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ITTO VOLUNTARY GUIDELINES FOR THE SUSTAINABLE MANAGEMENT OF NATURAL TROPICAL FORESTS

(Revised edition of the ITTO SFM Guidelines of 1991)

Initial Document prepared by Juergen Blaser and Cesar Sabogal (2011)
Validated through country workshops and reviewed by James Gasana (2012)
Further reviewed and revised by Juergen Blaser and Ricardo M. Umali (2013)
Amended by Jurgen Blaser based on Decision 4(XLIX) adopted in Gabon, November 2013

Contents

Acronyms

AAC	Annual Allowable Cut
ARM	Adaptive Resource Management
C&I	Criteria and Indicators
CBD	The Convention on Biological Diversity
CBFiM	Community Based Fire Management
CEPA	Communication, Education and Public Awareness
CFM	Community Forest Management
CIFOR	Center for International Forestry Research
CPF	Collaborative Partnership on Forests
DBH	Diameter at Breast Height
FAO	Food and Agriculture Organization
FMPs	Forest Management Plan
FMU	Forest Management Unit
FPIC	Free, Prior, and Informed Consent
GIS	Geographic Information Systems
IAC	International Agricultural Centre
ITTO	International Tropical Timber Organization
IUCN	International Union for Conservation of Nature
MDH	Minimum Diameters for Harvesting
MRI	Multi-resource Inventory
NGOS	Non-governmental organizations
NLBI	Non-Legally Binding Instrument
NTFPs	Non-timber forest products
NWFP	Non-wood forest products
PCTs	Potential (or Future) Crop Trees
PFE	Permanent Forest Estate
PSPs	Permanent Sample Plots
REDD+	Reduced Emissions from Deforestation and Forest Degradation
REL	Reference Emission Level
RIL	Reduced Impact Logging
RL	Reference level
SFM	Sustainable Forest Management
UNCCD	The Convention to Combat Desertification
UNFCCC	The Framework Convention on Climate Change
WCFSD	World Commission on Forests and Sustainable Development

INTRODUCTION

Purpose of the SFM Voluntary Guidelines

This publication updates and replaces the original *ITTO Guidelines for the Sustainable Management of Natural Tropical Forests*, published in 1990 as ITTO's first policy guidance document on the management of the natural tropical forest estate. In 2007 the International Tropical Timber Council decided to update these guidelines[1] in the light of increased knowledge and the emergence of a wide range of new challenges and opportunities for tropical forest management. These revised guidelines constitute an international reference document for the development or improvement of national and subnational guidelines for the sustainable management of natural tropical forests. They also provide a reference on technical issues at the macro or landscape scale and the micro or forest management unit (FMU) scale. They recommend implementation actions for each guideline based on best practices and existing tools. The specific objectives of the I*TTO Voluntary Guidelines for the Sustainable Management of Natural Tropical Forests* (P&G) are to:

- Identify the framework conditions for the application of forest management guidelines in natural tropical forests for the sustainable delivery of forest goods and ecosystem services.
- Provide guidance for addressing the policy, legal, institutional, ecological, social and economic issues that need to be taken into account in the planning, implementation and evaluation of SFM.
- Help forest owners and managers to implement SFM at the local and landscape levels.
- Stimulate the adoption of appropriate and adaptive management practices to maintain the capacity of natural tropical forests to sustainably deliver multiple goods and ecosystem services.
- Inform international processes that deal with globally relevant issues, such as climate change, water, biodiversity, food security, agriculture and desertification, about the role that the sustainable multiple use management of natural tropical forests can play in such issues.

Scope and use of the Voluntary Guidelines

These Guidelines are designed as a basis for policy decisions and as a technical reference that can be used or adapted to the needs and capacities of users. They present the rationale for action and identify roles and responsibilities of stakeholders, actions needed for SFM. They are intended for governments, specified public and private organizations and actors, professional practitioners and associations, scientific, educational and research institution, civil society organizations and all other groups and bodies with responsibilities and activities relevant to sustainable forest management. **These Guidelines are considered voluntary in nature and not legally binding to ITTO member countries but they can be implemented as appropriate to national and local conditions.**

Target audience

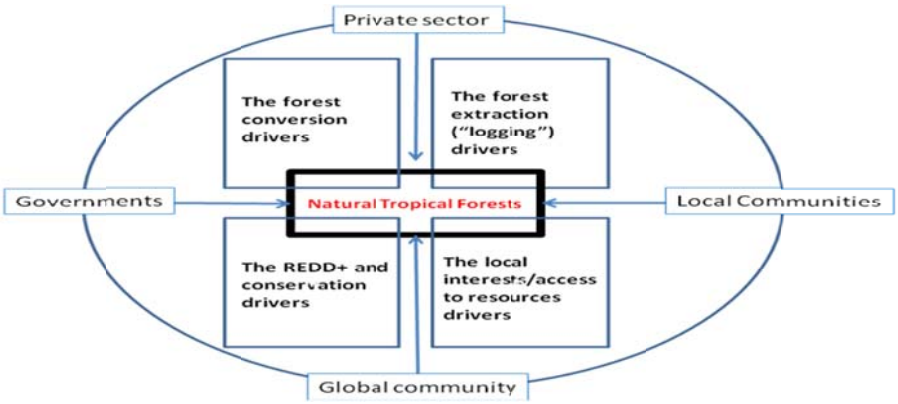
Many actors have interests in forests (Figure 1). While some of these interests are compatible, some are not. At one extreme, there are stakeholders who aim to preserve forests (even though interpretations of the term 'preserve' may vary), while, at another, there are stakeholders who would like to clear the forest to better exploit its soil or sub-soil. In between these two is a wide range of actors with a broad set of uses for tropical forests. Because of this, these P&Gs have a wide audience

[1] Decision 2(XLIII) - ITTO Biennial Work Programme for the years 2008-2009

which includes the following groups involved in the management and protection of tropical natural forests:

- Forest managers, such as state and local forestry agencies, timber companies, producer associations, natural-forest smallholders and rural and forest communities.
- Policymakers and legislators such as political parties, government agencies dealing with forests, conservation, the environment and land-use planning, development and extension agencies, and civil-society organizations.
- Agencies, institutions and firms interested in the ecosystem services provided by natural tropical forests.
- Public and private forest research, education and training institutions.
- International funding and development agencies, public and private.

Figure 1: The various and sometimes competing influences on the use and management of natural tropical forests



Structure and organization of this document

The document is organized as follows:

- Part I introduces the user of these voluntary guidelines to the context in which they are developed. Part of this context is the important extent at which ITTO has developed approaches and tools for the sustainable management of tropical forests
- Part II provides an overview of the Guiding Principles', connectivity with ITTO's C&I
- Part III describes the Guiding principles and respective Guidelines and Recommended Actions.
- A glossary of terms used in this document is presented in the annex, also a list of references and sources for further background and deepening of understanding.

PART 1: THE CONTEXT FOR SUSTAINABLE MANAGEMENT

1.1 The International Context of Forests

There have been many significant developments in international policies related to tropical forests and forest management since 1990. These include the adoption, in 1993, of the Convention on Biological Diversity (CBD), the Convention to Combat Desertification (UNCCD) and the Framework Convention on Climate Change (UNFCCC); adoption of the Kyoto Protocol in 1996; the UNFCCC 'Cancun' decision on REDD+ in 2010; and the 2007 agreement on the Non-Legally Binding Instrument on all Types of Forests (NLBI; Resolution 62/98 of the United Nations General Assembly), which includes four globally agreed objectives on forests. There has also been a general shift in tropical forest management from a focus on timber towards holistic multi-purpose approaches that place increasing emphasis on forest ecosystem services. Box 1 summarizes some of the general developments that have affected the management of natural tropical forests since 1990.

