inspection for logs abandoned in the forest. This in part explains the tendency for the owner to defer the measurement of timber volume until after the tree is cut or transported to roadside.

Efficiency in tax collection is also a matter of preventing erosion of tax revenue by inflation. Whatever type of charge utilised, it is important that the system be periodically updated in the face of changing market and currency values, and cost of management and harvesting.

7.6 Forest charges and optimum forest management

Charging too little for access to tropical timber is believed to have been among the main causes of tropical deforestation [Repetto (1988)] . If logging is very profitable for existing leaseholders, considerable pressure is likely to be exerted by the industry to allocate new areas for logging. Secondly, “cheap logs” are likely to encourage wasteful and careless logging and encourage inefficient domestic processing. For both of these reasons, increasing the timber prices to the level of true stumpage value (“appropriating the resource rent”, as this is inaccurately called by some) is considered essential to ensure sustainability of forest resource management .

“Making logs cheap” will certainly result in most logging profit going to the industry rather than the Government owner. This is normally an unintended outcome of the taxation regime rather than a deliberate policy even if an argument could be made [e.g., Hyde and Sedjo (1992)] that channeling the profits to the Government for subsequent investment may not be significantly superior to such investment decisions being made by the industry.

While the impact of higher prices on the distribution of logging profit between the owner and the leaseholder is fairly clear, its impact on the optimality of forest management is less straightforward. The “timber underpricing” idea is appealing for It seems to be an exact parallel of any other case (e.g., irrigation water) where the owner supplies the resource at prices below the full cost of production. Too much resource is then used and the resource management is gradually starved of revenue to ensure continued provision.

Box 4: Forest taxation

Some of these arguments of the text can be summarised diagrammatically. Figure 1 depicts the relationship between logging cost and unit revenues typical of operating conditions in tropical forestry. Prices of logs (equal to marginal revenue, MR) decline as logging moves from the most valuable to

[Figure 1]

less valuable log species and grades. Incremental cost of logging will normally increase past a certain point as the most favourable locations begin to run out. In the absence of the depletion and environmental cost of logging, the concessionaire will produce OL1 cu m of logs per ha and realize a profit equal to the area p1M1p4. A view, still widespread, holds that it is this surplus of timber value over logging cost that is a legitimate target of taxation efforts, that the more perfectly this surplus is appropriated, the greater will be the social efficiency of forest management, and that all that needs to be done is specify how best to go about this task.

Such view amounts to mistakenly equate logging with sustainable forest management. The area p1M1p4 will always overstate the true (sustainable, long-term) amount of surplus. The main effect of the taxes advocated will be on the distribution of the short-term profit between the owner and the concessionaire, not promotion of sustainability.

Consider now taxation in the presence of depletion and environmental cost (MDC, MEC, respectively, in marginal terms) using Figure 1 above. The policy objective would be to reduce the concessionaire's output to OL3 cu m of logs per ha, i.e. to the point where the price of the marginal log would equal the sum of marginal logging, user and environmental cost. OL3, the social optimum, would imply a smaller log output than the private optimum OL1, and less (though not a non-zero) environmental damage.

The challenge for the model (and subsequent practice) is to devise a tax or a mix of taxes that would compel the logger to reduce his output from OL1 to OL3. If taxes could mimic the pattern of user and environmental cost, all would seem to be well. Indeed, most technical discussion relating to this question is directed towards specifying which from among common taxes (e.g., ad valorem royalties or differentiated royalties) is best suited for this purpose [see, in particular Gillis (1980), Vincent (1991 and 1993b) and Hyde and Sedjo (1992)].

The difficulty with these tax-based approaches is that the charges envisaged target the mature timber, not the immature stock and those that target both (e.g., area-based fees) do so partly at best. If, as all economists (finally!) agree, prices effect behaviour, the absence of a suitable price of immature timber will make it difficult to influence, through price (tax), the manner in which the leaseholders deal with such immature forest. The resource owner is then compelled to substitute direct regulation (logging rules, maintenance obligations etc.) for a suitable tax instrument with all the inefficiencies inherent in regulating a party having no vested interest in complying with such rules. It is for this reason that changing the structure of incentives through a different type of lease (or an outright ownership transfer) is likely to have a far greater impact on the pattern of concessionaires' behaviour than a changed structure of taxes on logs.

The other difficulty arises where forest taxation is used as an instrument of environmental regulation. The accepted wisdom in the tropics (and beyond) considers both the environmental and depletion cost to be related in a predictable fashion to logging intensity. Hence the instinctive assumption common to the profession that, where a risk of environmental damage exists, a tax restraining loggers' "appetite" will be good for the environment. Use of taxes to induce socially optimal behaviour in the presence of environmental spillovers or depletion is fairly standard and appropriate in many areas of policy (say, pollution control). However, applied to tropical forestry, such taxes are too blunt. Experience suggests that environmental damage of logging is related not so much to logging intensity but more to the topography of the area, distribution of population and the existence of incentives to the leaseholder to maximise the value of the immature stock. Two different loggers removing the same amount of mature timber from similar areas may generate two distinct values of environmental and user cost. The environmental cost of logging is quite intractable both on average and at the margin and the marginal environmental cost of logging can be defined at a concession level but probably not in the aggregate.

A more careful assessment (such as that hinted at in Boxes 3 and 4) suggests, however, that sustainability and optimality of tropical forest management will not be

determined predominantly by attempts to correctly price the harvested timber but rather by correctly pricing mature *and immature* timber combined. [see Paris and Ruzicka (1993) and the Fable of the Forest at the very beginning of this volume]. This feat is made rare in practice because the tenurial arrangements used make it easy for the leaseholder to neglect immature stand while superficially complying with regulations that have the official purpose of safeguarding future harvests. Inappropriate tenurial arrangements make it possible for the leaseholder largely to omit the price of immature timber from his forest management decisions. In turn, the belief that the “right price” of mature timber, by itself, can lead to optimal forest management detracts from attention to the type of tenure instruments used and the incentives they contain (or lack) for making the leaseholder want to maximize not the the net logging profit but the value of standing stock.

7.7 Administration of forest revenue systems

Forest revenue systems are arrangements made for collecting, earmarking and using the revenues derived from the public forests (and, to a lesser extent, private forests, in those cases where the FS has jurisdiction over tree growing on private land). In addition to an economically sound structure of forest charges (a topic discussed under previous headings), effective forest revenue systems demand accurate assessment and full collection of the revenue due to the owner and smooth transfers of the revenue between those who collect it and those who use it.

Depending on the forest taxation regime in force, the revenue is collected either by the FS, by the customs authorities (e.g., the export tax), by local authorities where collection of some forest charges is decentralised or where specific local taxes exist) or by other agencies of the State owner (e.g., corporate tax or VAT).

The collection of forest revenue is invariably linked to the question of financing the forest administration and the FS that embodies it. Fundamentally, the arrangements made amount to a decision whether the country’s forest resources economy generate a fiscal surplus that can be siphoned off to finance other sectors of the economy. Persistent surplus of the revenue collected over the amount allocated to ensure the forest’s continued productivity amounts to a deliberate decision to tolerate conversion of forest assets into other forms of wealth (where forest revenue is invested) or consumption.

The amount retained by the FS or allocated to it from the general budget will in principle depend on the level of government involvement in forest management. Allocating tropical production forest to the private sector for exploitation *and management* reduces the State’s own FS budget requirements. Even here, however, the FS budget needs to cover the cost of basic administration and the management of that part of non-production forest (e.g., protected areas) where revenue collection is not the primary management objective.¹ Depending on the importance of production forestry in the total forest land use, and the extent to which forest management is devolved to the private sector, the amount of revenue retained by the FS (or reallocated to it from the general budget) will vary from country to country. Variations will also exist in the

¹ Some of the non-production forest could also be managed to raise revenue. The prospects of making different components of the forest estate self-financing will vary. In some cases (say, hunting reserves) they are good and here, the forest category in question could in principle be privatised, further reducing the State owner’s overall budget for the sector.

manner in which it reaches the FS in question. Between the two extremes of (1) the FS having the responsibility for collecting all of the forest revenue, retaining a part of it to cover its administrative costs and remitting the balance to the general budget; and (2) FS and other tax collection organs of the owner remitting all of the revenue collected to the general budget to start with and the State owner subsequently allocating funds to FS and others according to the overall budget situation, lies a number of intermediate cases. The arrangements in force in Sabah, for instance, are close to case (1) while those in Brazil and a number of other countries, to case (2).

Model (2) is more common: in many cases, the transfer of the bulk of the forest revenue collected from the production forest to the general budget is accompanied, however, by chronic shortages of funding of non-productive (protection, environmental-oriented) forestry activities. This reflects the low value placed by the owner on such non-productive functions of the forest or an uncertainty about what this value might be. Where the FS as a whole is underfunded, this is indicative of the owner's unstated assumption that depletion of the forest asset is an optimal strategy, at least in the short run.

If sustainability --rather than depletion-- is the management objective (as we assume to be the case), important to observe --and avoid-- is a tendency common to many timber producing countries to condone, through the functioning of the forest revenue system, an artificial and inefficient separation of logging from forest maintenance functions. This happens in those cases where a failure by forest concession holders to maintain the forest asset under their management is countered by an imposition of a "deforestation tax" (or the like) whose stated purpose is to generate funds necessary for the government owner to do that which the leaseholder has failed to do himself. In the worst cases, "deforestation tax" is used to increase revenue rather than alter the leaseholder's behaviour. Given the obvious cost advantages of forest maintenance being undertaken by those whose resources are already deployed in the locations concerned (i.e. the leaseholders), it will normally be more efficient to concentrate administrative resources on altering the pattern of economic incentives inherent in the type of lease arrangement used, rather than on formulating and collecting new taxes.

The complexity of the revenue system will therefore depend in part on the extent to which it has to compensate for the weaknesses of sustainability incentives inherent in existing tenurial instruments. For a given area of lease combining different functions (e.g., mature old-growth forest suitable for selective logging, denuded areas requiring reforestation, conservation area, etc.), it is possible to formulate a type of tenure that encourages the leaseholder to channel some of the profits made in the logging segment of the lease to fund contractually-imposed forest protection activities in another segment of the lease.(a case described in the Philippine case study further below). The same outcome can be obtained, at a higher cost, by delinking the non-profitable segments from the area of lease, taxing the profitable activity more heavily and channel, through the taxation system, some of the higher tax revenues to a third party (typically, the FS itself) to undertake the non-profitable activities.

8) Policies for sustainable forestry: Conclusions

8.1 Forest tenure as an evolving tool

Forestry practices are shaped by existing institutional arrangements. Among the latter, the structure of forest tenure is crucial. A tenure system rarely consists of a single type of instrument. Instead, it will tend to comprise several instruments, their composition intended to capture the complex mix of social, economic, environmental and political objectives of the government. The evolution of the mix of government objectives will naturally be reflected --with a lag-- in changes in the tenure system.

A major conceptual difference has always existed (and shows little sign of lessening) between two broad views of forest tenure and the respective roles of the State and private leaseholders. On the first view, the publicly owned resource, often embodying externalities, cannot be left to private leaseholders under any normal circumstances. The leaseholder's legitimate role is that of a logging-or related contractor. This view seems to be supported by existing practices in, for instance, the U.S., where production forests in the public domain are managed by the U.S. Forest Service through the highly controlled modality of stumpage sales. The other view assumes (without always saying so) that there are limits in most developing countries to how much forest the State can effectively manage. It assumes (once more without always saying so) that it is better to lease the forest to the private sector, with a possible risk of sub-optimal management, than not to utilize the forest at all. That view is reinforced by the experience of inefficient State management or sheer protection of the resource. There are relatively few examples that combine the strict oversight found in, e.g., the U.S. public forest with a willingness to assign forest areas to the private sector for long term management. The most relevant are probably the practices in force in British Columbia and several other Canadian provinces and these examples deserve to become better known in developing countries.

8.2 Centralised vs. decentralised forest management

The increasing awareness of the forests' environmental value and a willingness to place values on them in many countries of the tropics has tended to expose another level of policy disagreement between those who now champion such longer-term or indirect benefits against the forests' short-term fiscal potential. In the process, a further conflict between "centralizers" and "decentralizers" has appeared.

The habit of channelling the bulk of forest taxes to the central government, supported by the notion that (i) tropical timber is given (rather than man-made) and therefore, in fairness, its fruits should benefit everybody; and (ii) the standard public finance justification for centralised revenue collection, i.e. the desirability to equate marginal benefits of budgetary outlays across sectors and regions of the country, tends to lessen the commitment of local resource managers to the forests' long-term health. This is because efficiency of natural resource management in general, and renewable resources in particular, is normally enhanced by decentralised decision making and resulting ability to more accurately identify and target the beneficiaries of investment efforts and the sources of social cost. For instance, downstream beneficiaries of watershed protection, rather than public at large, would ideally pay for the upstream protective activities if a socially optimal extent of watershed protection is to be provided.

(too little will tend to be provided otherwise). Similarly, efforts by local communities to enhance the value of neighbouring parks as a tourism venue should be accompanied by a proportionate allocation of tourist revenue to these communities (progressive degradation of the park is a danger otherwise). Extended to forestry, taxing all leaseholders on the basis of inaccurate centralised perception of what the adverse environmental impact of logging may be, for instance, will penalize the more careful among the loggers, i.e. the opposite of the taxation's intended impact.

More recently, the economic argument for decentralised decision-making has come to be reinforced, in parts of the tropics (e.g., the Philippines), by political decentralisation and a shift of emphasis towards community-based management of forests. More often than not, this shift has occurred after the commercially most attractive areas of the forest had been exploited and the land had become a mixture of different --and mostly unsustainable-- uses. The resident communities, combining former forest encroachers and newcomers, then typically lease the resources in varying stages of degradation. In view of this and the well-known difficulties of reconciling private- with collective- decision making, the efficiency of community-management leases is yet to be tested.

