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Many countries still have large areas of forest outside the PFE. These are sometimes set aside deliberately for later planned conversion or reservation for other uses – as agricultural land, for example; this allows for the in-migration of people and an increase in agricultural production. Sometimes, however, land-use plans – if formulated – are not followed and forest is parcelled up and converted to other uses in an ad hoc fashion, with potential repercussions for the PFE.

The area of natural production PFE in ITTO producer member countries is estimated to be 353 million hectares (29% of the total area of tropical closed forest estimated by FAO 2001 to be 1.20 billion hectares – see tables 2a, 3a and 4a). Of this, an estimated 96.3 million hectares (27% of the total natural production PFE) are covered by management plans, 10.5 million hectares (3.0%) are certified by a recognized independent certification organization, and at least 25.2 million hectares (7.1%) are managed sustainably. The area of protection PFE in ITTO producer member countries is estimated to be 461 million hectares (38% of total tropical closed forest area as estimated by FAO 2001), of which an estimated 17.8 million hectares (3.9%) are covered by management plans and at least 11.2 million hectares (2.4%) are being managed sustainably. A much larger but unestimated area of the forest estate is not under immediate threat from anthropogenic destructive agents, being remote from large human settlements and projected roads.

Thus, the proportion of the tropical production PFE managed sustainably has grown substantially since 1988, from less than 1 million hectares (Poore et al. 1989) to more than 25 million hectares, and to more than 36 million hectares if the area of protection PFE so managed is included. Despite this significant improvement, the overall proportion of the PFE known to be sustainably managed remains very low, at less than 5% of the total.

Wood from natural production forests is supplemented in many countries by planted forests, some of them covered by management plans and some certified. In ITTO producer countries, planted forests now cover 825,000 hectares in Africa (488,000 hectares with management plans, none certified), 38.3 million hectares in Asia and the Pacific (11.5 million hectares with management plans, 184,000 hectares certified) and 5.60 million hectares in Latin America and the Caribbean (2.37 million hectares with management plans, 1.59 million certified). In many cases, data for plantation areas are from FAO (2001) and are therefore at least five years old. The area of the plantation estate in ITTO producer countries has no doubt grown substantially since then.

Illegal logging and the illegal movement of timber have become pressing issues in many countries, exacerbated by local warfare and by drug smuggling and other criminal activities. These have not only made forest management in the field a hazardous business and prejudiced the security of PFEs in many places, they have also undermined legitimate markets for timber and reduced the profitability of legitimate producers.

ANALYSIS, CONCLUSIONS AND RECOMMENDATIONS

COMPARING SURVEYS

The basis of comparison for the management of production forests is their condition as presented in Poore et al. (1989). There is no comparable baseline study for the protection PFE.

The first question asked in the 1988 survey was simple: how much natural forest was being managed at an operational scale for the sustainable production of timber?

The answer was unequivocal: almost none. In Latin America and the Caribbean, there were only 75,000 hectares in Trinidad and Tobago; in Africa, none. In Asia, a number of "forests and operations appeared to be reasonably successful as potential sustained-yield units" in Malaysia, Indonesia and the Philippines. Note, however, that insufficient information was received from India in 1988 to reach any conclusions, even though India was a member country at the time.

Any comparison of findings from the 1988 and present surveys faces some obvious difficulties. The first is that comprehensive, reliable data were scarce for both surveys, although more was available for the second than the first (see later discussion). Another is that the number of countries surveyed expanded greatly in the second, from 18 to 33. Several of the 15 additional countries have significant tropical forest resources, including Colombia, DRC and Venezuela. Combined, the 15 contribute 2.80 million hectares of the estimated area of SFM

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in 2005, and India contributes 4.80 million hectares. Thus, while the overall estimate of SFM in the natural production PFE in 2005 is 25.2 million hectares, the increase in the countries that were included in both surveys is about 17.5 million hectares.

In addition to the gross increase in area considered to be under SFM, one of the most noticeable improvements since 1988 is the almost universal move towards the enactment of new forest laws and regulations, the reorganization of departments responsible for forests and, in many countries, moves towards the devolution of responsibilities to lower echelons of government. An increasing interest in certification within both government and the private sector is also apparent.