BOX 1: Developments that affected the use and management of tropical forests since 1990

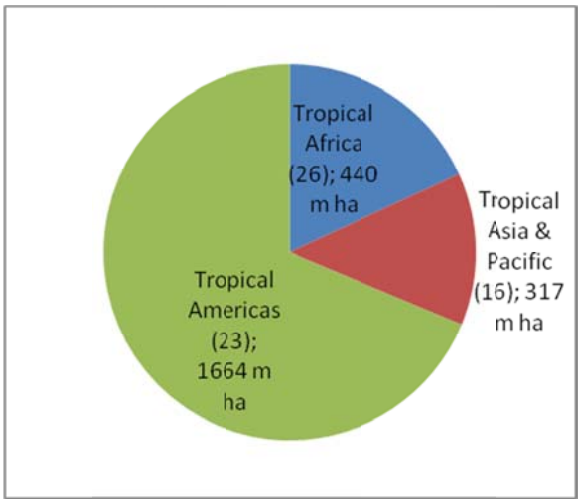
- Increased competition for forest lands.
- Increased societal demands and expectations on forests and environmental and social awareness about tropical forests and the need to manage them sustainability.
- Increased recognition of the role of tropical forests in delivering 'global' ecosystem services, including those related to biodiversity, water, carbon and stable environments.
- Increased recognition of the rights of indigenous peoples and forest communities over forests and forest use, and the need to safeguard those rights.
- Increased decentralization of control over forests including privatization and recognition and transfer of ownerships by local and indigenous communities.
- Emergence of forest certification as an important driver of SFM.
- Increased awareness of illegality and corruption as major impediments of SFM.
- Increased role of the informal sector and its lack of visibility in national statistics and development plans.
- Increased role of non-governmental organizations (NGOs) in forest management and forest policy development.
- Loss of silvicultural knowledge and practice and a lack of research, leading to over-optimistic cutting cycles and a lack of silvicultural management.
- Increased vulnerability of tropical forests to abiotic and biotic threats attributed to climate change and climate variability
- Development of REDD+ as part of a global climate change mitigation agenda and the increasing recognition of the fact that forests in the climate change adaptation agenda. Mitigation and adaptation have raised the visibility of tropical forests to the highest political level.
- Increased demand for wood, fiber and wood products, even as the international market for tropical timber diminishes.
- Increased role of planted forests in meeting demand for wood products and fiber.
- Increased demand for renewable energy, including forest-based energy.
- Increasing trend to proclaim more protected areas and ban harvesting in natural forests.

1.2 The ITTO Context

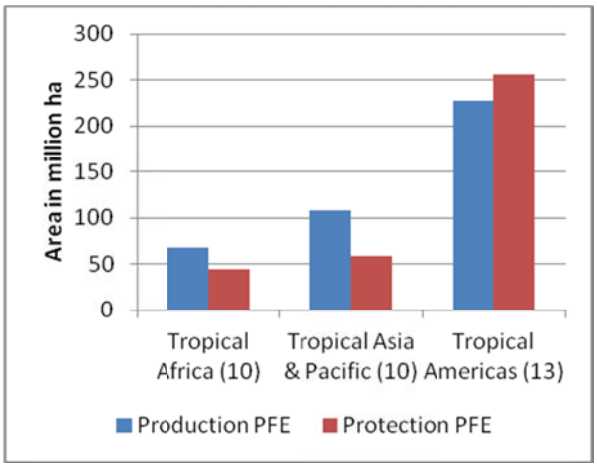
1.2.1 The extent of tropical forests in ITTO's membership

Natural tropical forests extend over about 1664 million hectares in 65 countries, 1421 million hectares (85%) of which are in the 33 ITTO producer member countries (ITTO 2011). In total, the 33 ITTO producer member countries have an estimated natural-forest PFE of 761 million hectares, comprising of 403 million hectares of production PFE and 358 million hectares of protection PFE (Figure 2).

Figure 2 Distribution of natural tropical forests worldwide, and Permanent Forest Estate (PFE) in ITTO producer member countries



Total tropical forest area, 65 countries, by region (figures in brackets = number of countries)



Natural tropical PFE by region, 33 ITTO producer member countries (figures in brackets = number of countries)

Source: FAO (2010), Blaser et al (2011).

1.2.2 ITTO's Management Approaches

Influenced by the above international trends, approaches to forest management have evolved considerably in most of ITTO's producer member countries since 1990. This is reflected in the (continued) development of an important spin-off of the original guidelines, the Criteria and Indicators (C&I) for Sustainable Forest Management (SFM). All ITTO member countries have acknowledged the importance of C&I as a tool for defining forest management and for monitoring progress in and challenges to SFM. These revised guidelines for the sustainable management of natural tropical forests take all these developments and others into account and bring together all the requirements for achieving SFM in natural tropical forests. They are designed to assist forest managers, policymakers and other stakeholders to manage, conserve and sustainably use some of the planet's most valuable resources, natural tropical forests.

Sustainability. The original (1990) version of the *ITTO Guidelines for the Sustainable Management of Natural Tropical Forests* recognized that managing forests sustainably is about achieving a balance among the different uses of the forest while ensuring continued ecological functioning and the provision of benefits and functions into the future; key ingredients were seen to be knowledge, its application in forest management actions, and the evaluation of practices to assess outcomes compared with expectations. ITTO (1992) elaborated on this discussion by defining SFM as: "the process of managing forest to achieve clearly specified objectives of management, with regard to the

production of a continuous flow of desired forest products and services, without undue reduction in the forest's inherent values and future productivity, and without undue undesirable effects on the physical and social environment".

This definition implies the following objectives of SFM:

- continuously satisfying the needs for goods and services provided by forests
- ensuring the conservation of forest soils, water and carbon stocks
- conserving biological diversity
- sustaining the resilience and renewal capacity of forests, including carbon storage
- supporting the food security and livelihood needs of forest-dependent communities
- ensuring an equitable sharing of the responsibilities and the benefits from forest uses.

ITTO's criteria and indicators. To assist in the monitoring, assessment and reporting of SFM at the national and FMU levels, ITTO developed in 1992, and subsequently revised in 1998 and 2004 (ITTO 2005), a set of seven C&I for SFM that can be used to guide forest management and assess its sustainability (Figure 3). The ITTO C&I were not formulated for application in forests managed strictly for protection, where forest goods are usually not extracted. Nevertheless, they can still be applied in such forests, even though the extraction of timber and non-timber forest products (NTFPs) should be zero, or close to zero. The seven criteria which have been harmonized with other C&I schemes constitute the basis for the assessment of SFM. These are:

1. Enabling conditions for SFM
2. Extent and condition of forests
3. Forest ecosystem health
4. Forest production
5. Biodiversity
6. Soil and water protection
7. Economic, social and cultural aspects.

Multi-purpose management. Natural forests are the source of a diverse array of products, ecosystem services and social and economic opportunities, and they have many stakeholders. Managing a forest for a single product or service may affect its capacity to provide others—for example, a high level of timber ~~production~~ extraction may affect a forest's value as a habitat for wildlife. Decisions on tradeoffs in the provision of various goods and ecosystem services are best made using processes that involve the full range of stakeholders. Forest managers applying SFM must continually balance various management objectives that inevitably will change over time as social and community needs and values change; this is the challenge of multi-purpose forest management. Although embedded in the laws of many countries, it has proven to be a complex endeavor that faces a range of economic, social and institutional barriers. Nevertheless, success stories around the tropics, particularly in community-based initiatives, show that it can be made to work—to the benefit of communities and the forest itself.