8.3 Sustainable forest management and competing land uses

Speaking more generally, much of observed deforestation in the tropics is directly or indirectly related to the expansion of cropping or grazing, offering short-term cash or in-kind benefits. The prospects of sustainable forest management through one or another kind of forest lease improve in proportion to the ability of the country concerned to gainfully employ the growing agricultural population. It is hard to conceive of a reform of forest tenure based on a provision of incentives to maintain and improve the forest asset without parallel incentives being provided to the farmers. The cost of maintaining an area as forest may well become prohibitive without potential intruders being given a powerful enough reason to stabilise their occupancy and invest in improving or at least maintaining this land's productivity. Community forestland management leases mentioned above attempt to simultaneously provide these incentives as does the *de facto* land reform in the formerly forested uplands (under a variety of labels such as "stewardship contracts". Attention to farming or agro-forestry in the buffer areas may well be the best way of maintaining the integrity of the remaining forest. If so, institutional ramifications are several: agricultural extension in deforested "forest lands" should be seen as an ally rather than an enemy; it becomes relatively unimportant whether trees are interplanted with crops under a forestry banner or farmed lands have trees planted on them under an agriculture banner; desirable moves to create a permanent forest estate need to be coordinated with agriculture initiatives, etc.

8.4 Reform of concession management

The account presented in this document contains the building blocks of a viable system of concession management. The challenge lies not so much in stating what such a system might be but rather in saying how best to graft it onto existing arrangements. Reform is, after all, just that. Rarely, if ever (and regardless of how many forestry or environmental "master plans" may be completed), does a possibility exist to "start from scratch". Typically, for political reasons, changes have to be introduced in a piecemeal fashion, their effect often blunted or even negated by the strength of remaining components of policy or by uncoordinated modifications simultaneously taking place.

The Philippine and Albanian case studies presented further below illustrate some of these difficulties. For the reform proposals to be useful, they must be more than a statement of the ultimate objectives. They must provide a sense of the desirable timing and relative importance of different reform components.

Tenure systems in all countries of relevance to this study comprise several different instruments, rather than a single one. It was argued in Section 3 that, according to the configuration of forest-management, depletion and environmental cost, different types of forest tenure may be needed if broad economic efficiency is to be possible in principle. The existence of social and political considerations, in addition to the economic and environmental ones, will mean that the tenurial instruments will often proliferate and will be compromise vehicles trading off economic efficiency and environmental acceptability against other considerations. After years of refining its approach to managing its (largely publicly owned) forest, the sophisticated Canadian province of British Columbia, for instance, has still felt it necessary to operate with no less than ten different types of forest tenure, not counting the provincial parks. The administrative demands --i.e. the legal, educational and physical prerequisites of effectively administering such a tenure structure-- are clearly considerable and at present can be met only by a small group of countries or regions. Complex tenure structures, despite their theoretical appeal, are usually inappropriate for those areas where the administrative resources are modest. Simplicity of a tenurial system becomes an important plus, to be considered alongside the system's ability to generate economic and environmental values. Those arrangements and modifications that help achieve the efficiency and environmental goals while simplifying the administrative burden will become particularly attractive. The long-term lease accompanied by a performance bond mechanism, described elsewhere in this document, had precisely this virtue as did, if with important qualifications, competitive approaches.

At the level of statute-drafting accompanying the modifications of tenure systems, the quality of statutory changes rarely match the intent of proposed reforms. The "reformers" tend to underestimate the task of explaining this intent to legislative drafters while legislative drafters (where such specialists rather than "ordinary" lawyers have been employed), for their part, have not usually risen above legal neatness to capture the spirit of the reform proposals. It is a rare forestry legislation specialist who, working without *continuous* support by economists and foresters (and, possibly, others) can produce a strong legislative draft. Yet, the practice of legislative initiatives supported by TFAP and other master plans has been either that lawyers have been allowed to work in isolation (with predictable results) or that, when the crucial stage of converting reform proposals into new regulations or legislation comes, a level of fatigue is reached that exempts lawyers' work from critical scrutiny. The far-too-common practice has been for the "technicians" to finish their deliberations and, more as an afterthought, hand over the "finished product" to a lawyer. Where the result requires legislative approval, the poor quality of the draft diminishes the quality of the legislative debate and results in unnecessary delays.

8.5 Enforcement as a condition for success

An important point to make here is that no system of forest management, forest revenue, or concession allocation would ever work if there is not an effective system of monitoring and control for enforcement of the legislation. In a series of countries, huge improvements in the state of forests and forest management would derive from the simple implementation of existing forest legislation and management plans. While most effort to date has focused on the development of public policies and management systems, there is now the need to develop effective means of enforcement, which are simple and affordable.

Effectiveness of a control system is a function of value of fees and the frequency of verification. A right balance has to be found between these factors to determine the optimal level of fees at an affordable frequency of field inspections. A study on this subject is currently being conducted in the Brazilian Amazon (Imazon, pers. comm).

Lack of enforcement is derived from a variety of reasons, such as lack of funds of FS, lack of staff, low salaries, no incentive for FS staff to perform, and corruption. In many cases, sub-contracting of field inspections and collection of fees to specialised agencies may provide the means to overcome some of these limitations.

9) Case studies

9.1 The Congo: Challenges for legislative changes in the forestry sector

Sources: Grut et al. (1991); Cleaver et al. (eds.) (1992); SGS Forestry (1996)

Commercial logging in the Congo began in the coastal region of the country (Mayombe and Chaillu) some eighty years ago and, despite fluctuating fortunes of the industry, tropical timber remained the country's leading source of export revenue for the most part of the post-war period well into 1970s when petroleum came to provide the bulk of export proceeds and Government revenue. Though the relative importance of forestry declined, the sector continued to generate both employment and revenue. Beside selective logging of old-growth (or subsequent-growth) forest, the country saw successful (foreign-driven) large-scale establishment of eucalyptus plantations. Based on an expectation of continued oil price increases, and in keeping with the political priorities of the day, the Congo established 10 state or semi-state enterprises in the early 1980s that were awarded over 3 million hectares of forest for management, more than half of the total leased for utilization in the country.

By 1991, all of these enterprises accumulated losses and all except two ceased operation. The overall macroeconomic situation of the Congo continued to deteriorate as petroleum-based revenue had effectively become chattered while public-sector employment and expenditure remained high. In 1992, a program of macroeconomic reforms, agreed between the Government and IMF, began. In due course, a new look at the forestry sector became necessary to see if the sector could contribute more to state revenue and overall economic development. Collection of taxes levied on traded commodities was strengthened, in the case of log exports becoming co-managed by a foreign contractor. A Tropical Forestry Action Plan for the Congo, completed in 1995,

recommended, *inter alia*, a review of the existing legislative framework. With about 20 million hectares still under forest (of which about half estimated to be old growth) and a relatively small population of less than 3 million, the importance of a sound policy and statutory framework in avoiding the deforestation fate of some of the Congo's tropical counterparts had become clearer. A draft of a new forest law was prepared by the Government in the same year. Alongside, driven more by the Finance Ministry than the technical ministry in charge, steps were being readied to privatise state forestry enterprises and resume production on the area leased to them. The account of the beginnings of this process, especially as it applied to forest concessions, is intended to sketch some of the problems of policy reform mentioned in the text. The related purpose is to give the reader a sense of balance between the quality of detailed provisions and the overall soundness of the overall statutory framework.

Unfinished efforts to revise forestry legislation

The draft of the new legislation (at the time of writing, yet to be finalised and enacted) was based on a comprehensive analysis of the sector contained in TFAP. Its general intent is to bring Congolese forestry closer to the requirements of sustainable management and prevent further degradation of the forest, notable in the southern provinces of the country. The draft contains a number of provisions widely regarded as desirable (clearer definitions of different categories of the forest estate --four categories being recognized--, greater recognition of forests' ecological functions, the right of local communities to benefit from forestry activities, a measure of decentralisation in the management of forestry resources, etc.). In the important section dealing with commercial utilization of forest, the draft proposes a hierarchy of leases and permits, from wood collection permits and wood-processing contracts to "harvesting-management contracts", and "processing-management contracts". In this it builds on the existing (1974, modified in 1983) legislation as well as a Central- and West-African precedent. The first two mentioned entitle the holders, who can be individuals, to cut specified volumes and species of logs. The latter two are reserved for corporations that, beyond logging and processing activities, are expected to carry out all forest management activities within the leased area. Within this group, three subcategories of leases are envisaged: a logging lease (of up to 7 years), a wood-processing lease (of up to 15 years) and forest management-cum-processing leases (of no less than 15 years in duration). No transfer of the lease to a third party is allowed. At expiry, the contract can be renewed at the discretion of the MEF. Where the contract is revoked ahead of its original validity, the new leaseholder is bound by law to acquire the original lessee's enterprise at its fair value.

Among other things, the draft mandates local processing of all logs (even if a temporary log export relief is provided for) and provides for tax incentives proportionate to the degree of processing and guarantees first right of access to the raw material to local firms.

The overall approach to forestry taxation is said to be "based entirely on economic criteria in ways designed to derive maximum benefit from each product without hindering the expansion and sustainability of forestry activities". The draft enunciates the principle of no free commercial use within the forest estate.

Two classes of fees are provided for, the first, consisting of an export tax, the proceeds of which are to go in their totality to the State, and second, consisting of species-specific royalty, an area-based deforestation tax and four other minor taxes, the proceeds of which are to go to a forestry development fund whose purpose is said to be to finance forest management and conservation activities, and a number of other related activities. Production originating in plantation forest is to be exempted from the second group of taxes and be subject only to an export tax. At least 25 per cent of all taxes in the second group is to be paid ahead of actual logging.

The draft retains much of existing principles of production forest management. Most fundamentally, it reserves for the State owner all planning and sustainability-related decisions. Using mainly ecological criteria, the *Ministere des Eaux et Forêts* (henceforth MEF) divides total forest estate into forest management units (*unités forestières d'aménagement, UFA*) and the State also prepares a management plan for each UFA, specifying the maximum annual volume (*VMA*) for the main commercial species and the cutting cycle.

As in the existing legislation, selection of leaseholders is to be decided on the basis of proposals submitted by applicants and evaluated by an inter-agency committee by reference to the anticipated socio-economic impacts of proposed activities and the candidate's commitment to the principles of sustainable management. Despite the draft's use of the term "invitation to bid" (*appel d'offres*), the proposed procedure is thus administrative, not competitive.

Selected statutory provisions relating to large forest concessions in the existing and (the first draft of) proposed legislation are compared in Table 3, with minor simplifications. The right-hand column contains comments on the proposed modifications.

Table 3: Process of legislative change: Drafting new forestry law in the Congo

Statutory provision	Existing legislation	First draft of proposed legislation	Comments
Responsibility for management of production forest and its main elements	State owner responsible for UAF delineation, inventory, UAF-wide management plan, specification of VMA. Leaseholder responsible for management plan for the area of lease and for a pre-logging inventory.	No major change. The role of State in managing the resource further enhanced. Proposal to create a separate state forest inventory-and-management- planning arm	Control and adjustment of VMA by the State owner remains the principal tool of long-term management. The leaseholder to remain an executant of the State's management plan, a de facto logging contractor. This defeats one of the purposes of leasing. Past experience indicates that the Congo does not have the admin. strengths to emulate, say, US Forest Service's practice in dealing with the private sector on public land
Basis of leaseholder selection	Administrative review of a management proposal by an inter-agency body without specified evaluation criteria; Simplified criteria applying to small-scale logging permits	No major change	The system in force accounts for wide variations in the level of efficiency of leaseholders. It allows, indeed encourages, economic and non-economic criteria to be mixed and obscured in selection. The latter, in particular, is a serious minus.
Types of leases	Small-scale cutting permits and large-scale leases whose duration linked to the scale of intended investment	A more systematic link between lease duration and intended investment. Possibility of lease renewal at expiry.	The proposed lengthening of lease duration unlikely to be sufficient. Where long ("no less than 15 years"), the question of guarantees of good conduct not tackled. Without them, the otherwise desirable transferability of lease to third parties risky.

Type of taxes and fees	<p>1. <u>Export tax</u> (as per cent of FOB reference price, location-, species- and grade-specific). Proceeds going to the state budget. Several minor export -related taxes</p> <p>2. <u>Forest taxes</u> (50 % of proceeds to MF, 50% to a reforestation fund supporting a govt.reforestation agency)</p> <p>2.1 royalty (species-specific related to FOB reference price; payable on total estimated VMA).</p> <p>2.2 miscellaneous taxes</p> <p>Locally-processed logs exempt from forest taxes (but not the export tax)</p> <p>[Not covered in forestry statutes:</p> <p>3. <u>Other taxes</u></p> <p>Turnover tax, social infrastructure obligations]</p>	<p>1. No change</p> <p>2. Forest taxes:</p> <ul style="list-style-type: none"> - All proceeds of forest taxes to a forest fund - Area-based fee added (not clear whether intended as a de facto environmental tax or a good-conduct deposit) - miscellaneous taxes retained (the proposal does not eliminate them) <p>3. Not dealt with</p>	<p>1. Export tax is a “wrong” tax but it retains its prominence because it is easy to collect. A more “correct” tax is levied at stump.</p> <p>2. The logic of the arrangements, i.e. tax away all short-term profits of the leaseholder and channel the proceeds to a state organisation responsible for the resource’s long-term health, is inefficient. Better tax the leaseholders less but make them responsible (via returnable financial guarantees) for resource maintenance.</p> <p>3. These taxes (or de facto taxes) applied inconsistently and in a non-transparent manner. A disincentive to new investment by the law-abiding.</p>
Level of taxes and fees	Rates or levels specified in the statutes in nominal terms	Rates revised.	Law doubling up as a fiscal tool. Inclusion of rates and amounts in nominal terms requires frequent changes if the risk of value erosion is to be avoided.