Some countries appear to have made less progress than others. Since 1988, the area of closed tropical forest for both production and protection has declined significantly in countries such as Côte d'Ivoire, the Philippines and Togo. Countries such as Liberia and DRC, which have endured major armed conflicts, have been unable to develop the administrative and private-sector capacity to pursue SFM. A lack of forest law enforcement remains a major problem in many countries, and progress in identifying, demarcating and securing a PFE has perhaps been less than might have been hoped for.

PRODUCTION FORESTS

Despite difficulties and some notable deficiencies, there has been some significant progress in the last 17 years. Countries have established and are starting to implement new forest policies that contain the basic elements of SFM. More forests have been given some security by commitment as PFE (or a similar concept) for production or protection, more are covered by management plans and more are actually being managed sustainably. All of this is encouraging, but the proportion of natural production forest under SFM is still very low, and SFM is distributed unevenly across the tropics and within countries.

The area now covered by formal forest management plans is estimated to be 96.3 million hectares (27% of the natural production PFE). The fact that this is much more than the 7% that is managed sustainably warrants further examination. Part of the discrepancy may be because more information was available on the area covered by management plans than on the extent to which such management plans were being implemented. But almost certainly there is also a problem in the actual implementation of management plans. Companies are able to comply relatively easily with the requirement to develop management plans for the forests they are licensed to harvest, but without keen oversight by a regulatory body may not feel compelled (and in some cases may not have the capacity or the intention) to implement them. With more international support, coupled with greater enforcement of the requirements of forest management plans, SFM is likely to become more widespread in the natural production PFE. Countries such as Brazil, Congo, Ghana, Malaysia and Peru might be expected to lead the way, and many others have established at least some of the elements necessary for the greater adoption of SFM.

Planted forests

Planted forests are coming to play a much more significant role in the supply of tropical timber. The fact that this role was not even considered in the 1988 survey shows how much things have changed; the area of planted tropical forests has expanded considerably in the past 15–20 years and continues to do so, and some countries are becoming increasingly reliant on planted forests for domestic wood supply. Unfortunately, there is a lack of comprehensive information across a range of countries as to the proportion of wood supply derived from plantations and the implementation of SFM in them, information deficits that will need to be rectified to allow more meaningful assessments of overall progress towards SFM in the tropics in the future.

Sustainable yield

Sustainable yield – the amount of timber (and other products and services) that can be harvested from a forest on a sustainable basis – is critical to SFM in the production PFE, both nationally and at the FMU level. However, few countries provided estimates of sustainable timber yields or data on actual offtakes in their PFEs and FMUs for this report.

The calculation of sustainable timber yield is complex and depends on, among other things, knowledge of growth rates of timber species under specified silvicultural prescriptions, adequate inventories of growing stock, the quality of forest management practice, the accessibility of production forest and the marketability of different species. It is therefore beyond the scope of this report to calculate potential sustainable yields or their relationship with current timber production; such an exercise would be inherently unreliable given the paucity of information on harvesting intensity, periods between re-entries

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to previously harvested stands, productivities of different forest types for industrial roundwood and fuelwood, the role of plantations (which usually have a much higher sustainable yield), etc.

Nevertheless, an examination of available data shows that if the average sustainable timber yield was about 1 m^3 per hectare per year in natural production PFEs (a conservative but widely accepted estimate of tropical forest productivity), many countries would have sufficient forest resources to sustain or increase current production were they to introduce (or expand) a sustainable yield regime in their PFEs. On the other hand, some countries would already appear to have difficulty supporting current production on a sustainable-yield basis from their natural forests. They must rely on timber plantations, harvesting from non-PFE forests and/or imports (as well as production from their natural PFEs) to maintain their current timber consumption; often, such countries also have large areas of degraded forest lands.

PROTECTION FORESTS

Data are still sparse on the extent to which the protection PFE represents the full diversity of forest ecosystems found there. Indeed, the designation of protected areas has often been relegated – not just in the tropics – to those areas of land left over when all other economic land-uses have been satisfied or that are too difficult to harvest. But it is now recognized that they should be selected according to their intrinsic value for biodiversity conservation, which usually means the inclusion of representative samples of all forest ecosystems; any areas of exceptional biological richness or where there are concentrations of endemic species; and the breeding, feeding and staging grounds of migratory species. It is desirable, too, that protected areas should be large and contain internal variation and, ideally, should constitute a network of connected habitats if they are to accommodate the larger animals and be buffered against environmental change. They also depend crucially on the cooperation and support of local communities.