Adaptive forest management. Adaptive management is the process by which research and learning is continuously incorporated in management planning and practice. Specifically, it is the integration of design, management and monitoring to systematically test assumptions in order to adapt and learn.

While much knowledge has been accumulated on the composition, structure and dynamics of tropical forest ecosystems and their social and economic roles, there are still many uncertainties; moreover, they are subject to very rapid social and physical change. Forest management, therefore, must be based on a continuous monitoring and learning process that enables the adaptation of practices as conditions change. In general, these guidelines advocate an adaptive management that implies the following:

- Analysis of the costs and benefits of SFM practices and to whom (e.g. government, communities, private sector, forest managers and civil society) they accrue.
- Monitoring and evaluation of the environmental, social and economic impacts of management.
- Provision of mechanisms for the continued involvement of stakeholders in decision-making on forest management at the appropriate scale.
- Documentation and quantification of the tradeoffs between and synergies among multiple objectives (e.g. related to timber, NTFPs, carbon, water and biodiversity).
- Monitoring and evaluation of incentives and disincentives for SFM and the potential for failures of governance.

1.2.3 Issues for the sustainable management of natural tropical forests

SFM in the wider context of landscape management. A landscape level should balance the developmental needs of a country or for specific states or provinces within a country, with those of natural resources management, including SFM. A fundamental component of national land use planning is identification of a Permanent Forest Estate (PFE), comprising forests of all ownership types. Traditionally the objective of producing wood was overwhelmingly important. The awareness that forest management decisions and developments in other sectors are closely interconnected led to approaches to SFM broader development realities.

SFM in natural tropical forests. In closed natural tropical forests[2] subject to their first timber harvest, the way in which operations are implemented (including the opening-up of areas with access roads) is of major importance in determining the success of SFM. Influencing the way this first cut is carried out, therefore, is an important task of proponents of SFM. Closed natural forests generally stock more carbon and are biologically more diverse than modified forest ecosystems on the same sites. The entry of forest operations to previously intact primary forests could therefore lead to increased carbon emissions and biodiversity loss (CBD 2009), mainly because the provision of access roads is associated with deforestation and the loss of forest fauna through overhunting (Nasi et al. 2008). For example, the likelihood of deforestation in logged forests in the Brazilian Amazon was found to be up to four times greater than for non-logged forests because logging was often a precursor of land-clearing for agriculture (Asner et al. 2006). In Southeast Asia, roads built by loggers to access high densities of valuable *Dipterocarpus* trees in lowland forests led to deforestation in sparsely populated protected areas (Curran et al. 2004). Nasi et al. (2008) concluded that improved access to forests considerably increases the risk of unsustainable hunting of bushmeat. Deforestation and overhunting are incompatible with SFM. Therefore, broad, well-enforced land-use planning and policies are

[2] The term 'closed natural forest' is subject to debate. Here, it is taken to mean forests of native species in which ecological processes are not significantly disturbed (FAO 2005); the term 'primary forest' is also used in this context. ITTO (2002) defined primary forest as: forest which has never been subject to human disturbance, or has been so little affected by hunting, gathering and tree-cutting that its natural structure, functions and dynamics have not undergone any changes that exceed the elastic capacity of the ecosystem. The 'elastic capacity' of a forest ecosystem relates to "dynamic forest processes within a range of changing vertical forest structure, species composition and biodiversity, and productivity normally associated with the natural forest type expected at that site" (ibid.). ITTO proposes a set of definitions in a continuum of forest use, including, as main categories, primary forests, modified natural forests and planted forests.

needed to guard against them in the PFE. In many countries, however, land-use planning is often *ad hoc*, and even when good planning and policies exist they may not be well enforced. Natural forests, therefore, continue to be converted or degraded at a high rate, often illegally. Controlling road access is the most effective determinant of deforestation, as improving access to a forest area often creates strong pressures to deforest it (World Bank 2007). This should be taken into account at all stages of SFM at the landscape and national levels when natural forests are involved.

Some NGOs have criticized SFM as an excuse for a 'business as usual' approach to natural tropical forest management, placing timber values first and offering little consideration to the protective, social or ecological values from forests. For example, in their critique of the World Bank's Forest Investment Programme, Greenpeace and Rainforest Foundation (2009) stated that SFM has, in practice, often been misused to legitimize destructive activities. On the other hand, a large group of interested stakeholders have helped to advance SFM through forest certification (Box 2).

BOX 2: Forest certification

Forest certification in natural tropical forests has been promoted by many NGOs, private sector companies involved in timber harvesting and downstream forest industries and research and educational institutions since the mid-1990s. A voluntary, market-based instrument, forest certification has helped to increase awareness of the need for defining standards for good forest management. It has helped to initiate an important capacity-building and awareness-raising process, and has provided an incentive for many tropical-timber-producing companies, especially those exporting their products to Europe and North America, to improve the standards of their forest management. Although certification has been most successful in temperate and boreal forests, it has also had important effects on SFM in natural tropical forests.

Forest degradation and restoration. Forest degradation is often considered to be a precursor to deforestation and conceptualized as part of the same process; therefore it has tended to be coupled with deforestation in considerations by the UNFCCC on the role of forests in climate change mitigation. But forest degradation is not always followed by deforestation. In most cases the drivers behind them are not the same, and nor are the actors. Most deforestation is caused by the large-scale commercial conversion of forest for agriculture or ranching, the expansion of urban areas, and infrastructure development, some of which is 'governed' (sanctioned by government authorities) and some of which is ungoverned (Blaser and Thompson 2010). On the other hand, most degradation is the result of unsustainable extraction of forest products and values by local people as part of their livelihood strategies (ibid.). The area affected as such is estimated to be between 850 million hectares (ITTO 2002) and 1.1 billion hectares (WRI 2009). An additional cause of forest degradation is commercial logging, but this affects a relatively small area (about 130 million hectares, ITTO 2006).

Since the actors and processes are different, it follows that strategies to deal with deforestation may differ from those aiming to reduce forest degradation. Moreover, while a reduction in deforestation will reduce greenhouse-gas emissions, curbing degradation will both reduce emissions and (usually) increase carbon sequestration. This is because reducing degradation pressures and instigating SFM—including forest restoration programs—will usually lead to forest growth.

SFM and biodiversity. There is a close relationship between ecosystem resilience and forest biodiversity (Thompson et al. 2009). Resilience is an emergent property of ecosystems that is conferred at multiple scales by genes, species, functional groups of species, and the processes within an ecosystem. From an ecological perspective, SFM attempts to manage and maintain ecosystem resilience. To accomplish this, biodiversity must be maintained because of its functional roles in maintaining ecosystem processes (as well as for other reasons, such as for its intrinsic, spiritual, aesthetic, scientific and economic values and for moral reasons). Thompson et al. (2009) suggested that the relationship between biodiversity, productivity and the resilience and stability of forests is a key element of adaptive management, particularly in light of climate change. Therefore, maintaining

biodiversity in space and time is a critical aspect of SFM. Biodiversity conservation should be considered at the landscape scale (among others). According to ITTO/IUCN (2009), many tropical forest species require a variety of habitats that they use at different times of the year or for different periods of their life cycles; these habitat should be provided for in forest zoning and harvesting patterns. Methods are available to help achieve a balance between different components of a landscape mosaic that will provide optimal conditions for a broad range of species and populations.