The above (simplified) summary suggests that the proposed changes in the approach to commercial utilization of the country’s forests have been less a matter of substance and more a matter of changing the taxation of logging profits. The summary raises several important issues, stated here as questions for consideration:

1. Is an increase in the prices the government charges for its forest resources likely to sustainably increase the sector’s contribution to the national economy? Could the emphasis that the existing, and proposed, statutory and tenure arrangements place on short-term forest taxation policies come at the expense of creating a policy environment conducive to maintaining or increasing the long-term value of the forest asset?
2. The direction of the new legislative proposal is towards strengthening the role and oversight of the State over the leaseholders. In view of existing experience (bankruptcy of state forestry enterprises and a record of limited ability of the State to supervise leaseholders), is this direction justified? Should the law want to allocate concessions to those who have the capacity to manage the forest (rather than simply do logging) while, at the same time, placing the bulk of the management responsibility on the State?
3. Simplification of the taxation regime may be as important as attention to the levels of existing fees and charges. Good understanding of the the cost structure in the industry, including the combined element of taxation, is essential if misleading calculations of the industry’s profitability are not to reinforce the “short-termist” outlook and an unsuitable regulatory framework.
4. The practice of placing on forest leaseholders social and physical infrastructure obligations of the State obscures the true financial position of the leaseholder and is a source of abuse and arbitrariness.

Reviewing the progress of various initiatives up to then, and a narrow-based forest-charges emphasis evident in most reform proposals, a 1996 consultant study

attempted to widen the debate by providing tentative estimates of likely revenue repercussions of policy changes or initiatives that eschew the tempting “remedy” of simply increasing forest charges:

Policy initiative / measure adopted	Likely ultimate increase in govt. revenue (\$ mil equiv. p.a.)^{a/}
Increasing forestry taxes to appropriate the entire short-term logging profit for the Government	5.4, assuming no disincentive effect of higher taxation
Activating currently inactive production areas (see text below)	5.9, some increase in forest degradation possible
Improvement of transport network, in particular the railroad artery leading to the port of Pointe Noire	6.0, excluding wider benefits to the economy
Adoption of more investment-friendly forestry and investment codes	11.0, impact not immediate
Preservation of the economic and environmental value of forest resources	19.7, impact delayed

a/ total tax income the Government derived from forestry was estimated at about \$11 million p.a. in mid-1990s. This excluded the value of social and physical infrastructure obligations placed on the industry.

Even if only tentative, the estimates suggest that much more is at stake in drafting a forestry code that an ability to raise the maximum amount of revenue. They also suggest that there may exist factors (such as the state of the transportation network, in the case of the Congo) exerting as powerful an impact on the sector’s potential economic contribution as the statutory framework specific to the sector.

The early experience of the Congo with a reassignment of State-enterprise operations to private concessionaire is also instructive:

Not unreasonably, the Congolese government have felt for some time that privatisation of state enterprises offered the greatest scope for sizeable short-term boost to revenue. Auctioning state enterprisies among potential bidders is seen as an attractive possibility. The risk inherent in the process is of two kinds: a temptation to mortgage future forest tax revenue in an attempt to rid government books of the insolvent companies' accumulated debt, and a temptation to relax forest utilization rules in order to make the companies a more attractive take-over target. The value of these companies' fixed assets is minimal and, if sold off on that basis, the amounts raised would be minimal or none. The value of the forest concession is what makes the company potentially worthwhile. The situation is made more serious by the lack of transparency.

The first of the companies, privatized early in 1996, raised a respectable cash amount, without however any verifiable information about the terms of this transaction or the rules to guide the privatisation process itself . The implications are worrying: A large fee for an insolvent company can only mean a large expectation of future profits associated with the utilization permit. Even allowing for improved operating efficiency of the new owner, this assumes either continued willingness of the Government to give up most of its future claims to the companies' profits or a willingness to sanction an "accelerated" logging regime with potentially serious consequences for the forest (and possibly also, the environment). In conclusion while the task of placing the currently “dormant” forestry concessions under management, preferably using competitive bidding, deserves priority, the urgency of the task should not be allowed to use the auctions carelessly, without ensuring that the bid amounts cannot mask resource depletion. At the same time, once a suitable modality chosen to reassign leases from

State corporations to private forest enterprises is tested, it should then become a standard tool, or one of the tools, of concession allocation in preference to the methods in use at present.

9.2. Philippines: Performance guarantee bonds for commercial management of natural forests

[Adapted from Paris et al.(1994)]

The largest single exporter of tropical logs in the early 1970's, the Philippines went on to become an importer of logs mere two decades later. An average of over 200,000 ha of closed canopy forest is estimated to have been lost annually during this period. Throughout it, utilization of old-growth forest was based on Timber Licence Agreements (TLAs) that gave concessionaires harvesting and management responsibilities for a specified area for a period of 25 years, renewable for the same length of time.. TLAs were awarded administratively, taking account of the applicants' technical and financial resources and commitment to local processing as well as, it is widely felt, political affiliations.

Deforestation and accompanying environmental deterioration on this scale took place against a seemingly sound structure of TLAs that specified annual allowable cuts, prescribed harvesting methods to be used, placed reforestation obligations on TLA holders, and made them responsible for protection of each TLA area.

The responses to the deforestation trends have been of two kinds. The first consisted of logging moratoria in selected parts of the country (eventually extended to all of the remaining old-growth forest) and non-renewal of expired TLAs. The second targeted the high profitability of TLA operations and resulted in substantial increases in timber royalties and introduction of a new environmental tax intended to compensate the Government for the damage caused by logging. The measures, especially the former, have reduced the environmental damage caused by the industry but have hardly affected the overall situation. This was because the areas withdrawn from TLA operations have come close to becoming an open access resource as the Government forestry arm, the Department of Environment and Natural Resources (DENR), lacked the resources to police some 2 million hectares of additional residual (logged over) forest. In any case, the proceeds of forest taxes accrued to the central government. Deforestation led by slash-and-burn farmers continued. There was clearly a limit to the area of the forest the State could --of chose to -- effectively protect. To sustain the remainder of the forest, it had to work with the industry, but work differently than before.

In 1991, DENR introduced a new type of forest lease agreement, dubbed Industrial Forest Management Agreement (IFMA). The agreement assigned to private lessees the responsibility for management and protection of suitable areas of forest land combining, within single units, residual forest management, protection of ecologically critical areas, and establishment of industrial tree plantations on deforested land. This was in sharp contrast to the traditional practice of awarding rights to harvest profitable areas to the private sector while shifting the burden of protecting threatened areas to the government.

IFMA placed heterogeneous forest areas under a single management responsibility. It thus encouraged creation of geographically rational management units allowing greater efficiency in combined timber extraction, plantation establishment and protection --activities requiring similar or shared inputs-- and in principle allowed the cash flow from the profitable parts of the lease area to subsidize both plantation establishment and protection activities.

Rather than according to the highest cash bid, IFMAs were to be awarded for management on the basis the highest amount of guarantee bond the bidder was prepared to post to secure the package of rights and obligations inherent in each lease. The Forest Guarantee Bond (FGB) is a returnable performance bond deposited with the Government. FGB has the following main features:

- it relies on competitive public bidding to allocate the lease and associated harvesting rights
- it encourages responsible long-term management by the leaseholder since non-depleting behaviour is rewarded by the return of the Bond with accrued interest (in addition to which the lessee could, at any time, sell his rights, appreciated by improvements)
- it provides a mechanism for the prompt penalization of the lessee in case of violation of the terms of agreement, a contrast to the TLA system in which the most the government has been able to do is cancel the license
- it provides a clear, market-based indication of the profitability of forest management in a particular area, with sites commanding very low or no bond bids being indicative of insufficient prospects of profit under the terms of the IFMA. Such sites may be then regarded as unsuitable for private management and the government must directly subsidize their protection

The introduction of FGB was accompanied by a stipulation of a bidding floor price set at P100/cu m (US\$3,60), with a minimum value of P6,000/ha (US\$217). The former of the two values amounted to 10 per cent of an assumed average net stumpage. The per hectare minimum was necessary since no recent inventory data were available for most of the residual forest areas being offered; in these case, an average allowable cut of 60 cu m/ha was assumed.

The form of FGB was not clearly specified and all IFMA holders decided to post a surety bond rather than a cash bond. This meant that instead of depositing the cash amount in a government escrow account, the lessee assigned the bond obligation to a registered bonding company by payment of an annual premium, the cost of which ranged between 0.35 and 0.60 per cent of FGB's nominal value. Real assets of the IFMA holders (in most cases, Manila real estate) were normally required as collateral and were subject to forfeiture to the bonding company should DENR claim the bond. Reputable forest companies were able to raise FGBs without real estate security. Since a surety bond is not interest bearing or returnable (unlike a cash bond), the only incentives for good behaviour were the relaxation of the collateral requirements and reduction of the premium. Both of these effects occurred through inflation, since the bond amount was fixed in nominal terms throughout the life of IFMA.

In the first two years following the introduction of IFMA, about 0.5 million hectares of forest land was assigned to leaseholders but the bulk of this area was completely deforested. Only two areas covering a total of less than 5,000 ha had been allocated by bidding. Everywhere else, the minimum area-based bid was the basis of the award. The slow adoption of the scheme had been due largely to uncertainty among potential investors regarding the conditions of the bond and ambiguities in the regulations as to what constitutes bondable forest. More specifically,

- the maximum proportion of residual forest in the total area of IFMA was set at 50%, often resulting in irrational management unit boundaries
- absence of recent forest inventory data made it difficult to determine the extent or quality of bondable forest or to prescribe sustainable management provisions to be covered by the lease
- considering the condition of much of the residual forest made available to potential IFMA holders, the area-based FGB floor price was in many cases too high
- the requirement that TLA holders wishing to convert their TLA to IFMA participate in FGB bidding meant that the most responsible TLA holders were, the higher they had to bid against newcomers. This discouraged some of the best forest managers from becoming IFMA holders .
- the provisions of FGB were not specified clearly by DENR: each FGB issued carried different provisions, creating uncertainty among the bonding companies
- a suitable monitoring system which would clearly define the grounds for calling the bond was missing

Introduction of IFMAs took place with many elements of old policy in place and certain new developments going against the intent of IFMAs. In particular, responding to popular sentiment, the constitutional provisions of 1987 limited the period of private tenure on publicly-owned resources to 50 years. As a result, IFMA, like TLAs, were awarded for 25 years and were renewable for one additional term. This tenure restriction removed much of the incentive for multiperiod behaviour and unduly emphasised FGB's punitive function.

The industry disliked the FGB regarding it as a disincentive in forest management. It argued that returns on industrial tree plantations, a predominant component of the early IFMAs, were not sufficient to stimulate the investment needed to bring large areas of degraded forest back into production. The value of the potentially productive natural forest within IFMA areas was acknowledged but this was nullified by the imposition of the FGB, even in its surety bond form. Besides, the industry argued, plantation establishment on the denuded portions of leased areas acted as a bond, since required investment of some \$1000/ha equivalent would be lost if DENR cancelled IFMA for failure to protect the non-degraded forest. The industry's position was strengthened by the retention of existing (much increased) royalties --something that contradicted the logic of the IFMA scheme, as originally conceived.

Proposals were soon made to improve the functioning of the scheme. First, private forest service organisations (FSO) were to be (competitively) engaged to prepare on DENR's behalf resource management plans for the residual forest areas, based on inventory, resulting in zoning- and community-involvement recommendations. These plans were to be the basis for competitive bidding for IFMA areas. The zoning is required to ensure that the rationale of the FGB is not lost: if IFMA were to remain a traditional "planting of trees on degraded land", no meaningful bids would be forthcoming (indeed a guarantee for the investor- a "negative bond"- would be more appropriate). Planned IFMA areas therefore had to include significant portions of the natural forest. DENR eventually rescinded the previous 50 per cent limit for the productive residual forest areas.

The second modification regarded the FGB floor prices. With well-established bidding procedures and clear zoning conditions, setting minimum bid values would be unnecessary since competitive pressures would ensure correct valuation of the resource. Given, however, the infancy of the scheme in the Philippines, floor prices were considered necessary to safeguard the resource. An FOB price-based formula was devised (not described here in detail) that was:

- set at a level that ensures reasonable compensation to the State owner and strongly penalizes a lessee for any damage caused by the default of the regulations
- related to measurable attributes of the forest at the time the lease is granted
- not a disincentive to bidding on poor quality or recently-harvested forest both of which require investment and time to reach a harvestable condition again

The effective use of the FGB mechanism requires that revenues sufficient at least for the delineation and zoning of areas and monitoring and audit of IFMA holders' performance are generated for DENR. This requires either that part of the forest taxes be allocated to DENR for these activities or that the conditions of FGB bidding foresee the winner reimbursing the government for the cost of inventory, aerial photography and preparation of resource management plans.

Among the conclusions drawn by the authors (see the reference above) more than two years ago were the following:

"The Forest Guarantee Bond was developed as a way to grant maximum security of tenure to forest lessees while providing the government with ready means to penalize violators of forestry laws. It also attempts to confine the government to regulating enforcement functions while entrusting the private sector with the actual tasks of managing and protecting (the forest). In the face of constitutional restrictions preventing private ownership of forest areas, the aim was to create a situation approximating that in ordinary market, where the owners of resources benefit from good stewardship and suffer the consequences of bad management in the form of capital loss. In the case of forestry, however, private ownership rights need to be qualified by zoning provisions designed to protect the environment. The Bond covers

both these aspects while economizing government resources by simplifying the forestry law monitoring and enforcement tasks of the government”

Among the drawbacks of the scheme, as applied in the Philippines, the early observations were the following:

“..... the constitution-imposed tenure limitation...in most cases will allow only one harvest within a given area, thereby removing any economic incentive to maintain, let alone improve, a stand after harvest. Since the surety bond is not returnable, only the threat of bond forfeiture will ensure fulfillment of harvest obligations. Although transfer of an IFMA is allowed, the purchaser is left with the same remaining term as the seller.