Data provided by UNEP-WCMC presented in this summary and in the main report estimate the extent of forest types included in protected areas conforming to IUCN protected-area categories I–IV, by country. According to this source, 156 million hectares of tropical forest out of a total area of protection PFE of 461 million hectares are within reserves conforming to IUCN categories I–IV. Moreover, these seem reasonably well distributed among the various forest types in at least some countries. However, much more detailed analysis is needed to illuminate discrepancies in the data and to determine their reliability, the adequacy of the coverage of forest types, and how far the distribution of areas will ensure buffering against the possible effects of environmental change. Sparse though the information is, any progress in the sustainable management of protected areas must be assessed against these data; there is no earlier reliable baseline.

SUMMARY OF CHANGE

To summarize the present status of SFM compared to that in 1988:

- uneven progress has been made in the identification, demarcation and protection of PFEs. In many countries there still exists considerable uncertainty about the concept;
- there is greater government commitment to SFM, as demonstrated by improved legislation, administrative arrangements and consultative processes;

- forest tenure is still in a state of flux in many countries but is increasingly directed towards communities;
- there is an increase in the area of PFE that is managed sustainably, but progress is uneven within and across countries and regions;
- forest law enforcement is often weak due to the inadequate staffing and support of enforcement agencies, the remoteness of the resource, and confusion created by sometimes-conflicting legislation and by decentralization and other political processes;
- the resources allocated by governments and development assistance agencies to forest management are often seriously inadequate, reflected in chronic shortages of vehicles, equipment and trained and motivated staff; and
- there is more and better information about SFM than in the past, but it is still far from adequate for the comprehensive monitoring, assessment and reporting of SFM in either production or protection PFEs.

CONSTRAINTS TO SFM

Putting aside the difficulties caused by wars and armed conflicts, several constraints frequently recur in the country profiles. Probably the most important, and the most generally applicable, is that sustainable management for the production of timber is less profitable to the various parties involved (government, concessionaires and local communities) than other possible ways of using the land. Many of the FMUs in which SFM (and particularly, in some countries, certification) has been established have benefited from external financial and technical support from development assistance agencies and NGOs. The economic viability of SFM within these FMUs will be properly tested once such support is withdrawn. Those governments and companies that have been striving to improve forest management, even when they have not yet been wholly successful, merit the long-term support of markets, development assistance agencies, NGOs and the general public.

Other constraints are related to land. There have been advances in many countries in committing forest for either production or protection and in establishing a PFE, but without the security provided by long-term government resolve and by credible arrangements for tenure, SFM is unlikely to succeed. The best results will usually be achieved where countries (or relevant sub-national political units) decide the future uses to which they wish to allocate their forest resources and set up mechanisms to ensure that this allocation happens. There is little point in devoting scarce resources to bring an area of forest to a high standard of management if it is eventually to be converted to some other non-forest form of land-use.

Illegal logging and the illegal trade of timber are significant problems that have increasingly exercised the international forest-policy community in recent years. Discussing the problems is certainly an important first step in dealing with them but cannot, in itself, be sufficient. Ultimately they will be best addressed by improved laws and rigorous forest law enforcement, which in many cases will require increased support from governments in both producer and consumer countries. In many places, control in the field remains a central concern.

There is an almost universal lack of the resources needed to manage tropical forest properly. There are chronic shortages of staff, equipment, vehicles, facilities for research and training and all the other necessities for running an efficient enterprise – often accompanied by low staff morale. Pay and conditions of service are rarely sufficiently favourable to attract (and keep) enough able, dedicated and qualified staff to work in the field. These shortages are a reflection of the low social and economic status of field-based forestry and the relatively low priority accorded to forest management in many countries, both of which are partly attributable to the low economic returns provided by SFM.

THE NATURE OF THE EVIDENCE

In the preparation of the main report it became clear that, in most countries, information on the extent of forests and the status of management in the PFE is still very poor. For example, estimates of total forest area – arguably the most basic figure of all – vary by as much as 230% between sources. There also appears to be great uncertainty about the area of forest allocated to the PFE and about the extent of forests in protected areas and the level of protection afforded them. The extent of illegal activities in forests, one of the biggest hindrances to SFM, is rarely known or reported by governments, and estimates made by NGOs are often little more than guesses. Nearly one-third of ITTO producer member countries failed to submit a response to the ITTO C&I reporting format and, of those that did, many responses were at least partially unusable due to missing or obviously inaccurate data. The publication of this report should encourage ITTO member countries, and forest-

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related institutions and organizations, to continue to improve their data collection systems, since reliable information is the cornerstone for both practising and assessing SFM.