SFM and protection of soils, water, climate and carbon stocks. Managing forests has a bearing on maintaining the productivity and quality of soil, water and carbon stocks within the forest. It also plays a crucial role outside the forest in maintaining downstream water quality and flow and in reducing flooding and sedimentation and in contributing to adapt to climate change and to mitigate greenhouse gases from the atmosphere. Quantitative indicators of the effects of forest management on soil, water and carbon storage include such measures as soil productivity within the forest, data on water quality and average and peak water flows for streams emerging from the forest and data on the sequestration rate and the capacities of forests to hold carbon in its five carbon pools (living and dead biomass above and below ground, litter and organic soils. This kind of information is still difficult and expensive to obtain and is seldom available for more than a limited number of sites, as each site has its own specific characteristics.

SFM and REDD+: Forests sequester and store more carbon than most other terrestrial ecosystems and could play an important role in mitigating climate change. When forests are cleared or degraded, however, their stored carbon is released into the atmosphere as carbon dioxide and other greenhouse gases. Tropical deforestation is estimated to have released 1.5–2 billion tons of carbon per year for the past 20 years. The term REDD-plus was introduced after the mentioning of various forest mitigation options under paragraph 1 (b) (iii) of the Bali Action Plan (UNFCCC 2007). REDD-plus includes reducing emissions from deforestation and forest degradation and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries. REDD-plus allows addressing mitigation to climate change using all activities included in the framework of sustainable forest management. The aim of REDD+ is to provide financial incentives to tropical forest owners to compensate them for forest-based climate change mitigation efforts by reducing greenhouse-gas emissions from forests and by increasing carbon sequestration. By carrying out REDD+ activities, countries could simultaneously increase the resilience of ecosystems and social systems to face climate change, conserve biodiversity, protect other ecosystem goods and services, increase income for forest owners and managers, and help address issues of forest governance. Forest management activities included in REDD+ schemes are likely to be subject to high levels of scrutiny and accountability and the operationalization of REDD+ will require accurate monitoring and reporting.

SFM and extra-sectoral forces. Over the past two decades, tropical forestry has been shaped by powerful forces at the global, regional, national and subnational levels. These forces are mainly extra-sectoral in nature:

- In many tropical countries, the demands of growing populations for food, fuel and land have led to increased deforestation (i.e. the conversion of forests to a non-forest land use), forest degradation and fragmentation and the appropriation of customary lands. The poverty and lack of livelihood opportunities among upland communities and forest dwellers aggravate the pressure on natural forests.

- Globalized markets and national and international trade and investment are contributing to pressure on forested land by providing incentives for and investment in the expansion of agriculture, livestock, biofuel production, mining and other extraction activities.

- Poor governance and its associated illegal operations and corruption have been implicated in deforestation and forest degradation in a number of tropical countries. Of particular concern is a lack of clarity on land tenure and a sense of grievance among many indigenous and local people about their lack of rights to land. Although progress has been made, poor governance continues to hinder efforts to implement SFM.

- A lack of financial remuneration among involved stakeholders for the many ecosystem services provided by natural tropical forests is one of the reasons for their low financial competitiveness against other land uses such as agriculture and cattle-ranching.

While forest managers are often powerless to combat such forces, they nonetheless should be aware of them in their efforts to put these guidelines into effect. A recent survey of SFM in its 33 producing member countries (ITTO 2011) found that only about 30 million hectares, or less than 8% of the tropical production PFE, is under SFM. Douglas and Simula (2010) attributed the slow uptake of SFM to two central issues, as follows:

- The economic and social policies influencing forests and forest-dependent people are initiated a long way from the forest sector itself and can only effectively be manipulated by mechanisms that operate well outside the sector (without having a close relationship or concerns to forests).

- Forest sustainability requires the commitment of stakeholders closely involved in forest management—government agencies, forest owners, private-sector operators, local communities and others—not all of whom have been convinced of the benefits to them of SFM.

ITTO (2011) recognized several constraints to SFM that frequently recur in tropical countries. Probably the most important, and the most generally applicable, is that the sustainable management of natural tropical forests is less profitable as a land use than other ways of using the land, especially some forms of agriculture and ranching but also urban development and mining. As a result, SFM tends to be a low priority for governments and the private sector often lacks incentives to pursue it. In general, prices for tropical timber, still the major commodity extracted from natural tropical forests, remain relatively low. It is possible that they will increase in the future to better reflect the true costs of production, including the opportunity cost of retaining natural forest, but to date there is no sign of this. Nevertheless, natural tropical forests are recognized increasingly as an important resource at the local, national and global levels, especially for the ecosystem services they supply. In some countries, payments are being made for such ecosystem services, and REDD+ offers a potentially significant revenue-earning opportunity for forest owners. In the long run, the extent of payments for the ecosystem services supplied by tropical forests—made at either the national level or the global level—is likely to play a large part in determining the fate of remaining tropical forests. In order for such payments to achieve their potential to affect forest management, constraints related to governance also need to be overcome. Those governments, companies and communities 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.

Another constraint to SFM is confusion over ownership. SFM is unlikely to succeed without the security provided by credible, negotiated arrangements on tenure. In many countries, resolving disputes over land tenure is no easy task but it must be tackled—preferably through a transparent and equitable process—if resource management is to become sustainable. They also suffer from the lack of enabling policies and implementing guidelines for SFM.

PART 2: OVERVIEW OF THE VOLUNTARY GUIDELINES

2.1 Definition of key concepts

Sustainable forest management. A clear definition of sustainability is elusive, but it involves ways of using biological systems that do not impair their capacity to meet the needs of future generations. Sustainability has become a political priority globally and, for forests, SFM has developed into an essential tool. This document uses ITTO's definition of SFM (see below). Nevertheless, there are many other definitions that vary widely, sometimes because of specific field circumstances and sometimes because of the particular purpose to which a user believes a given forest should be put (Douglas and Simula 2010). The concept of sustainability in forest management has evolved from sustained yield and single-use management for timber, to one reflecting the wide range of goods, ecosystem services and values generated or otherwise provided by forests. The term SFM was coined to reflect management for this wider set of purposes and the enabling policy and institutional environments, and wording on it was adopted by the United Nations in 2007 (Box 4). In general, SFM involves the application of the best available practices based on current scientific and traditional knowledge that allow multiple objectives and needs to be met without degrading the forest resource. SFM also requires effective and accountable governance and the safeguarding of the rights of forest-dependent peoples.

It is generally recognized that the concept of SFM will change over time in response to the dynamic and evolving needs of society, and this may be partly the reason for the acknowledged lack of precision in its definition, particularly in regard to (WCFSD 1999):

- what needs to be sustained - i.e. the objectives of SFM;
- the values attached by different stake-holders to various SFM objectives;
- the uncertainties associated with interventions in complex forest ecosystems;
- the timeframes and spatial boundaries involved.

Box 3: United Nations Definition of SFM

The Non-legally Binding Instrument on All Types of Forests defines SFM as "a dynamic and evolving concept [that] aims to maintain and enhance the economic, social and environmental values of all types of forests, for the benefit of present and future generations".

United Nations General Assembly Resolution 62/98, New York, December 2007.

WCFSD (1999) concluded that SFM "must be a flexible concept that accepts changes in the mix of goods and services produced or preserved over long periods of time and according to changing values signaled by various stakeholder groups", and that it "should be viewed as a *process* that can be constantly adapted according to changing values, resources, institutions and technologies".

SFM embraces the view that forests yield many products and provides many ecological services. It will therefore produce an array of products and services that may—and may not—include timber. SFM therefore relates to the *multiple use* of the forest (Pearce et al. 1999). SFM refers not just to the flow of goods and services but also to maintaining forest ecological processes essential for maintaining ecosystem resilience—the capacity of a forest ecosystem to recover following disturbance (Thompson et al. 2009).