“...the requirement for forest lessees to post a guarantee bond was not accompanied by a waiver of forest charges on volume of timber extracted. Thus the bond “stick” comes with no “carrot” and the bond is (rightly) seen as yet another burden on an already struggling industry, reducing the cash flow available to forest managers to invest in long-term forest management. A major objective of the scheme - the cross-subsidization of forest protection and rehabilitation plantation from current revenue- is thus placed in jeopardy”.

“...(another drawback results from) the persistence of differential fiscal and regulatory regimes for various types of forests. Plantation-grown wood is exempted from forest charges and may be exported in any form, while logs and sawnwood from natural forests are subject to both royalties and an export ban. Furthermore, investment incentives, including tax and import duty exemptions, continue to be available for plantation establishment. These differences distort lessees’ management decisions by making mono-crop plantation establishment more attractive than rehabilitation of “naturally-grown” but “inadequately-stocked” forest...”.

Postscript

With distinctly more business-oriented policies of the new government, the pace of IFMA awards quickened in 1994, often at the expense of adequate zoning and resource management plans and competitiveness in IFMA awards. Reports of abuses of the system, allegedly used by some as an opportunity to log the last remaining adequately stocked areas of forest, multiplied, leading DENR to suspend the scheme in 1995 while undertaking a review of its functioning. To this day, the vast majority of IFMAs are no more than industrial tree plantation leases on denuded areas, commanding no FGBs. With a growing upland population of the country, the attention of the government has shifted towards community-based forms of management on the formerly forested land.

9.3 Albania: Sustainable forest management in an economy in transition

[Sources: World Bank (1993); FAO (1994); Ruzicka (1994)]

Like some of its Mediterranean neighbours, Albania is largely a mountainous country. Half of the total land area lies above 600 m of altitude and one third, above 1000 m of altitude. At most, 20 per cent of the total land area is suitable for cultivation. Despite

overall environmental fragility, nearly 90 per cent of the forest in Albania is classified as productive and actually utilized. "Natural regeneration"² has been the main management approach. Until 1991, all forests in Albania, like those in other centrally planned economies, belonged to the State and were utilized by state corporations or cooperatives. About half of the total wood consumption was fuelwood. Unlike in mixed economies, no overt market-based signals were generated that would facilitate the valuation of different forest management alternatives. Relative success in maintaining forest cover³ was achieved largely thanks to draconian measures aimed at control of livestock and encroachment in general. These measure and what they stood for had become thoroughly discredited and the challenge for the new Albania was to formulate a policy that would maintain the value of forestland resources without exclusive recourse to command and control.

The situation in which new policy was being formulated saw a rapid privatization of virtually all agricultural land (largely completed by 1994), a concomitant increase in livestock population and grazing pressure on the forest, a collapse of state forestry enterprises and local wood processing and an increase in illegal production of fuelwood. It is against this background that certain policy topics acquired prominence. Some of the debate that took place is summarised below.

Level of sustainable wood production

There was a general perception that Albania's forests had been overcut and degraded and that more than anything else, the policy needed to be directed towards that threat. The discussion of the annual allowable cut (AAC) seemed to go to the heart of both the production and sustainability debate.

There was little disagreement about progressive degradation of forest resources in areas close to major settlements over a period of at least 15 years but a great deal of uncertainty about the situation at the national level. Based on Government figures of growing stock, its species and age distribution, and yield tables, FAO and the World Bank estimated the weighted maximum annual increment (MAI) of Albanian high and coppice forests combined to be 5.0 cu m/ha p.a. By contrast with this figure, the official estimate of AAC of 1.4 million cu m p.a. implied a figure of only 1.4 cu m/ha p.a.. Since a maximum MAI is a concept that assumes ideal management conditions, the extent of any over- or underharvesting will depend on how closely actual management conditions approximate the ideal ones. Existing data made it difficult to produce a robust enough estimate of the true MAI. Estimates of the actual average annual harvests (combining the official and unofficial) exceeded the figure of 1.4 million cu m p.a. by up to 3.4 million cu m.

The fact that the forests had not been completely degraded in the face of what appeared to be massive overutilization led the same observers to conclude that the Government underestimated the production capacity of its forests in calculating the AAC and that surveys of fuelwood consumption may have overestimated the actual fuelwood consumption. They also noted an imbalance in the concentration of fellings. About 11 % of the growing stock located in inaccessible areas were nevertheless

² The reason for using inverted commas are given elsewhere in the text and other case studies

³ Success only as measured by the extent of forest cover. The text goes on to discuss this issue in greater detail.

included in the calculation of the AAC implying that the corresponding volume had to come from accessible areas.

To leave the issue here, i.e. noting overexploitation of the resource at the national level and spatial imbalances in utilization rates, seemed incomplete as the assessment was conducted entirely in non-economic terms. The acceptance of virtually all parties to the debate of the traditional sustained-yield, even-flow, management of the forest as a suitable basis for policy was hard to leave unchallenged. This was, first, because the estimates of AAC used in the discussion of Albanian forest (and indeed environmental management) assumed that all high forest outside protection areas was economically worth harvesting. This was almost certainly not the case despite the generally high economic value at stump of average hardwood stand. Leaving aside, initially, the environmental cost of logging, the variations of production cost (due principally to widely different road-building conditions and distances from the market) were such that many areas included in the AAC estimates may have best been left unlogged no matter how underutilized they may have at first appeared to be. Somewhat paradoxically, perhaps, an economic --rather than purely silvicultural-- approach to forest management might result in smaller areas being made available for timber production and correspondingly larger areas left for protection, recreational and other uses (including, in the Albanian conditions, certain types of grazing). The same, economic, approach may also have dictated departures from the even-flow timber harvests so desired by the forestry profession.

As one of the assessments [Ruzicka (1994)] put it, “unless an extreme view of sustainability is adopted (such that would preclude not only changes in the spatial extent of renewable resources but also in the objective of their management), estimates of aggregate annual allowable cut are extremely poor guide for any policy attempting to maximize social welfare. Long-term volume of wood production is a poor proxy for the aggregate value of the range of benefits that can be obtained from the same area of land.⁴” The study went on to say: “What is needed in Albania is not to reach an agreement on what the AAC is, adjust harvesting level accordingly and gear most policy instrument to that objective.what is needed is to equip the State administration technically to be able adequately to judge the value of individual parcels of forest land put to different uses, wood-production or otherwise, and ensure that the socially optimum options are adopted and become self-financing, i.e. sustainable.”

Efficiency of timber production

Related to the question of AAC was the approach to be adopted by the State to managing its production forest. The traditional structure of management and production resting on the management plans being carried out by a network of state logging enterprises collapsed in Albania in 1993 as the enterprises themselves ceased to function. Private entities came to fill part of the void, in some cases aiming to take over the harvesting functions of the former state enterprise together with whatever was left of the functioning equipment. For the most part, however, the new entrants into

⁴ Hyde (1981), showing that the U.S. Forest Service, the guardian of public interest very much wedded to the principles of sustainable yield, unwittingly opened excessive --economically speaking-- areas of old forest, seemed directly applicable to Albania.

the industry were small, ad hoc, enterprises with little history and experience in industrial timber production.

The general provisions of the 1991 Forest Law regarding harvesting in production forest had been translated into a policy of the State entering into two kinds of utilization contracts: (i) auctions of standing timber in relatively small areas (typically, less than 500 ha) served by existing logging roads; and (ii) long-term contracts which combined timber harvesting with road-building in larger (up to 3000 ha) areas, inaccessible at the time.

The former category (i.e. stumpage sales) had been accompanied by the adoption of a comprehensive list of floor prices. These, in the case of timber and fuelwood, had been derived by estimating the cost to the State of producing the relevant category of wood over a given rotation period (at an uncertain rate of discount). The resulting estimates were then said to be adjusted by reference to “reasonable international standards”. About fifty private enterprises had participated in the early round (up to mid-1994) stumpage sales and the prices realized had exceeded the floor prices by between 5 and 25 per cent.

The second category of the production contracts was to be awarded not on the basis of a bid price but according to the quality of the management proposal. The applicant selected was then to acquire the timber at existing floor prices adjusted downwards by a factor reflecting the magnitude of estimated unit road-building costs. In recognition of the public benefit that road-building was believed to generate, the contractors were to be given a four-year profit-tax holiday.

Both approaches, not new by international standards, represented nevertheless a bold foray into an uncharted territory in Albanian conditions. The boldness was a matter of at least three factors: the new private logging enterprises, including those cases where they were successors to the state predecessors, were said to lack technical competence, scruples, or both. Serious budgetary cutbacks facing the Directorate of Forestry at the time compounded these failings as Forest Service could not provide the necessary technical advice and supervision. Secondly, the number of qualified and independent operators was still relatively small to ensure truly competitive stumpage sales. This had led FAO and World Bank to recommend that instead of sales of standing trees, wood should be auctioned off at roadside to ultimate buyers whose greater number would lead to better prices for the Government.

These reservations were reinforced by others, more fundamental. Though seemingly attractive in view of past inefficiency of state logging enterprises, privatization of harvesting activities only in the absence of adequate monitoring by the State owner was obviously flawed since higher price bids could in principle be “recouped” at the cost of long-term productivity of the forest asset.⁵ The two, i.e. restored and improved capacity of the State to monitor, and involvement of private harvesting contractors had to go hand in hand and if they could not, the former should have probably taken

⁵ Those with no long-term stake in the success of forest management need not overcut in order to behave sub-optimally. Even if volume or logging intensity can be controlled (a task certainly easier in European forests than the tropical ones), the method of logging (and potential damage to the future productivity of the site) may be much costlier to control..

precedence over the latter since the cost of foregone output (while monitoring is being improved) could well be lower than the social cost of poorly supervised and “short-termist” logging. Inefficient and sullen compliance of a state logging enterprise with the requirements of long-term optimality may not be significantly inferior in a social sense to activities of an efficiently destructive private operator. However, as one of the observers of the evolving framework noted, “social optimality requires not that an (unimpressive) state forest enterprise be resurrected but that the private licensees be placed in a position where they cannot (or have no incentive to) trade short-term stumpage for long-term productivity of the forest asset.” Good monitoring of compliance with logging regulations was certainly one possible --but costly-- approach, long-term utilization contracts accompanied by performance guarantees and creation of markets for immature wood seemed a superior alternative. The most elegant of the alternatives, eliminating the high supervision and information-acquisition cost altogether, i.e. vesting full ownership, was not among the options in Albania.

The second of the two types of contracts introduced in Albania, i.e. long-term harvesting-cum-roadbuilding contract, suffered from several disadvantages in its initial form: First, the criteria by which the proposals were to be evaluated were not easily measurable and the selection of leaseholders was bound to raise questions about the impartiality of the process. The extent to which the road design and alignment were to be imposed on the contractor by the Government (rather than being a management variable) was not clear. With floor prices being fixed by the Government and all aspects of road-building determined also by the Government, the leaseholder came close to being a passive executor of the Government will, raising the question of why the work should not have been done by the Government itself.

One of the consultant reports offered the following summary of the process:

“....(I) rather than being an element in a controlled and well-planned withdrawal of the State from wood production, utilization contracts (in Albania) have been resorted to initially to compensate for the sudden reduction in the Government direct funding of the sector; (ii) the emerging structure of (timber) production contains few incentives for the Government’s new partners voluntarily to abide by the rules; reliance on parties with little or no stake in long-term productivity of the forest land carries significant risks and requires expensive additions to State owner’s monitoring and enforcement resources. ; (iii) emphasis on short-term stumpage sales does have the merit of tying the State management of the forest to the market. However, this merit diminishes in proportion to the lack of financial autonomy of the State manager; (iv) to ensure that the current utilization policy is consistent with long-term optimality of forest management, the State would have to exercise a degree of control whose information and other cost would probably exceed that of the private owner; (v) state management through “harvesting and road-building proxies” is probably not significantly superior to state management pure and simple especially if significant environmental externalities are present. Where such externalities are largely absent, the system is inferior to private ownership or long-term, performance-linked, private management; (iv) in view of the legal impossibility, for the time being, of divesting of parts of suitable forest estate, the emphasis must be on improving the Directorate of Forestry’s capacity to monitor utilization contracts and contractors’ performance and on developing longer-term utilization contracts containing performance safeguards.”

9.4 Indonesia: Building environmental concerns into forest land classification and forest concession management

[Sources: World Bank (1990); Dick (1991); Groome Poyry (1994)]

The history of the “timber boom” of 1970s and Indonesia’s rapid rise from being a minor player in the regional context to becoming, first, the world’s single largest exporter of tropical logs, and later, the largest exporter of tropical plywood, is sufficiently well known. The structure of forest concessions (“HPHs”) and accompanying policies that made this possible have also been described in some detail. Considerable attention has been paid to the taxation of the sector including the prominent role given in the structure of forest charges to a reforestation levy. The role of log export bans (and, later, sawnwood-export bans) and other measures adopted to stimulate local wood processing has also attracted comment. Relatively less well known are recent attempts to reconcile the forestry policy with the country’s ambitious environmental objectives.

Among key issues, directly linked to forest land utilization and corresponding tenure arrangements, is that of forest land classification. The quality of the categorization and allocation of forest land to different uses, and the effectiveness of implementing these decisions in the field, were recognized (by no less than the Tropical Forestry Action Plan for Indonesia) to have a major bearing on the prospects of sustainable management of the country’s forests. A sound classification of forest by functional categories furthermore provides a more rational basis for a discussion of deforestation and degradation, since their consequences can be vastly different according to the class of land on which they occur. In terms of forest concession allocation, different functional classes of land may --and do-- call for different tenure arrangements. This, in a simplified form, is recognized in most tropical countries including Indonesia where industrial tree- or pulpwood plantations, for instance, tend to be restricted to forest lands of lower quality and supported by a distinct type of forest lease.