FUTURE DIRECTIONS

The global setting for the management of tropical moist forests is changing. Populations and aspirations are growing and communications improving. The agricultural frontier is continuing to advance, while previously inaccessible forests are becoming accessible and others have already been logged more than once, often becoming degraded in the process. The global market economy is extending its reach, with profound implications for land-use. For timber, the demand for certification is starting to influence management in FMUs in export-oriented countries. Conversely, a ready availability of relatively cheap commodity timbers from non-tropical forests, tropical plantations and illegal operations impose strict limits on the price increases that are possible for timber from sustainably managed natural tropical forests.

There is little doubt that standards of forest management improve as countries become richer and better able to allocate resources to enforce forest laws and implement SFM. It follows, therefore, that SFM can be expected to become more widespread in the tropics with economic growth, although such growth might also increase deforestation, at least temporarily. Eventually, countries that continue to develop economically will attain the capacity necessary to safeguard their PFEs and manage them sustainably. Conversely, continued poverty poses a significant threat to tropical forests. Civil war and other violent conflicts are similarly problematic, and those countries in which such conflicts have been prevalent since 1988 have generally made little progress towards SFM.

A number of possible developments may affect the direction of future change:

- the expansion of planted forests and the use of agricultural tree crops for timber may reduce timber-demand pressure on the natural forest by supplying an increasing proportion of wood production;
- declining timber prices and/or increased prices for agricultural products would undermine efforts towards SFM;
- a greater focus on the management of high-value timber species, an expanded range of species, and/or increased value-added production could help increase the profitability of natural forest management;
- climate change could affect forest growth, yield and even survival. A general drying in the tropics could lead to an increased incidence of forest fire and drought-related changes to forest structure. Conversely, increased rainfall could lead to higher rates of forest growth and could also cause more erosion, landslides and flooding;
- greater security of tenure may help to increase sustainable management;
- the situation of those peoples who live in or near the forest is unlikely to remain static. If living standards improve and migration to urban centres continues, local pressures on forest may decrease;
- decentralization may align forest management more closely with local interests, but there is no guarantee that this will favour SFM;
- as affluence increases, public pressure could induce governments to improve management and pay more attention to environmental values; and

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- the global community could increase its payments for the global environmental services provided by natural tropical forests, thereby improving the economic viability of SFM.

Given the number of variables at play, and the likelihood that entirely new ones will arise, it is difficult to predict how the status of tropical forest management will change in the future. It seems fairly certain, however, that the global area of natural tropical forests will continue to decline in the medium term and that management in the remaining areas, responding to a combination of market pressures and growing domestic concerns for forests as countries grow economically, will continue to improve. ITTO and others seeking to promote SFM in the tropics will continue to face a challenging agenda in the years to come.

RECOMMENDATIONS

This report should prove helpful in illuminating the status of tropical forest management; however, its usefulness will be limited if it is not repeated at reasonably regular (and frequent) intervals, because trends are essential in assessing progress towards SFM. **It is therefore recommended that regular reporting on the status of tropical forest management be instituted at the international level.**

Many countries still lack the capacity to collect, analyse and make available comprehensive data on the status of forest management. **It would be in the interest of the international community to make resources available to improve this capacity, and it is recommended that it does so.**

There has been an appreciable degree of progress towards SFM in tropical forests over the last 17 years, but there is still a long way to go in building the practice of SFM on these enabling foundations. However, the most debilitating weakness is the failure to develop an adequate and reliable system on a global scale for funding the additional costs involved in putting SFM into practice in the forest. A general progression towards SFM in the tropics will be faster and more robust if SFM is seen as a financially competitive land-use. This in turn will be best achieved if prices for timber from natural tropical forests are strong and/or the important services provided by such forests, such as water production, biodiversity conservation and carbon storage, are paid for. **A final recommendation is that the international forest-related community makes its number-one priority the development of a system for ensuring that SFM is a financially remunerative land-use.**

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