An important dimension of SFM is the scale at which it is applied—global, national, sub-national, FMU and stand. SFM should be addressed at all levels.

- *A*t the ***global and national levels****,* the concept of SFM has evolved in the past 20 years as an approach that balances environmental, social (including cultural) and economic management

objectives in line with the 'Forest Principles' adopted at the United Nations Conference on Environment and Development in 1992. The guiding objective is to contribute to the management, conservation and sustainable development of all types of forests and to provide for their multiple and complementary functions and uses. The global ecosystem services provided by forests, such as those related to the carbon cycle and biodiversity, should be addressed at the international level because all people have an interest in their maintenance; global payment mechanisms for such services are now being discussed in international forums. Much of the policy development on SFM initiated at the international level, including ITTO's work on C&I and various guidelines, has influenced policies at the national level.

- At the ***sub-national or landscape level,*** the objective of maximizing wood yields has traditionally been overwhelmingly important. Growing awareness of the broad role of forests, however, has led to new approaches to SFM that give weight to the full range of environmental, social and economic factors. At the landscape scale, trade-offs will almost always have to be made in the mix of products, ecosystem services and values offered by forests. Ideally, such trade-offs are agreed in a planning process involving all stakeholders and express a consensus view on what constitutes SFM in that particular landscape within physical and other constraints. Questions to be addressed in such processes include: How much forest do we need or want? What kinds of forest should there be? Where should it be situated? How should it be conserved and managed?

- *At* ***the FMU level***, SFM has three elements: the management of forests for multiple objectives to meet the needs and demands of concerned stakeholders; achieving a balance among outputs (of goods and ecological services), rather than the maximization of any single one; and designing and implementing management practices that are compatible with the ecological and social processes that sustain forest resources and ecosystems. Within an FMU, the management of ***forest stands*** may vary (for example, some stands may temporarily have low or no tree cover, while others at different growth stages are full stocked) and still be compatible with SFM.

In summary, the essential aim of SFM is to maintain and enhance the potential of forests (at all scales) to deliver the goods and services that people and societies require of them over time. Thus, the use of forests should be planned at the national, landscape and FMU scales, and each FMU should be managed sustainably for the purposes for which it is intended in the landscape. Management should be applied consistently with the aim of maintaining ecosystem resilience, including by emulating natural disturbances, and the effects of management should be monitored so that management can be adapted over time as conditions change (see 'adaptive management' below).

Permanent Forest Estate (PFE). The notion of permanence is a necessary condition for SFM. The permanent forest estate (PFE), as defined in ITTO (2005), comprises land, whether public or private, secured by law and kept under permanent forest cover. It includes land for the production of timber and other forest products, for the protection of soil and water, and for the conservation of biological diversity, as well as land intended to fulfill a combination of these functions. Although the guidelines can be applied to the sustainable management of all natural tropical forests, the focus is on the PFE[3] and the multiple-use roles of forests, including timber production.

The production PFE corresponds to those forest areas where timber harvesting and other forms of resource exploitation are permitted, albeit subject to certain conditions. The protection PFE is the forest area where such exploitation is generally not permitted. These guidelines are primarily

[3] There are still a number of important tropical countries that have yet not defined their PFE. In these cases, the Guidelines are meant to be applied in those natural tropical forests that are meant to be preserved under forest cover by agreement (customary, oral or written) between forest owners and forest users.

designed to be applied in the management of the production PFE, although many of the principles, guidelines and recommended actions can and should be applied in the protection PFE.

2.2 Overview of the Guiding principles

The *Voluntary Guidelines for the Sustainable Management of Natural Tropical Forests* use the ITTO C&I, as revised in 2005, as an important reference document and draw on them in the development of both principles and specific guidelines. They complement the following other ITTO guidelines on various aspects of tropical forest management[4]:

- ITTO (1990). ITTO Guidelines for the Sustainable Management of Natural Tropical Forests. ITTO Policy Development Series 1.
- ITTO (1992). Criteria for the Sustainable Management of Natural Tropical Forests. ITTO Policy Development Series 3.
- ITTO (1993). ITTO Guidelines for the Establishment and Sustainable Management of Planted Tropical Forests. ITTO Policy Development Series 4.
- ITTO (1993). ITTO Guidelines for the Conservation of Biological Diversity in Tropical Production Forests. ITTO Policy Development Series 5.
- ITTO (1997). ITTO Guidelines for Fire Management in Tropical Forests. ITTO Policy Development Series 6.
- ITTO (1998). Criteria and Indicators for Sustainable Management of Natural Tropical Forests. ITTO Technical Series 7.
- ITTO (1999). Manual for the Application of Criteria and Indicators for Sustainable Management of Natural Tropical Forests. ITTO Policy Development Series 9.
- ITTO (2002). ITTO Guidelines for the Restoration, Management and Rehabilitation of Degraded and Secondary Tropical Forests. ITTO Policy Development Series 13.
- African Timber Organization/ITTO (2003). ATO/ITTO Principles, Criteria & Indicators for the Sustainable Management of African Natural Tropical Forests. ITTO Policy Development Series 14.
- ITTO (2005). Revised ITTO Criteria and Indicators for the Sustainable Management of Tropical Forests including Reporting Format. ITTO Policy Development Series 15.
- ITTO (2009). ITTO/IUCN Guidelines for the Conservation and Sustainable Use of Biodiversity in Tropical Timber Production Forests. ITTO Policy Development Series 17.

Table 1 gives an overview of the ITTO SFM Principles and shows connectivity between them and ITTO Criteria and Indicators.

Criteria Group	Present SFM Guiding principles		Connectivity with ITTO C&I
	Description	Observations	
Enabling conditions for SFM	– GP 1: Forest Policy, Governance, Laws and Institutional Arrangements; – GP 2: Security of tenure, access and use rights	Apply mainly at the national, sub-national and local government levels to address issues regarding legislation, socio-economic and trade policies and environmental policies.	Criterion 1: “Enabling conditions for sustainable forest management”; Criterion 7: “Economic, social and cultural aspects”
Extent and condition of forests	- GP 3: Land-use planning and permanent forest estate	The increased pressure on forest land and forest resources and new challenges such as REDD+ represents both, challenge and	Criterion 2: “Extent and condition of forests”

[4] All the documents listed can be downloaded at www.itto.int.

		opportunities for SFM.	
Forest ecosystem health and vitality	– GP 4: Forest resilience and forest-based adaptation to climate change – GP 5: Identification, prevention, monitoring and management of threats to forest ecosystem integrity	Applies mainly at the FMU level. The effects of climate variability, fire, pest and diseases, pollution and other disturbances are ~~often~~ still insufficiently known or managed. Also illegal human activities and pollution of any kind affect forest integrity.	Criterion 3: "Forest ecosystem health"
Maintaining the multiple functions of forests (soil, water, biodiversity and carbon)	– GP 6: Multi-purpose forest management for goods and services	Wood and NWFP will continuously play a major role as a raw material. Soil, water and biodiversity conservation and carbon permanence for forest ecosystem services with a vast range of applications will be a major future challenge for tropical forest management.	Criterion 4: "Forest production"; Criterion 5: "Biological diversity"; Criterion 6: "Soil and water protection"
Implementing sustainable forest management practices	– GP 7: Forest management planning at national/regional level; – GP 8: Silvicultural management planning at FMU level	There is an ambition to maintain a valuable supply of forest products and ecosystem services from natural tropical forests while, at the same time, ensuring that production is sustainable and dos not compromise the management options of future generations.	Criterion 1, under "Planning Framework" Criterion 4: "Forest production";
Social, cultural and economic aspects	– GP 9: Social values and community involvement in natural tropical forest management – GP 10: Working conditions in tropical forest management – GP 11: Economic viability of natural tropical forest management	SFM needs to bridge forest-based production (in particular of timber), environmental protection and local development concerns. Tropical natural forests are important in subsistence livelihoods and poverty alleviation and the workplace for many. They need to be sustained also for socio-economic reasons. Only if their value is recognized, tropical natural forests will also sustain in the long term.	Criterion 7: "Economic, social and cultural aspects"

The Guiding principles are statements of goals or values that represent what are accepted or professed requirements that guide forest policies, processes and practices for achieving SFM. They provide a critical foundation that can be applied to reach SFM. The set of guiding principles described in this document should be considered by its users as the essential characteristics of SFM, which means that SFM would not be effectively met if any one principle was to be ignored. The underlying expectation is that once the principles are understood, the actors involved in SFM will be able to implement good practices, keeping in view the specificities of their own contexts and with the assistance of more specific tools as needed.