Since 1973, forest land in Indonesia has been categorised into nature reserves, protection, conservation, production and limited-production forest. Certain areas were left unclassified, in most cases eventually becoming “conversion forest”, i.e. land considered to be of higher social value if utilized for purposes other than forestry. The more recent and formalized versions of such a classification have been based on a process referred to as a “consensus land use plan” (“TGHK”) dating back to early 1980s, involving inter-agency reconciliation of conflicts over the use of land under the jurisdiction of the Ministry of Forestry. The TDKH designations are as follows:

Table 4: TGHK-based classification of Indonesia’s forest land, 1984

<i>Category of forest land</i>	<i>Primary purpose</i>	<i>Sanctioned method of timber extraction</i>
1. Nature reserve	Conservation of biodiversity	None permitted
2. Protection forest	Watershed protection	None permitted
3. Limited-production forest	Timber production and watershed protection	Selective logging
4. (Regular) protection	Timber production	Selective logging or clear-felling according to forest type
5. Conversion forest	To be converted to higher-value land uses	Clear felling

TGHK categorization was largely based on the criterion of erosion hazard, its magnitude derived using slope, soil and rainfall intensity parameters. The outcome of the TGHK classification, nation-wide, is given in Table 5:

Table 5: Areas of different classes of forest land in Indonesia according to TGHK criteria, 1984

	% Land Area	Area (mil ha)
Protection forest (intended primarily for watershed protection)	21	30.3
Conservation forest (incl. national parks)	13	18.8
Limited production forest	21	30.5
Production Forest	24	33.9
Unclassified/conversion forest	21	30.5
Total	100	144.9

The process, though logical, has been known to suffer from several weaknesses:

- The information base, especially forest and land resources inventory, available in the early 1980s did not allow a reliable delineation of forest land categories. There is a feeling (supported by data subsequently generated) that in many regions the designation were deeply flawed technically as well as procedurally..
- There are no objective criteria to distinguish production from conversion forest. The latter has often been designated as such without adequate knowledge of its productive capacity or inherent values. Substantial areas of “conversion forest” are now believed to be best managed for sustainable production of timber and other forest services
- TGHK-based boundaries do not excise environmentally sensitive areas within production forests. Also, TGHK maps contain little or no information about vegetation cover or a range of other characteristics of the physical environment having an important bearing on land capability. They are of limited use, therefore, in allocating land to schemes [such as industrial tree plantations (see below)] which are conceived to match a chosen activity to a particular class of land (degraded land, in the case of industrial tree plantations).
- TGHK designations make it possible to specify a timber harvesting system and its intensity but have little to say about other aspects of timber production (such as location of roads), often decisive in an environmental sense
- There is no identification of areas of forest land occupied or used by the local population.

Attempts to change the approach to the classification of forest land were supported by the results of land resource surveys undertaken by other agencies of the Government.

The most notable among these was the Regional Physical Planning Programme for Transmigration (known by another acronym, "RePPPProT"). Undertaken in late 1980s and based on recent aerial and satellite imagery, the results showed significant lack of consistency between zones as designated by TGHK and the actual condition and use of the land. They showed, first, that in all provinces, considerable areas of land that should be in the protection or limited-protection categories had been cleared. Second, they strongly indicated that many areas where normal forest harvesting by HPH holders took place, should in fact be classified as protection or limited-production forests.

RePPPProT team proposed revisions of the TGHK zoning, based on greater degree of ecological consistency within the zones, the application of more up-to-date information about the soils, topography and rainfall (especially for areas previously unclassified) and --perhaps the most important-- on present land use and condition. All steeplands under forest cover, grassland, brush or shifting cultivation were to be included into either protection or limited-production forest categories whereas the steeplands under (or reserved for) permanent agriculture, plantations or settlements were considered conversion forest. The results of the proposed revisions, nation-wide, would be a 78% increase in the area of protection forest and a 40% reduction in the combined area of regular and limited-production forest.

The RePPPProT approach has amounted to shifting the approach to allocation of forest land for forestry and other uses in the direction of a lands systems approach. The approach facilitates the screening for environmental capability, i.e. the capability of land to sustain an activity and avoid degradation.. This it does by combining biophysical parameters determining soil erosion hazard (the "TGHK parameters" supplemented by slope length and cover factors) with parameters determining the biological diversity and ecological importance of the system. This, in turn, makes it easier to assign the most suitable management regimes to different parcels of forest land, something of obvious importance to any system of forest concessions. The approach, using RePPPProT data, is being tested in eight provinces under the National Masterplan for Forest Plantations.

In the meantime, the revisions of the TGHK-based classification have been gradual. It has been attempted, first, to improve the land suitability assessment within existing concession boundaries as well as, in some cases, redrawing the existing outer boundaries to bring them more in line with ecological requirements. With large-scale aerial photographs now available it is also becoming easier to address the long-standing problem of the de facto overestimation of a concession's sustainable harvest caused by not identifying sub-areas environmentally unsuitable for logging and not excluding them from the gross area in calculating the annual allowable cut.

Recent concession-level inventories and experience have shown that in most instances, current HPH boundaries are unsuitable for sustainable management. Convenience-driven initial delineation of the boundaries, unauthorised forest clearance and changes in the categorisation and use of the land in the intervening years have all rendered the boundaries obsolete. It is felt that in many instances, breaking up the total area of several existing concessions and suitably combining ecologically and commercially similar sub-areas, production units could be created with much better chances of permanent use than is the case under the existing delineation. Under an

approach based on Forest Management Units (“KPHP”), rather than managing a given area in the traditional way (usually, Indonesian selective logging), both the area and management approach become variable in principle. The prospects of sustainability increase with a greater degree of matching of management regime to the characteristics of the area. The approach would be expected to result in a larger variety of forest management regimes than is the case at present when the main types of corporate forest leases (HPH and “HTI” or industrial tree plantations) are based on a very broad and insufficiently site-specific forest land classification. At the same time its success crucially depends on the quality of information about the resource and other management-related factors such as the pattern of local settlement. The concept is currently being tested in the provinces of Jambi and Central Kalimantan.

The piloting of KPHP, as well as the experience of concession management in general, have brought into much greater focus the role of local communities in defining the boundaries of viable, permanent, production units. A separate programme of the government (known as “Bina Desa”) was created in 1991 to encourage a constructive and mutually beneficial relationship between concession holders and the local population resulting in a voluntary respect of concession boundaries.

The developments sketched above took place in the midst of extensive legislative activity that intensified at the turn of the decade. This is important to bear in mind since in formulating its policies, the Ministry of Forests, though having jurisdiction over forest land, needs to align its policies with legally-sanctioned decisions of other agencies of State that have a bearing on the way forest land is used. In addition, its decisions need to conform to several kinds of overarching legislation. In the case of Indonesia, the most relevant have been:

- Environmental Management Act of 1982 and Environmental assessment (“AMDAL”) regulations of 1986 [award of any new forest lease has to be accompanied by an environmental assessment of its likely impact]
- Spatial Use Management Law of 1992 [inter alia, devolving most authority for land categorization to provincial governors making it necessary for the Ministry of Forest to reconcile the TGHK or any other system of forest land classification with provincial spatial use plans]
- Law on Population Development and Family Welfare of 1992 [*inter alia* strengthening customary rights of local population and mandating support for vulnerable communities]
- Law on Conservation of Ecosystems of 1990 [among other things, committing all agencies of the Government to sustainable management of natural resources and recognizing the importance of ecosystem integrity]

The case of Indonesia illustrates how imprudent it would be to divorce the discussion of the optimum structure and management of forest concessions from the issue of forestland classification and, indeed, the definitions of sustainability or deforestation. To quote from Dick (1991),

“We must rethink what we mean by deforestation, and under what circumstances it is undesirable.we must recognize that land is needed to support a range of human activities. Objectives for natural forest protection and management should be established for each (forestland) functional designation, encompassing all of the benefits derived from these forest units; ranging from genetic preservation, climate moderation and watershed protection to wood and fibre production. Forest land may be made available for other purposes providing its conversion does not conflict with the attainment of these forest conservation objectives, and providing the conversion results in sustainable benefits of substantially greater value than those obtained from the natural forest.The real challenge, not just for Indonesia but for many other countries too, is to assemble the information and to put in place the planning and control processes necessary to make wise and prudent decisions on land allocation. Until such time as these processes are functioning, it will be critical to carry out regular, accurate, and direct monitoring of forest depletion and land-use change. Clear criteria should be established to define forest depletion, and the monitoring system should identify the extent of forest loss by the agent responsible, by forest formation, and by functional category.....”

9.5 Brazil: The effects of bureaucracy and absence of a forest revenue system on forest degradation

[Main source: Hummel (1996)]

Brazil is the country which has the largest contiguous area of forest in the world, 250 million ha of rain forest in the Amazon region, representing 25 % of the world's natural forest area.

A large proportion of the forests in Brazil are privately owned, with the exception of 12 million ha of national forests and extractive reserves under government control. This tenure system was the result of a government effort which distributed land to promote the effective colonisation of the Amazon region during previous decades. This was done to guarantee the integrity of the National Territory as well as for re-settlement schemes designed to reallocate the landless from South and Northeast Brazil. However, this system now limits government control of forest resources.

Forest legislation and effects on sustainability:

According to the Brazilian Forestry Code, forest owners have two possibilities of utilisation of their forest resource: deforestation for forest conversion, or selective logging (management).

Deforestation is done mostly to open land for agriculture and cattle ranching. The legislation controlling this activity dates from 1965, when the rate of forest conversion started to increase significantly. According to the Forestry Code, land owners are allowed to convert up to 50 % of their forest area into other land uses⁶. The remaining forest must be kept but can be managed for the extraction of forest products, including selective logging [Hummel (1995)].

⁶ A recent government decree has reduced the proportion of land allowed to be cleared to 20 %.

The requirements for obtaining a deforestation licence (Autorização de Desmate) are reasonably simple. It is necessary to fill in an application form and pay the administrative fee. For properties larger than 1,000 ha it is necessary to conduct an environmental impact assessment (EIA). However, in order to avoid doing an EIA, forest owners often subdivide their properties and apply for licences separately or at different times. In this way, it is possible to obtain a deforestation licence with a few documents, a low fee and within a reasonably short period of time [Hummel (1995)]. The trees cut can either be used by the forest owner or sold. If the wood is sold, the forest owner must pay a reforestation fee, but this procedure can very easily be neglected.

Forest owners also have the option to apply for a management licence (Autorização de Manejo), which gives the applicant the right to conduct selective harvesting. Regulations controlling management activities were formulated in 1986. At this time there was already more concern about forest management and environmental conservation and, consequently, the regulations for selective logging are more complete and require more safeguards. The forest owner who intends to carry out selective logging must comply to the following regulations: formulate a management plan for the whole property, conduct a complete inventory of the forest resource, submit annual plans of operation, establish permanent sample plots for assessing natural regeneration, carry out an environmental impact assessment, prepare a report of environmental impacts (RIMA), submit it to scrutiny by public audience, and pay a variety of fees. Before being granted the logging permit, these documents must, theoretically, be checked in the field for their integrity and implementation. In practice, these documents are often purchased from small consultancy firms which mass-produce them. Even though the documents are forged, the process is slow and it takes a long time for its approval (it may take years).

There is a great discrepancy between the two systems, creating a large preference for deforestation. The number of approved management plans is very low, compared with the number of deforestation licences given. Most of the timber produced in the Amazon, consequently, are “legalised” through applications for deforestation licences, even when the timber actually comes from selective logging.

A variety of points need to be addressed in order to increase the level of compliance to the forestry law and reduce the rate of forest conversion in the Amazon, as listed below:

- It is necessary to simplify the procedures for legalisation of forestry operations. With the current legislation, it is infinitely easier, cheaper, and probably safer for land owners to go ahead with their forestry operations illegally, than to involve the government in a long legal procedure, thereby becoming conspicuous and raising the possibility of field verification. Furthermore, the application for these permits is usually only processed in the capital towns of the states, which are often hundreds or thousands of miles away from the forest owners. Considering the costs of travelling and accommodation while the environmental agencies process the applications, it is virtually impossible for small forest owners to comply with these regulations.

- In order to promote an incentive for land owners to opt for forest-related land uses, it is necessary to standardise the procedures for applying for different licences. The requirements for getting a management licence must be either similar or less complicated than for obtaining a deforestation licence.
- There must be better collaboration between the various agencies processing these applications. Currently, an application involves at least four agencies, which often do not communicate with each other: Ibama (Federal Environmental Agency), the OEMAs (State Environmental Agencies), Incra (Federal Land and Agrarian Reform Agency), and Funai (Institute dealing with the Indian Reservations). The whole process would be greatly improved if these agencies had integrated data-bases. This would also greatly facilitate the job of verification and monitoring of forestry activities.
- There must be a stronger effort in the enforcement of the forest legislation. The main weaknesses currently are due to an archaic system of data collection and control, and a chronic lack of staff. Consequently, most of the process of analysis and monitoring of the compliance to the forest law is purely bureaucratic, consisting of collecting documents and charging fees. A recent survey showed that not a single management plan in the State of Para was adequately written, or properly implemented in the field [Silva et al. (1996)], and that situation was not controlled by Ibama. Sub-contracting of certain services of inspection and monitoring of forestry activities has great potential.

Forest Revenue system

Another aspect of Brazilian forestry is the absence of a forest revenue system. Forests are seen as the property of the land owner, who purchased the land with whatever is found on it. This lack of acknowledgement of the value of forests leads to the perception that they are worthless, and therefore should be removed and converted into more productive ways of land use.

In the eyes of the land owner, the forest is often seen as an inconvenience, obstructing the development of agricultural crops or cattle ranching. Often, they do not consider themselves “forest owners”; instead, forest properties are referred to as “farms” or “ranches” (fazendas, sítios, ranchos). This perception has been reinforced by the rural land tax system which used to impose higher taxes on idle land than in productive land. Forests were considered idle land, while deforestation was interpreted as an improvement, clearing land for productive purposes (farming, ranching) [Almeida and Uhl (in press)]. This rural land tax system is currently being revised by the government.

From a government’s point of view, this absence of forest fees results in no revenue, and a chronically poorly funded environmental agency.

While the concept of charging for resources is not common in the Amazon, the southern states of Brazil utilise a reforestation tax which is charged to wood consumers. These fees are (or should be) collected and utilised for replanting programmes. A variation of this system is utilised in the state of Minas Gerais, where the value of this fee is differentiated depending on the source of the wood. Higher fees are applied to wood harvested in natural forests [Candeias Cavalcanti (1995)].

There has been some discussion in Brazil about the possibility of introducing a system of royalties on timber extracted from the Amazon. This would be a royalty based on standing volume, and the value would be around US\$5/m³, calculated as the extra cost of conducting low impact logging and silviculture [Barreto et al. (in press)]. This royalty would be paid at the time of application for permits by all the land owners applying for management or deforestation licences. Depending on the type of licence and the standard of implementation of the forestry operations, applicants may have their fees refunded, as follows:

- For those land owners that carry out deforestation, this fee would not be refunded. However, the extra cost derived from this new fee may create an incentive for the land owner to sell part of the wood cut as a means to pay the fees, as opposed to the practice of burning the “wood waste”.
- Those who apply for management licences but do not comply with the environmental and technical aspects of their respective management plans would also not be refunded.
- Land owners who are granted a management licence and conduct selective harvesting using low impact logging techniques and following the procedures described in their management plans would be refunded of the royalties, after field inspection by an Ibama officer. In this way, the extra costs spent with conducting good forestry practices can be compensated by the non-payment of royalties.

The royalties collected could be used by the state forestry and environmental departments (OEMAs) for financing reforestation and land rehabilitation activities in the region where it has been collected. The reason for doing this through the Oemas is that they can retain revenue within the state, while funds collected by Ibama have to go to a Federal fund and often do not revert back to the region where it has been collected.

9.6: The Costa Rican system of direct payment for environmental services

Costa Rica has a history of innovative approaches to development. In the fifties, in the middle of the cold war, the army was abolished releasing 15% of the country’s gross national product for use in development and social programs. In the eighties, Costa Rica was the first country to carry out a “debt for nature” transaction, which has subsequently attracted US\$ 80 million dollars for conservation of its forests.

Costa Rica is now launching a very innovative system to encourage land owners to opt for forestry-related land uses by providing incentives of direct payment for environmental services, i.e. CO₂ fixation, water quality, biodiversity, and landscape beauty [Forestry Law N. 7575, April 1996; La Gaceta (1996)]. These incentives aim at increasing the attractiveness of forestry compared to other forms of land use, reducing the rates of forest conversion to pasture which have been extremely high since the cattle raising programs supported by the World Bank and USAID in the eighties.

Incentives are paid to land owners over a period of 5 years following the signing of a contract to keep their land under a specified type of utilisation for a minimum period of 20 years. The value of these incentives varies according to the type of land use. There

are three main uses: conservation of existing forests, selective harvesting for sustainable wood production, and reforestation or natural regeneration of degraded pasture or agricultural land. In the case of private forest conservation, farmers receive US\$ 56/ha/year, to a total of US\$ 280/ha, and are waived payment of land tax. Those opting for natural forest management receive US\$ 47/ha/year, to a total of US\$ 235/ha, in addition to the revenue derived from timber harvesting. In order to enforce compliance with low impact logging guidelines, the law requires that any harvesting operation must be supervised by a trained forester. Farmers who choose to reforest part of their agricultural land receive a series of payments related to the costs of plantation establishment, to a total of US\$ 558/ha.

The institution co-ordinating the administration of these incentives is called Fonafifo (Fondo Nacional de Financiamiento Forestal - Forestry Financing Fund), an office created by the Minae (Ministerio del Ambiente y Energia - Ministry of Energy and Environment). Fonafifo has the role of receiving and analysing applications, conducting field verifications, carrying out the payments, and monitoring field implementation of forestry projects. Farmers who receive these incentives assign the rights of commercialisation of their environmental services to Fonafifo.

The resources required for this program will, during an initial phase, be raised from a new 15 % tax on fossil fuels⁷, which is expected to raise US\$ 21 million per year for this program (Franz Tattenbach, pers. comm). Costa Rica is also working on ways to charge the economic sectors which most benefit from these services. One example is the creation of a system to charge hydroelectric plants for the conservation of their water catchments, at a rate of US\$10/ha/year. These charges would revert in direct payment for farmers engaged in sustainable forestry activities in these catchments. A similar mechanism is being created for remunerating farmers in eco-tourism regions.

At the same time, Costa Rica is also creating mechanisms for selling some of these services to the international community. In the case of CO₂ fixation, this is done through the system of Certified Tradeable Permits (CTO) of carbon sequestration, which are issued by the recently created Costa Rican Office on Joint Implementation (OCIC - Executive Decree N. 25066 Minae, 1996). These CTOs are credits of carbon fixation based on the actual amount of CO₂ fixed in forests. They can be sold to countries which need them as a means to reduce their net CO₂ balances, to comply with the Framework Convention on Climate Change agreement signed in the UNCED [for further discussion, see Moura-Costa (1996)]. The first batch of CTOs (200,000 tons of carbon) has recently been sold to the government of Norway at US\$ 10/ton C, for a total of US\$ 2,000,000. In the case of biodiversity, a genetic prospecting contract was firmed between Imbio (the Costa Rica institute of genetic resources) and Merck (a large Swiss chemical company). This contract stipulates that Merck will pay to Costa Rica 10 % of the profits from any product derived from their forests.

Project Fundecor

Because of the characteristics of Costa Rica's land tenure, the implementation of any government forestry and agricultural program involves the participation of a large number of small holders. Central in the implementation of the program for payment of

⁷ Two thirds of this tax will be used for the maintenance and improvement of the road system, with the idea that this will result in reductions of CO₂ emissions, and the remainder is given to Fonafifo to finance the program of incentives for forestry.

environmental services is the Project Fundecor. Fundecor (Foundation for the Development of the Central Volcanic Range) was created in 1991 with the objective of reducing the rate of forest degradation in the World Biosphere Reserve of the Central Volcanic Mountain Range Conservation Area of Costa Rica and its surrounding buffer zone. Fundecor's approach is to increase the attractiveness of forestry activities as compared to alternative forms of land use (cattle ranching, agriculture). This is done by providing a variety of services for small and medium sized farmers, which include ensuring land tenure, as well as technical, marketing, and financial assistance.

On the technical side, Fundecor provides farmers with a variety of services which include development of inventories and management plans; monitoring of harvesting activities and plantation establishment; and selection of planting material for plantations. It also assists in the process of application for government incentives, and legal permits for forest management. For farmers opting for forest conservation, Fundecor provides protection against "professional" squatters who occupy land in the hope of gaining its tenure for future re-sale. In exchange for these services, farmers pay Fundecor 20 % of the financial incentives received.

Fundecor has also assisted farmers in the marketing of their production. This includes a system of selling standing timber in auctions in the Costa Rica Commodities Market (Bolsa de Productos Agropecuarios, Bolpro S.A.) Auctions have raised the amount received by farmers by nearly 100% compared to the informal system of direct negotiation with logging contractors [La Republica (1996)]. In order to join the auctions, forest owners have to provide a package containing a management and a harvesting plan, as well as a government license to manage the forest, which are done with the assistance of Fundecor. Since this process takes some time, loggers are willing to pay more for a ready-to-use package. It is expected that this system will evolve into some sort of future market for timber sales.

Financial assistance is provided through a system of advanced payment for future sales of timber from plantations or natural forest management⁸. In the case of plantations, farmers commit themselves to provide Fundecor with 40 m³/ha of the harvest, in exchange for yearly payments of US\$ 50/ha starting after the initial 5-year plantation establishment phase (during which farmers are still receiving government incentives). In the case of natural forest management, Fundecor pays US\$ 10/ha/year in exchange for 6 m³/ha of timber to be harvested at the end of the current cutting cycle (between 12 and 15 years).

The Costa Rican system of payment for environmental services is a splendid example of government's commitment and inventiveness to achieve forestry and environmental objectives. These sophisticated financial mechanisms also provide a pioneering example of a government trying to share the costs and responsibilities of environmental services between all parties involved, i.e., the forest users, the nation as a whole, and the international community. It is also an interesting example of where forest revenue systems were abolished for the sake of forest conservation.

⁸ Funds for this program were raised through a US\$500,000 loan from the World Bank.

10.1 Appendix 1

Table 6: Public policies and technical, environmental and social standards of forest management

Selected policy tools	Sustained yield	Maintenance of biodiversity	Protection of soil and water	Maintenance of protected areas	Contribution to national economy	Contribution to local economy	Promotion of social equity	Promotion of good working conditions	Maintenance of traditional rights
1) Land use planning	Important for all the factors above, specially maintenance of protected areas								
2) Tenure systems:									
State ownership and management	If properly managed, could theoretically address all points above, although there are no examples where it did								
State ownership, private management	The impact on the factors above would largely depend on the level of state control and enforcement.				Generally low. Depends on the type of forest revenue system	Low to medium	Generally low, depending on companies and governments social policies and enforcement		
Privately-sector owned	Impact would largely depend on the level of state control and enforcement. Usually do not promote the factors above.				Depends on type of revenue system	Depends on origin forest owner			
Community owned/ managed	Generally lower impact due to relatively lower size of operations.				Lower than other options	High contribution to factors above			
3) Allocation methods:									
Administrative	Impact will depend on conditions imposed by the state. Usually, low.					If properly regulated, could be tailored to promote the factors above			
Competitive	This method is more likely to select for operations with higher technical and environmental performance.				Tend to maximise forest revenue	If properly regulated, could be tailored to promote the factors above			
Privatisation	Less state control on operations' performance. Success dependent on level of enforcement				Generally low. Depends on the type of forest revenue system		Low, unless in the case of local communities ownership		
4) Features									
Duration	Important								
Size	Important					Large concessions will have greater impact on local economy and on social communities			
5) Management requirements									
Technical	Very important	Important in what concerns minimisation of impacts					Important for safety aspects	Important	
Environmental	Important	Very important							
Social						Very important			
Legal	Legal requirements can be used to ensure the objectives above, e.g. frequent reporting or conditional renewal of licenses. Unnecessary bureaucracy, on the other hand, may have the opposite effect, by halting the development of activities and inducing "short cuts".								

Selected Policy tools	Sustained yield	Maintenance of biodiversity	Protection of soil and water	Maintenance of protected areas	Contribution to national economy	Contribution to local economy	Promotion of social equity	Promotion of good working conditions	Maintenance of traditional rights
6) Revenue system:	Highly influential on all factors above. The effects depedn on how these the features of these systems .								
V royalties									
Area royalties									
Stumpage fees									
Royalty per tree									
Export taxes									
Fees on manufactured products									
No fees									
7) Enforcement	Vital to guarantee compliance to any standard or objective								

11) Appendix 1: A Fable of the Forest

There was once, in a tropical land called Afromosia, a forest with many mighty trees and monkeys. The forest belonged to the Crown. King Meranti and his men regularly came to hunt the monkeys and collect orchids. Every few years, workmen arrived and cut some trees to build the King's ships. (Meranti used to admire the speed with which the area previously cut regained its vigour. Meranti called his trees "my renewable princes".)

The King's subjects knew well that any trespass would be severely punished by Rodney, the King's chief whip. The forest contributed little to Meranti's favourite collection of coins but Meranti did not mind much. His pepper gardens brought him enough gold.

And then something happened that brought about a sequence of events that I need to recount today.

The pepper crop failed.

The pepper vines simply wilted and no amount of effort by Meranti's gardener could bring them back to life. The source of Portuguese and Dutch coins dried up, much to the chagrin of Meranti. Fortunately, at about the same time, a traveller arrived in Meranti's land from afar. His name was Tsimonoke (or some such back-to-front name) and a story soon spread that Tsimonoke was Japanese. Meranti asked that Tsimonoke be brought to his palace for he, Meranti, had heard of Tsimonoke's native land. The two men talked also about pepper. And then Tsimonoke said something that made Meranti almost choke on a betel nut. The Japanese liked wood almost as much as the Portuguese liked pepper. And they would be prepared to pay for trees cut by Meranti's men and brought to the harbour ("logs", Tsimonoke called them).

Tsimonoke also knew of men who could cut the trees faster than Meranti's own small group of shipbuilders. ("real loggers", said Tsimonoke). Meranti was tempted but feared that loggers would cut too much and too quickly even for his "renewable princes". Besides, his favourite hunting might suffer. "Worry not, Sire", said Tsimonoke. "You can divide your forest into smaller areas and assign a logger to each."

"A confession? Isn't that what the Portuguese in Nagasaki call it?", asked Meranti, "No, not a confession, a concession", explained Tsimonoke. "That way, you can produce more. You will also allow them to cut only the largest trees, the ones that do not grow any more, and your renewable princes will be in no danger. And if you worry about hunting, you can keep a part of the forest only for the monkeys. And here is the best part: you do not even have to deal with log buyers, you can get paid directly by the loggers if you like the idea. You will charge them a logging fee", continued Tsimonoke. "Is that what you call it? But how much should I charge them?" asked Meranti.

"That depends", said Tsimonoke. "You could try to get as much as possible. It is much better if the money goes to your Majesty that spends it wisely than to the loggers who are...how should I put it?...greedy and rough. Besides, the forest is yours". That sounded convincing enough to Meranti who beckoned Tsimonoke to continue.

"The Japanese pay the loggers 50 silver coins for a log and I know that the loggers spend only 10 to deliver it to the harbour. And that includes the cost of training new elephants and rice for men that is better than they could get at home. You could charge them 40 silver coins for each log they take from your forest", said Tsimonoke. "But my trees are of two different kinds. Are the Japanese paying the same price for all of them?" said Meranti. "Oh, your Majesty! You learn fast! Yes, there are in fact two prices, 60 coins for shiny acacias 40 coins for light mahogany and it would be better if you charged them 50 for the acacias and 30 for the mahogany. If you charged 40 for both, loggers would leave your mahogany unlogged. That would be good for the monkeys but not for your coffers. Differentiate the charges, your majesty.", said Tsimonoke.