The Guidelines are evidence-based advisory statements which are intended to assist decision-makers, forest managers and other stakeholders to make informed decisions about appropriate forest management decision or intervention. They focus on outcomes. They suggest specific good practices and contribute information on how to comply with SFM Principles. They are aspirational in intent and are framed at a certain level of generality so as to be of relevance under most tropical forest management conditions and circumstances. While they may not be applicable to every forest management situation, they may facilitate the continued systematic development of the SFM and assure a high level of application of good practices.

The Recommended Actions focus on processes. They are tasks which are suggested for implementing respective guidelines. Some of the actions proposed may be relevant in some cases but not in others, while there may be circumstances that demand actions that have not been addressed here at all. Such details need to be worked out by those actively participating in the implementation of SFM and these details are bound to vary depending on the context.

The recommended actions provide specific means to implement the guidelines. The basic minimum actions are proposed; however member countries can implement as many actions are needed in accordance with their own country forest policy objectives, national forest program, and forest resource situation. There are 11 guiding principles formulated; the guiding principles relating to management are applicable to SFM in natural tropical forests worldwide, with an emphasis on production forests in the PFE. These guiding principles are designed to encourage multi-purpose forest management practices that, if applied over the long term, will sustain the yields of multiple products from, maintain the provision of services by, and safeguard the values of tropical forests for the benefit of multiple stakeholders. While conceptualizing SFM at a broad policy level, the guidelines should also be useful to a wide diversity of forest managers working under a variety of management and tenure arrangements.

The guiding principles also present an adaptive and collaborative forest management concept that can be applied at multiple scales. They particularly provide guidance on tradeoffs in forest management decision-making and cross-cutting issues such as forest governance, land-use planning, policy and institutional issues and inter-sectoral linkages. It is intended that these guidelines form a basis for the development of specific guidelines at the national or sub-national levels.

For each guiding principle, practical *guidelines* are proposed, together with possible *recommended actions* addressed to particular target groups. An important aim in revising the guidelines was to keep them simple and practical, avoiding unnecessary prescriptions and always bearing in mind their usefulness to forest managers. Another aim was to support recommendations with science to the greatest extent possible. Thus, the document makes full use of the wealth of scientific literature that explicitly or implicitly provides evidence for recommended actions. Nevertheless, anecdotal evidence and field experience from experts and practitioners have also been taken into consideration.

Table 2 finally summarizes the 11 guiding principles and the 60 related guidelines.

Table 2: Overview on the 11 guiding principles and related guidelines (for details see Part III of this document)

Guiding principle 1: Forest Policy, Governance, Laws and Institutional Arrangements	
G1.1	Reaffirm political commitment and strengthen and implement effective policies and strategies to promote SFM.
G1.2	Establish coherence, effective linkages and coordination of policies and laws between different levels of governance.
G1.3	Develop effective regulations, forest law enforcement and administrative procedures
G1.4	Recognize that it is essential to have appropriate and capable institutions with effective linkages between them.
G1.5	Transfer authority and/or responsibility from the central government to sub-national governments and empower private sector, communities, and civil society institutions and women for their efficient collaboration.
G1.6	Monitor and analyze the impact that policies and laws of other sectors may have on SFM.
G1.7	Foster accountability/transparency and establish mechanisms for stakeholders participation and involvement with regard to SFM.
G1.8	Identify and integrate relevant emerging issues relating to SFM, capture synergies and address possible tradeoffs with existing objectives of forest management.
G1.9	Recognize the implication on SFM of the legally and non-legally binding intergovernmental agreements at the regional and global level.

Guiding principle 2: Security of tenure, access and use rights	
G2.1	Put in place effective formal systems for ensuring security of forest tenure.
G2.2	Recognize the importance to SFM of clear and equitable rights to forest access and use.
G2.3	Ensure that traditional use rights are clear, equitable and respected.
G2.4	Make sure that concession/logging rights are clear and transparent.
Guiding principle 3: Land-use planning and permanent forest estate	
G3.1	Implement a national and subnational land- use planning.
G3.2	Establish a Permanent Forest Estate by a law that defines its demarcation, utilization, and management strategies.
G3.3	Carry out periodically national or subnational forest resource assessments to provide reliable data at the landscape level.
Guiding principle 4: Forest resilience and forest-based adaptation to climate change	
G4.1	Identify causes and put in place preventative and remedial actions to reduce the vulnerability of forests to biotic and abiotic factors.
G4.2	Conserve and use biodiversity in ways that maintain forest resilience and enable adaptation to future change
G4.3	Manage forests in ways that maintain their regenerative capacities & ecosystem resilience.
G4.4	Restore degraded forest ecosystems to enhance native species composition, forest structure, biodiversity, productivity and ecosystem function.
G4.5	Assess the impacts & risks of climate change & climate variability on natural tropical forests.
G4.6	Assess social and economic effects of climate change as they relate to tropical forests
G4.7	Manage natural tropical forests for adaptation to climate change.
Guiding principle 5: Management of threats to forest ecosystem integrity	
G5.1	Protect the FMU from illegal and unsustainable activities.
G5.2	Formulate and implement fire management plans for the FMUs and adjacent lands.
G5.3	Integrate the management of pests and diseases into the FMU's forest management plan.
G5.4	Ensure that all waste and pollution derived from, and chemicals used in, forest management activities is stored and disposed of properly.
Guiding principle 6: Multi-purpose forest management for goods and services	
G6.1	Enable multi-purpose forest management.
G6.2	Ensure soil and water management for maintaining the productivity and health of forests and their hydrological regulation function.
G6.3	Give emphasis to biodiversity at all stages of managing natural tropical production forests
G6.4	Provide guidance and take measures to avoid unsustainable levels of NTFPs and hunting.
G6.5	Monitor biodiversity in the FMU to minimize negative impacts.
G6.6	Consider to include carbon permanence as a management option in natural tropical forest management and monitor forest carbon and safeguards as appropriate.
Guiding principle 7: Forest management planning at national/regional level	
G7.1	Develop and implement a national forest management planning framework.
G7.2	Support research and education in natural tropical forest management.
G7.3	Monitor progress and keep the public informed about the state of SFM through clear and open communication and the provision of regular information.
Guiding principle 8: Silvicultural management planning at FMU level	
G8.1	Conduct preliminary studies and develop a multi-resource inventory plan.
G8.2	Define management objectives for individual resources (timber, NTFPs, carbon, other environmental services).
G8.3	Use a reliable method for regulating and controlling yield.
G8.4	Plan harvest to enable good technical control, minimize costs, and reduce environmental impacts
G8.5	Put the FMU under a forest management plan and a silvicultural system framework
G8.6	Incorporate wildlife and biodiversity concerns into forest management plans.
G8.7	Enhance the potential for generating income from ecosystem services provided by an FMU.
G8.8	Prepare detailed 5-years working plans and annual operational plans, harvesting and silvicultural prescriptions
G8.9	Monitor the management implementation and apply adaptive management.