"I like that. Perhaps we should call the charges the 'majesties'", said Meranti

"May I suggest 'royalties', your Majesty? It avoids repetition", Tsimonoke replied. "You should also perhaps think of increasing royalties to be paid by the loggers whose concessions are close to the harbour. They need fewer elephants and it costs them only 5 coins to deliver a log to the harbour. Majesty would not wish to coddle them", added Tsimonoke, knowing perfectly well that the cost could go up to 35 in other areas. In truth, he had been guessing when mentioning the cost. There was no easy way to know. In any case, he did not want to start complicating things for Meranti.

"You could also consider something simple. Since we know the prices of logs in the harbour but are not sure about how much it costs to produce logs, let us decree that from now on, for each log produced the logger will pay you 40 per cent of the log price", said Tsimonoke who knew that '40' was Meranti's favourite number. He quickly calculated the effect that a flat rate of 40 per cent applied to the value of the log might have on the pattern of loggers production. He counted the cases where loggers would reduce their production as a result. Yes, there would be some cases, perhaps the light mahogany in high cost areas. "Those monkeys win again!". Tsimonoke mused.

"I still like the differentiated majesties best", said Meranti "Differentiated royalties, Sire", reminded Tsimonoke who began to fear that Meranti might ask him to actually devise the list of amounts to be paid by each logger. Then Tsimonoke remembered what he had earlier said about the loggers. They were greedy. And there were many of them willing to work in Meranti's land for the rice there was particularly fragrant.

"Your Majesty may want to collect all the money from the loggers in one clean sweep without coddling them", said Tsimonoke watching Meranti's reactions. Then he added, somewhat mysteriously, "Majesty is something of an expert in this."

"Pray go on", said Meranti. "Majesty can let the loggers compete among themselves not unlike the young men Majesty invited to compete for the hand of your daughter Agathis. Instead of feats of bravery, the loggers will offer you money for the privilege of cutting trees in the concessions. Majesty will grant the concessions to the highest bidders." Meranti seemed pleased. but several things troubled him. "What if those who offer me the most are the same ones who do not care about my 'renewable princes'? They may cut more than advisable and even if I send Rodney to check that they cut only the largest trees they may be reckless and destroy the young trees." Meranti knew about recklessness and had noticed how quickly men claimed any damage to be unavoidable only to see how rapidly it declined every time he had granted a long tenure

to his subjects. " Then I will have to spend some of the money they have paid me to repair the damage", he resumed his thought.

Tsimonoke was leaving for his homeland that week and Meranti had to decide fast. Some loggers had already arrived and declared themselves ready to start logging. "Instant cash, Sire", they intoned. Meranti felt in no mood to organise a proper contest for concessions ("Not another wedding!. We can do it later") and, in any case, he liked some loggers more than others. He gave concession of ten years to loggers of the first group and declared that loggers will pay 20 coins for each log sold to the Japanese. ("It is not a differentiated royalty but it is fast"). He also gave one concession of 200 years to one Reganam (or some such name), for Meranti liked to experiment and 200 was the product of 40 and another favourite number of his, 5. Logging began and Meranti's coffers swelled.

Years later, Tsimonoke returned to Afromosia. Logging turned out to be a success but...problems started appearing. The forest began to look distinctly patchy. Peasants took advantage of elephant tracks and logging damage to clear forest completely and plant yam. Rodney declared that keeping the peasants out of concessions was difficult. "It's degradation", he said to Tsimonoke. "Besides", he continued, "it seems that most loggers cut only acacias and cut too many of them and leave mahogany unlogged. We may be depleting our forest, sir". Tsimonoke listened patiently. He knew there were still areas of forest not allocated to loggers and he knew also that loggers asked for more forest to log when they finished cutting acacias in the original areas. However, the problem of forest loss seemed serious. The forest land, now used to grow yam, was not really suitable for it. The soil that washed down from yam fields after every heavy rain complicated life for rice farmers in the valley who now had to spend more time cleaning their irrigation canals. The prices of acacias seemed to go up all the time and Tsimonoke sensed that it may be to Meranti's advantage to leave more acacias unharvested for later on.

By coincidence, the same week, an Italian monk Pepetto arrived in Afromosia. Venetian in origin, Pepetto was no newcomer to financial matters of state. Tsimonoke described the problem to him. It did not take long for Pepetto to speak.

"The problem of Afromosia forests' degradation and depletion is insufficient taxation. Raise the logging fees and the problem will be largely cured. In Venice, we call the problem underpricing of resources". The next day, Pepetto left. Tsimonoke sat down in his room and thought.

"Of course, 20 silver coins for a log is not a lot". Tsimonoke knew many loggers who made a nice neat profit and liked the things the way they were. "What if we increased the tax to 30? Loggers will probably stop cutting logs in the hills where elephants cannot work easily. At least the monkeys will be left undisturbed there. Anywhere else, it will be the same as before. Meranti will get more money for fewer logs". Pepetto, he remembered now, had used a quaint expression 'elasticity' to describe how the loggers might react if the price Meranti charged them were to increase. " A pretty inelastic lot, these are", he thought. "Meranti should be pleased. He will get more money and his favourite hunting grounds will be less disturbed." Tsimonoke was beginning to be impressed by the elegance of Pepetto's recommendations. Winning

twice was a neat trick indeed. "No wonder the Venetians travel in golden gondolas and sing", thought Tsimonoke.

Meranti was pleased. The royalties were increased to 30 and Meranti's coffers kept swelling. Something odd happened, however. Depletion and degradation showed little sign of diminishing.

It was time for Tsimonoke to look at things more closely. He put on his boots and decided to visit the loggers, incognito (as Pepetto would have said).

He watched loggers at work. Logging was no work for the fainthearted. It was dangerous and tiring and there was a good deal of cutting, crashing and breaking. Loggers, however, were systematic. They all had ten-year plans, and each year logged in one tenth of the area of the concession. This was Rodney 's requirement which they did not like much but one which they grudgingly accepted. They said it made logging less profitable. They also marked each tree that Rodney allowed them to cut. Most of them respected Rodney even if they did not much like having to send an elephant each time Rodney decided to inspect the area. Rodney counted the logs they produced carefully and made sure Meranti received all of the royalties. Tsimonoke was pleasantly surprised for he knew that in many other lands, kings were cheated out some of the revenue in a number of different ways.

Of course Afromosia's loggers did not like royalties any more than loggers elsewhere, for every time royalties were increased, their profit declined. Where royalties were uniform, some of them stopped cutting mahogany. When the royalties were ad valorem and the percentage of tax went up, they responded similarly. When the taxes were differentiated they cut the same volumes per hectare but stopped smiling. Whatever the case, like all businessmen, they tried to protect their profits and looked at any opportunity to squeeze out more from their operations. Just as Meranti did not want to coddle them, they did not want to coddle their workers and their elephants. They also started utilizing felled trees more fully and tried to damage them less in transit.

Yes, increasing taxes had in some cases the effect of making logging "lighter" and left more mature trees standing. "Not necessarily the most valuable ones", Tsimonoke said to himself and started furiously to work something out on his abacus. "Damned elasticities!" [Tsimonoke found elasticities rather tedious and never felt quite sure about their correct sign but he felt reasonably confident that increasing royalties in Afromosia would increase Meranti's revenue.]

"Was this what Pepetto was talking about?", thought Tsimonoke. He reached for a slim volume Pepetto had left him before leaving Afromosia. "I prepared it for Holy See. The cardinals like powerful ideas" he said when presenting the document to Tsimonoke. The booklet's summary repeated what Pepetto had said about the effect that increased forest taxes have on forest depletion and degradation. Tsimonoke closed the booklet. Was the "lighter logging" and better utilization of felled trees he observed tantamount to reduced depletion and degradation? It was this question that made him extend his stay in the forest.

Tsimonoke noticed that loggers cared only about logs. That did not seem like much of an insight since that is what loggers do, but Tsimonoke persisted. He noticed that it

was not so much how many mature trees loggers removed from each block of forest but rather how they logged. Tsimonoke remembered Meranti's concern for his 'renewable princes' and could not help noticing how little loggers cared about the younger generation of the 'princes'. It was not that loggers were cruel or ignorant men. Most of them knew more about trees than Rodney and Rodney's team of young assistants. But, as they said one evening to Tsimonoke, "In a few years' time, our concession will expire. If we spend much effort coddling [they, too, liked the word] Meranti's 'young princes' it will not be us but somebody else who will benefit. All it will do for us is to make our profits lower. It is not like Reganam's concession up the river". One of them, an older man, later said to Tsimonoke in private: "After the last increase in royalties, we stopped preparing logging tracks carefully for this takes a lot of elephant time. In fact we stopped many of the activities Rodney would like us to undertake to protect Meranti's future harvest. We have stopped cutting some acacias but we cause more damage cutting fewer trees now than we did originally. And peasants go on planting their damn yam [the old man, in addition, liked alliteration] even more than before because we have stopped patrolling our concession."

Tsimonoke was taken aback by the old man's account, for it seemed to suggest the opposite of what Pepetto had said. It was as if increased taxation made depletion and degradation worse than it was before. And if the old man exaggerated (the way old men often did in Afrosia), it was not clear which of the two impacts would be more important: the effect of fewer trees being cut or the effect of reduced maintenance of 'young princes'. "The cardinals will be disappointed", thought Tsimonoke. "Unless, of course, Pepetto's 'powerful idea' has by now become a dogma".

"Does not Rodney mind?", Tsimonoke continued. "He does and he does not", said the old man. "It is very difficult for Rodney to check everything and say if the damage to 'young princes' is greater than it should be. Also, Meranti is pleased to get more revenue. He has read some Venetian monk's book that convinced him that getting more coins for his trees protects his 'young princes and monkeys, and is pleased with Rodney's meticulous counting of logs."

Tsimonoke began to feel that it was not perhaps the level of forest charges or even the way in which these charges were imposed on loggers but something else that had a more powerful effect on whether the value of Meranti's forest, mature trees and 'young princes' taken together, grew or declined and whether there were many peasants growing yam on Meranti's forest land and making life difficult for rice farmers downstream. "Reganam!" Tsimonoke suddenly remembered what the loggers had told him. "Not like Reganam's concession up the river".

Paddling up the river was not easy. As he went, Tsimonoke passed log rafts with Reganam's men skilfully manoeuvring them past sand banks. Reganam's concession was large and not very different from the loggers' concessions. There was the same mixture of acacias and mahogany and same undulating terrain. It was not difficult to notice that Reganam's men worked differently. They seemed to cut fewer mature acacias than did the loggers. Special team of men helped the log cutters select the best direction of felling and also selected elephant tracks in a way that caused least damage to 'young princes'. Other men continuously patrolled the concession boundaries. Tsimonoke noticed that Reganam hired local men to do this. The men later

told him that they were better off working for Reganam than they would have been if they had tried to grow yam. "This cannot be cheap", thought Tsimonoke

Reganam was not one to mix his words. "You think I would do all of this if I had the same concessions as my colleagues down the river? I do it only because it pays. And it pays because it is me who will harvest those young acacias in 40 years' time, not somebody else".

"What about Rodney?", asked Tsimonoke.

"Rodney? Rodney does not even have to come here. When I was granted the 200-year concession, Meranti insisted that I deposit a large sum with him." "A little like a hostage?" asked Tsimonoke. "Yes, a little like that. You see, Meranti was worried that I might convert part of the concession into pineapple plantation. You like pineapples?"

Then Reganam continued. "Frankly, that would have been more profitable than growing trees but Meranti said that it would disturb monkeys too much and made rice farmers in his native village very upset. So he took the hostage just in case"

"So what you do here is financially suboptimal", said Tsimonoke who, like most men, could not resist showing off from time to time. "If growing trees were financially optimal, there would be no need for the hostage" thought Tsimonoke as the penny began to drop.

"Yes, it is financially suboptimal but economically optimal", said Reganam, not to be outdone.

"That means it is the best outcome for Meranti who gets less cash from his forest land but does not have to import monkeys and give expensive gift to rice farmers to make them accept pineapple plantations nearby", said Tsimonoke just to confirm his understanding.

"Interesting, both you and the loggers say that what you do is financially suboptimal" continued Tsimonoke

"Yes, but what we do here is economically optimal and what they do is economically suboptimal" said Reganam.

Reganam continued. "In both cases, Meranti and Rodney forbade us to do certain things and made our forestry operations less profitable than they would be otherwise. In my case, however, I have every reason to make my tree growing profitable now and in the future whereas the loggers care about making their logging profitable only now. Incidentally, have you noticed I used the term 'tree growing' instead of 'logging'?. With the hostage in Meranti's vault, Rodney does not have to come here often. My men know much better than Rodney himself how to enhance the value of my concession. We out-Rodney Rodney", said Reganam in a feeble attempt at a joke.

He went on. "You observed that it was the neglect of forest maintenance by the loggers that was the main cause of forest depletion and degradation. And I mention depletion and degradation in the same breath because it is the initial neglect of forest

maintenance, overcutting and the like depletion that leads to subsequent problems of yam growing and silted up irrigation canals. Degradation of the forest and even areas outside it as you and Rodney call it. It means that those like us who have an interest in undertaking forest maintenance continue to provide these vital services. Meranti should be pleased with us. Instead of changing the type of concessions he gives to loggers, Meranti has listened too much to the Venetian monk and allowed a greater stream of cash to blind him to the size of future bill for rehabilitation of 'young princes' and the repair of irrigation canals.

Much later that evening, under a mosquito net, Tsimonoke thought about that curious resource called tropical forest whose wise management depended on so many things other than the price of mature timber. He briefly thought of Venetians and their gondolas and then he fell asleep.

11) References

- Almeida, O.T. and Uhl, C. (In press), Brazil's rural land tax as a tool for stimulating productive and sustainable land uses in the Eastern Amazon. *Forest Ecology and Management* (in press).
- Barnett, T. (1989), Commission of inquiry into aspects of the timber industry. Final report. Government of Papua New Guinea, Port Moresby, PNG.
- Barreto, P, Amaral, P., Vidal, E. And Uhl, C. (In preparation), Impactos do manejo florestal na economia da exploração de madeira na Amazonia oriental. Imazon, Belem, Brazil.
- Browder (1988) ,?????, In: *Public Policy and the Misuse of Forest Resources*, Repetto, R. and M. Gillis (eds.), Cambridge University Press, New York.
- Burgess, P. (1989), "Asia", in Poore, D., Burgess, P., Palmer, J., Rietbergen, S., and T. Synnott (1989), No timber without trees. Sustainability in the tropical forest. Earthscan Publications Ltd, London, 252 pp.
- Candeias Cavalcanti, U. (1995), Reposição florestal em Minas Gerais. In Proceedings of the Workshop on "Mecanismos alternativos para financiar a silvicultura no Brasil". SBS, Sao Paulo, Brazil.
- Carter, J. (1996), Recent approaches to participatory forest resource assessment. Rural Development Forestry Study Guide 2. Overseas Development Institute, London, 322 pp.
- Child, B. (1993), Zimbabwe's CAMPFIRE programme. *Commonwealth Forestry Review* 72:284-296.
- Cleaver, K., Munasinghe, M., Dyson, M., Egli, N., Peuker, A. And F. Wencelius (eds.)(1992), *Conservation de la foret dense en Afrique centrale et de l'Ouest*, World Bank Environmental Paper No.1, World Bank, Washington D.C.
- Cubbage, F. W., O'Laughlin, J. and Bullock III, C.S. (1994), Forest resource policy. John Willey & Sons Inc., New York, 650 pp.
- de Graff, N.R. (1986), A silvicultural system for natural regeneration of tropical rain forest in Suriname. Agricultural University Wageningen, the Netherlands. 250 pp.
- Del-Rey (1994), Documento básico para desenvolvimento de plano estratégico para promoção do manejo florestal sustentado. Relatório de Consultoria 11. Del-Rey Serviços de Engenharia, Belo Horizonte, Brazil.
- Dick, J. (1991), *Forest Land Use, Forest Use Zonation, and Deforestation in Indonesia*, A background paper for KLH and BAPEDAL prepared under the EMDI Project, Jakarta
- Dunn, R. and Otu, D. (1996), A community forest inventory for productive forest management in Cross River State, Nigeria. Pp. 33-53 in Carter, J. (Ed.), Recent

approaches to participatory forest resource assessment. Rural Development Forestry Study Guide 2. Overseas Development Institute, London, 322 pp.

Dykstra, D.P. and R. Heinrich (1995), FAO model code of forest harvesting practice. Food and Agriculture Organization of the United Nations, Rome, 117 pp.

Ericsson, M. and Hamilton, H. (1990), A year in the life of a forest owner. Pp. 96-97, in Nilsson, N.E. (Ed.), The forests. National Atlas of Sweden. SNA, Stockholm, 144 pp.

FAO (1994), *Albania: Integrated Forest Management Project*, Preparation Report 15/94 CP-ALB 12, Rome

Fraser, A., Kuljadi, A., Ardjoyuwono, S. 1995. Establishment of Production Forest Management Units (KPHP). Indonesia - UK Tropical Forest Management Project. Unpublished report, 19 pp.

FSC (1994), Forest Stewardship Council principles and criteria for natural forest management. Forest Stewardship Council, Oaxaca, Mexico. June 1994.

Gillis, M. (1980), *Fiscal and Financial Issues in Tropical Hardwood Concessions*, Discussion Paper No. 110, Harvard Institute for International Development, Cambridge, Massachusetts.

Gillis, M. (1988), "?????", In: *Public Policy and the Misuse of Forest Resources*, Repetto, R. and M. Gillis (eds.), Cambridge University Press, New York.

Gray, J. A. (1983), *Forestry Revenue Systems in Developing Countries*, FAO Forestry Paper No. 43, Rome

Gronow, J and Safo, E. (1996), Collaborative forest resource assessment surveys for the management of community forest reserves in Ghana. Pp. 111-134, in Carter, J. (Ed.), Recent approaches to participatory forest resource assessment. Rural Development Forestry Study Guide 2. Overseas Development Institute, London, 322 pp.

Groome Poyry (1994), Forestry Sector Study, Consultant report to ADB and the Ministry of Forests, Indonesia.

Grut, M., Gray, J.A. and N. Egli (1991), *Forest Pricing and Concession Policies: Managing the High Forest of West and Central Africa*, World Bank Technical Paper No. 143, Africa Technical Department Series, Washington D.C.

Hannelius, S. and Kuusela, K. (1995), Finland, the country of evergreen forest. Forssa Printing House Ltd, Helsinki, 192 pp.

Hyde 1981

Hyde, W.F. and R.A. Sedjo (1992), "Managing Tropical Forests: Reflections on the Rent Distribution Discussions", *Land Economics*, Volume 68(3), pp.343-50

Hummel, A.C. (1995), Situação atual do monitoramento da atividade madeireira na Amazonia. Unpublished manuscript. Ibama, Manaus, Brazil.

Ingles, A., Jackson, B., Singh, H.B., Om Prakash Dev, and Branney, P. (1996), Resource assessment for forest management by user groups: two case studies from Nepal. Pp. 135-169, in Carter, J. (Ed.), Recent approaches to participatory forest resource assessment. Rural Development Forestry Study Guide 2. Overseas Development Institute, London, 322 pp.

Initiative Tropenwald (1994), The need of European harmonization.

ISO (1994a), Draft BS ISO 14001: Environmental Management Systems - Specification with guidance for use. British Standards Institute Document 94/400 681.

ISO (1994b), Draft BS ISO 14000: Environmental Management Systems - General guidelines on principles, systems and supporting techniques. British Standards Institute Document 94/400 682.

ITTO (1990), ITTO Guidelines for the sustainable management of natural tropical forests. ITTO Technical Series 5. International Timber Trade Organisation, Yokohama, Japan.

ITTO (1991), ITTO Guidelines for the establishment and sustainable management of planted tropical forests. ITTO Policy Development Series 4. International Timber Trade Organisation, Yokohama, Japan.

ITTO (1992), Criteria for the measurement of sustainable tropical forest management. ITTO Policy Development Series 3. International Timber Trade Organisation, Yokohama, Japan.

ITTO (1993), ITTO Guidelines on the conservation of biological diversity in tropical production forests. ITTO Policy Development Series 5. International Timber Trade Organisation, Yokohama, Japan.

Johnson, N. And Cabarle, B. (1993), Surviving the cut: Natural forest management in the tropics. World Resources Institute, Washington D.C., 71 pp.

Jonkers, W.B.J. and H. Mattsson-Marn (1986). Logging damage in tropical high forest. FAO, Forestry Development Project, Kuching, Sarawak, Malaysia.

Krutilla, J.V., Fisher, A.C., Hyde, W.F. and V.K. Smith (1983), "Public versus Private Ownership: The Federal Lands Case, *Journal of Policy Analysis and Management* , Vol. 2, No.4 pp.548-558

La Gaceta (1996), Ley Forestal 7575, April 16 1996. Alcance n. 21 a La Gaceta, Diario Oficial, N. 72. 8 pp.

La Republica (1996), Bolpro avanza en transacciones para comercializar madera en pie. La Republica, February 1996, San Jose. Pp. 9.

Larsson, U. (1990), Who owns the forests ? Pp. 118-121, in Nilsson, N.E. (Ed.), The forests. National Atlas of Sweden. SNA, Stockholm, 144 pp.

Lawrence A. and Godoi, M. (1996), Forest inventory in the Awá Sustainable Forest Management Project, Ecuador. Pp. 56-82 in Carter, J. (Ed.), Recent approaches to participatory forest resource assessment. Rural Development Forestry Study Guide 2. Overseas Development Institute, London, 322 pp.

Lawrence A. and Sánchez Godói (1996), The role of inventory in the communally managed forests in Quintana Roo, Mexico. Pp. 83-110, in Carter, J. (Ed.), Recent approaches to participatory forest resource assessment. Rural Development Forestry Study Guide 2. Overseas Development Institute, London, 322 pp.

Mayer, J., Howard, C., Ashie Kotey, E.N., Prah, E. and Richards, M. (1996), Incentives for sustainable forest management: A study in Ghana. IIED Forestry and Land Use Series No. 6. IIED, London. 39 pp.

Miller, R. (1981), *State Forestry for the Axe: A study of the Forestry Commission and de-nationalisation by the market*, Institute of Economic Affairs, London

Moura-Costa, P. (1996), Tropical forestry practices for carbon sequestration: A review and case study from Southeast Asia. *Ambio* 25:279-283.

Moura-Costa, P. and Tay, J. (1996), Reduced impact logging in Sabah, Malaysia. In: Proceedings of the International Workshop on Integrated Application of Sustainable Forest Management Practices. Kochi, Japan, November 1996. ITTO, Yokohama.

Nussbaum, R., Bass, S., Morrison, E. and Speechly, H. (1996), Sustainable forest management: an analysis of principles, criteria and standards. Towards a sustainable paper cycle, Sub-Study Series No. 4. WBCSD and IIED, London. 100 pp.

ODA (1996), Sharing forest management: key factors best practice and ways forward. Overseas Development Administration, London, 35 pp.

Olsson, A. (1990), Forestry organisations. Pp. 126-129, in Nilsson, N.E. (Ed.), The forests. National Atlas of Sweden. SNA, Stockholm, 144 pp.

Paris, R. and I. Ruzicka (1993), "The case against environmental taxes for sustainable forestry", *Journal of Forestry*, Volume 91 (4)

Paris, R., I. Ruzicka, and H. Speechly (1994), "Performance guarantee bonds for commercial management of natural forests - early experience from the Philippines", *Commonwealth Forestry Review*, Volume 73 (2)

Pearce, D., Markandya, A. and E.B. Barbier (1989), Blueprint for a green economy. Earthscan Publications Ltd, London, 192 pp.

Pinard, M.A., Putz, F.E., Tay, J. and Sullivan, T., 1994. Creating timber guidelines for a Reduced-Impact Logging Project in Malaysia. *Journal of Forestry* 93:41-45.

Pinard, M.A. and Putz, F.E. (1996). Retaining forest biomass by reducing logging damage. *Biotropica* 28:278-295.

Poore, D. (1989), Queensland, Australia: an approach to successful sustainable management, in Poore, D., Burgess, P., Palmer, J., Rietbergen, S., and T. Synnott (1989), No timber without trees. Sustainability in the tropical forest. Earthscan Publications Ltd, London, 252 pp.

Poore, D., Burgess, P., Palmer, J., Rietbergen, S., and T. Synnott (1989), No timber without trees. Sustainability in the tropical forest. Earthscan Publications Ltd, London, 252 pp.

Queensland Forest Service 1991. Harvesting guidelines for native rainforest. HM and RM Manual. Reference 425-02 (MY3). Section 41.11.

Repetto, R. (1988),?????, In: *Public Policy and the Misuse of Forest Resources*, Repetto, R. and M. Gillis (eds.), Cambridge University Press, New York.

Repetto, R. and M. Gillis (eds.) (1988), *Public Policy and the Misuse of Forest Resources*, Cambridge University Press, New York

Rice 1995

Richards, M. (1995), Role of demand side incentives in fine grained protection: A case study of Ghana's tropical high forest. *Forest Ecology and Management* 78:25-241.

Richards, M., Navarro, G., Vargas, A. And Davies, J. (1996), Decentralising forest management and conservation in Central America. ODI Working Paper 93. ODI, London.

Rietbergen, S. (1989), "Africa", in Poore, D., Burgess, P., Palmer, J., Rietbergen, S., and T. Synnott (1989), No timber without trees. Sustainability in the tropical forest. Earthscan Publications Ltd, London, 252 pp.

Roe, D., Dalal-Clayton, B., and Hughes, R. (1995), A directory of impact assessment guidelines. IIED, IUCN and WRI. IIED, London. 183 pp.

Ruzicka, I. (1994), *Sustainability without a big stick: A study of forestry policy in Albania*, Consultant report to USAID, Central and East European Environmental Economics and Policy Project, HIID, Cambridge, Mass.

Schmidheiny, S. (1992), Changing course: A global business perspective on development and the environment. The MIT Press, Massachusetts. Pp 54-68.

Schmithusen, F. (1977), Forest utilization contracts on public land. FAO Forestry Papers 1. FAO, Rome, 197 pp.

Schmithusen, F. (1980), Forest utilisation contracts: a key issue in forest policy and in the development of the tropical hardwood sector. Asia and the Pacific Regional

Workshop on Negotiations with Transnational Corporations in the Tropical Hardwoods Sector. Thailand, 1980. Document No 12.

Sedjo 1996

Silva, N. et al. (1996) -

SGS Forestry (1996), *Audit of the Congolese Forestry Sector*, a consultant report to the World Bank, Oxford]

Stockdale, M. and Ambrose, B. (1996), Mapping and NTFP inventory: participatory assessment methods for forest-dwelling communities in East Kalimantan, Indonesia. Pp. 170-211 in Carter, J. (Ed.), *Recent approaches to participatory forest resource assessment. Rural Development Forestry Study Guide 2*. Overseas Development Institute, London, 322 pp.

Upton, C. and Bass, S. (1995), *The forest certification handbook*. Earthscan Publications, London, UK.

Vincent 1991

Vincent, J.R. (1993), "Managing tropical forests: comment", *Land Economics*, Volume 69 (3), pp. 313-318

World Bank (1993), *Albania: Environmental Strategy Study*, Washington, D.C.

World Bank (1990), *Indonesia - Sustainable development of forests, land and water*, Country study, Washington, D.C.