Guiding principle 9: Social values and community involvement in natural tropical forest management	
G9.1	Address the local livelihood needs of people, including indigenous peoples and other vulnerable forest-dependent peoples and communities.
G9.2	Assure effective participation of relevant stakeholders in planning and implementation of SFM
G9.3	Recognize cultural and spiritual values and respect archaeological, cultural and spiritual sites identified in the PFE.
G9.4	Consultation with local communities on the management of natural forests (PFE, FMU).
G9.5	Provide opportunities to local communities to actively and sustainably manage forests to increase income and improve living conditions.
G9.6	Strive to ensure that benefits from community forest management are shared among stakeholders according to their rights, roles and responsibilities.
Guiding principle 10: Working conditions in tropical forest management	
G10.1	Provide a framework of rights and responsibilities to forest workers and forest managers on safety and health in forest operations.
G10.2	Consider safety management as a top priority.
G10.3	Introduce best practices in silvicultural management to ensure safe and efficient operations, minimize damage and reduce environmental impacts.
G10.4	Develop capacity at all levels of workforce, including attention to working conditions
Guiding principle 11: Economic viability of natural tropical forest management	
G11.1	Enable the environment for investment in natural tropical forest management
G11.2	Provide guidelines for optimal efficiency in timber harvesting to reduce log wastes
G11.3	Monitor the distribution among the principal stakeholders of the costs and benefits of forest management
G11.4	Encourage economic instruments to supporting natural tropical forest management
G11.5	Provide preferential access to markets for products from sustainably managed tropical forests.

PART 3: VOLUNTARY GUIDELINES AND RECOMMENDED ACTIONS FOR SUSTAINABLE FOREST MANAGEMENT

3.1 Enabling Conditions for SFM

Guiding principle 1: Forest Policy, Governance, Laws and Institutional Arrangements

Political commitment, supportive national policies, strong institutions, laws and regulations and appropriate governance are essential to SFM.

Rationale

Political commitment. A national commitment to preserving its forest resources for the benefits of the present and future generations is essential to achieve SFM. Such a commitment is normally based on a provision for sustainable forest management in the country's laws or policies. Another important sign of political commitment is ensuring that adequate resources are made available to conserve and manage the forests in order to meet the economic needs of society without sacrificing the needs of future generations.

Forest policy. A national forest policy is understood as a negotiated agreement between governments and stakeholders on the orientations and principles of actions they adopt, in harmony with other national socio-economic and environmental policies, to guide decisions on the sustainable management of forests for the benefit of society. It guides present and future decisions relating to forests, determines appropriate actions and provides directions over a period of time. Forest policy goals should be clearly linked to national development strategies that determine wider societal developments. For example, new challenges relating to food security, energy security and climate change, including REDD+, open up possibilities for new forms of forest management. Forest policies no longer address only the traditional aspects of forestry, but take into account the broader needs of and benefits to society as well as the problems arising from increased pressure on a finite resource base (Blaser and Gregersen 2013). Considerations in deciding on a forest policy include *inter alia* the present proportion of land under forest cover, the needs and aspirations in regard to forests and forest goods and services of present and future generations of the population, the place of forestry in national economic planning, and the needs of protection and conservation of biological diversity, carbon stocks, soil and water.

Governance*[5]*. Policies and laws provide incentives and disincentives which affect the behavior and choices of forest managers, users and other stakeholders. On their own, however, good laws and regulations are insufficient. Political will to provide the means for the enforcement and implementation of laws and regulations is necessary, as is strong leadership to coordinate across sectors. Political will and good governance, together with adequate stakeholder participation and awareness in all sectors of the importance of sustainable management and use of natural tropical forests, is essential. Today, an effective forest policy is widely understood as a negotiated agreement among government and other stakeholders on a shared vision on forests, their functions and their use (FAO 2010a).

Legislation and forest law compliance. A forest policy sets out a broad vision or goal and a long-term direction about forests and their use but does not specify in detail the instruments or practices to implement it. One key instrument for implementing a forest policy is the forest legislation. While government policy needs to be consistent with the Constitution and other overarching legislation of a

[5] See glossary for the general definition of governance as used in this text.

country, all laws, including those pertaining to forests, need to be based on policies. Thus, a policy needs to be developed before any aspect of it can be made legally binding. The primary purpose of forest legislation is the distribution and enforcement of rights and responsibilities that support the sustainable management of forests.

Legislation is setting out rights and obligations and institutionalizing the rules through primary legislation (see Guideline 1.2) and secondary legislation, e.g. regulations, decrees, ordinances and by-laws. Many implementation aspects of SFM policies are defined at such secondary legislative level (see also Box 3). Often, that level is much influenced by bureaucracy and has the potential to comprise some undesired consequences, e.g. excessive administrative requirements or incentives and disincentive measures that do not correspond to the needs of adaptive management[6].

Box 3: The five factors that give rise to a lack of forest law compliance

(i) Failings in the policy and legal frameworks;
(ii) Insufficient enforcement;
(iii) Lack of information;
(iv) Corruption;
(v) Market distortions.

Addressing effective regulations and defining clear and implementable administrative procedures are keys for sustainable forest management. The lack of forest law compliance and good governance has far-reaching environmental, social and economic consequences in-side and outside forests. Although the extent of illegal forest activities is notoriously difficult to quantify, their economic cost is likely to be high. Problems relating to inconsistent forest policy and legal frameworks arise when laws are incoherent, unrealistic and unenforceable and fail to address forest land tenure and use rights. Excessive regulations can mean that the transaction costs of legal operations are prohibitively high and push forest users to illegal practices. Insufficient enforcement capacity is often due to institutional weaknesses coupled with a lack of transparency and accountability in the implementation of the policy and legal frameworks.

Insufficient monitoring of the forest resource and the supply chain makes it difficult for forest law enforcement agencies to know when illegality occurs. Corruption in the private sector, government institutions and among local decision-makers is linked to a lack of transparency in policy implementation, the marginalization of rural people, and a lack of public scrutiny. Market distortions for wood products can occur in domestic and export markets where there are ready outlets for low-priced illegally harvested products.

Institutional arrangements. As part of an effective governance arrangement, there must be adequate institutions and personnel at all levels to undertake sustainable forest management. These include effective public agencies that guide and supervise forest management, forest managers and other implementing agencies, research and academic institutions and appropriately trained personnel to ensure that management is in accordance with scientific and technical knowledge. Nonetheless, forest institutions also need to be able to appropriately deal with non-technical issues as balancing conflicting interests in SFM is often rather a political and societal than a technical matter. The diversity of public and private stakeholders involved in policy implementation calls for the need to be explicit about the division of responsibilities among different government institutions and stakeholder bodies.

Working through decentralized bodies and institutions is based on the ideals of greater accountability in local governments for sustainable forest management, increased involvement and empowerment for local communities and more appropriate use of forest resources. Decentralization is implemented through the delegation of authority and responsibilities at local levels to municipalities, communities and other local players. It requires considerable efforts by government officials to coordinate and collaborate not only across sectors but also across different levels of government as more levels of government share responsibility for implementation of SFM. Thus, public agencies at all levels need

[6] See definition of adapted management in the glossary

to have goals, structures and capacities to discharge their mandate in respect to SFM. In order to have an effective decentralization process, it is critically important to establish a dynamic balance between authority, accountability mechanisms, responsibilities and revenue sharing across different levels of government. Experiences from diverse countries indicate that the relationship and balance among these elements determine, to a large extent, the effectiveness and efficiency of decentralized systems of forest governance (Colfer and Capistrano 2005). Equally important are effective linkages with other sectors that affect or are affected by the forest sector. In general terms, successful decentralization is linked to secure tenure and access to forest resources, financial means and authority at lower levels, commercials rights and market access, and sensitivity to cultural traditions and local knowledge.

Integrating emerging issues. Sustainable forest management provides a flexible, robust, credible and well-tested framework for addressing emerging issues concerning forests. Some issues, that are classified as emerging in these days have been internalized in forest management since many years: the regulatory function of forests on freshwater is well known; also the renewed regard on the role of forests to deliver bioenergy beyond fuelwood is well known and new demands and technologies are under development. The role of forests to simultaneously reducing carbon emissions, sequestering carbon, serving as the major land-based carbon pool and enhancing adaptation to climate change is however a novel challenge for SFM. Above all, forests can help supply environmentally friendly forest products and fibres, protect biodiversity and secure the supplies of other essential ecosystem services.

Voluntary guidelines for guiding principle 1 – Forest Policy, Governance, Laws & Institutional Arrangements

Guidelines		Recommended Actions		Indicative stakeholder group
G1.1	**Reaffirm political commitment and strengthen and implement effective policies and strategies to promote SFM**.	A1.1.1	Develop a formal forest policy statement that implies a shared vision and goals on forests and specific objectives and lays out the strategies for their achievement.	Government and legislators, jointly with all interested key stakeholders in the forest sector and from other sectors with a strong influence on forests
		A1.1.2	Revise or update periodically the forest policy and allow flexibility for the methods to be used.	
		A1.1.3	In revising forest legislation, observe the following regulations: (i) avoid legislative overreaching; (ii) avoid unnecessary or superfluous licensing and approval requirements; (iii) enhance provisions for transparency and accountability; (iv) enhance role of stakeholders; (v) ensure that the drafting of laws is participative and transparent; and (vi) ensure that the law includes direct enforcement mechanisms.	Government and legislators, forest managers, private sector, civil society, research and education
		A1.1.4	Maintain a mechanism for engagement among stakeholders to allow continuous adaptation of forest policy and its implementation.	Government, forest managers, private sector, civil society, research and education
G1.2	**Establish coherence,**	A1.2.1	Implement the updated forest policy through rules and regulations.	Government,

	effective linkages and coordination of policies and laws between different levels of governance.	A1.2.2	Ensure compatibility between laws, regulations and the institutional frameworks at different levels of decision making and also with related sectors (notably agriculture, energy, mining, and tourism).	jointly with all interested key stake-holders in the forest sector and from other sectors with a strong influence on forests.
G1.3	**Develop effective regulations, forest law enforcement and administrative procedures**	A1.3.1	Ensure consistency of the regulatory framework to make certain that rules and regulations do not contradict others within the forest legal framework or other sectors.	Government and legislators, forest managers, private sector, civil society, research/education.
		A1.3.2	Streamline bureaucracy and reduce administrative burdens.	
		A1.3.3	Develop fiscal and economic incentives in order to encourage the actors to work within a legal framework.	
		A1.3.4	Foster and practice a transparent governance culture in administrative processes and in forest management planning and implementation.	
		A1.3.5	Build institutional capacity for forest law enforcement within the forest administration, through promoting interagency linkages and through collaboration with the private sector and civil society.	
		A1.3.6	Adopt strategies for control of illegal activities, focusing on preventive actions.	
		A1.3.7	As appropriate, enable women and other key stakeholders to improve their own livelihoods and the condition of forests by removing any constraints that inhibit them from doing so.	
G1.4	**Recognize that it is essential to have appropriate and capable institutions with effective linkages between them.**	A1.4.1	Establish or strengthen existing institutions with adequate personnel and other resources at all levels to promote SFM in a transparent manner.	Government, forest managers, private sector, civil society, research and education
		A1.4.2	Establish or enhance and develop clear rules for a proper administrative structure responsible for sustainable management of forest resources.	
		A1.4.3	Strengthen forest education at technical and university levels, forestry research, knowledge and skills in order to support SFM programs.	
		A1.4.4	Seek innovative funding mechanisms to finance SFM, incl. performance-based funding.	
G1.5	**Transfer authority and/or responsibility from the central Government to sub-national governments and empower private sector,**	A1.5.1	Provide proper political support in planning, financial resources, capacity building and follow up in order to ensure that the enabling conditions for decentralized forest management are in place.	Government, forest managers, private sector, civil society, research and education
		A1.5.2	Raise local governments' awareness, and coordination for sustainable forest management in support of	

	communities and civil society institutions and women for their efficient collaboration.		decentralization processes.	
		A1.5.3	Facilitate delegation of administrative power from national governmental administration to local public institutions and civil society groups.	
		A1.5.4	Strengthen further the capacities of local constituencies in terms of organization and managerial skills to develop and implement local forest management and silvicultural norms.	Government, civil society, research/education
		A1.5.5	When implementing decentralization of forest management, take into account livelihoods and address inequities such as those relating to gender and in particular women.	Government, forest managers, private sector, civil society, research and education
G1.6	**Monitor and analyze the impact that policies and laws of other sectors may have on SFM.**	A1.6.1	Adopt and implement at national level a system to monitor and analyze the impact that policies and laws of other sectors may have on SFM, including of external forces that affect forest management.	Government, forest managers, private sector, civil society, research and education
		A1.6.2	Assess extra-sectoral drivers of deforestation and forest degradation at national and landscape level and make proposals on how to address them.	
G1.7	**Foster accountability/ transparency and establish mechanisms for stakeholders participation and involvement with regard to SFM.**	A1.7.1	Adopt regulations that define the mechanisms for public participation for managing natural forests and that require forestry institutions to be accountable to peoples' needs and aspirations, based on national capability and circumstances.	Government, forest managers, private sector, civil society, research and education
		A1.7.2	Develop pathways for more transparent information and communication that are locally accepted and adaptable for community and other stakeholders.	
G1.8	**Identify and integrate relevant emerging issues relating to SFM, capture synergies and address possible tradeoffs with existing objectives of forest management.**	A1.8.1	Monitor and assess new and emerging issues in SFM ensuring greater coordination at all levels-	Government, forest managers, private sector, civil society, research and education.
		A1.8.2	Embed new and emerging issues into the overall forest management approach after due considerations including particular societal needs in the resource assessment, planning and implementation strategies for SFM at national and/or sub-national level.	
G1.9	**Recognize the implication on SFM of the legally and non-legally binding intergovernmental agreements at the regional and global level**	A1.9.1	Consider adjusting the national legal and regulatory frameworks for SFM as appropriate, to incorporate the provisions of international commitments.	Government, forest managers, private sector, civil society, research and education
		A1.9.2	Develop or improve information systems to provide data on forests and forestry to meet international reporting requirements, including those of ITTA, UNFF, UNFCCC and CBD.	Government, civil society, research and education

Guiding principle 2: Security of tenure, access and use rights

Ensuring security of forest tenure and clearly defined access and use rights, including customary and traditional rights, with particular attention to rights of marginalized groups, is a necessary condition for SFM.

Rationale

Forest tenure is a broad concept that includes ownership, tenancy and other arrangements for the use of forests. It is a combination of legally or customarily defined forest ownership and of rights and arrangements to manage and use forest resources. Forest tenure determines who can use what resources, for how long and under what conditions. While forest tenure is closely linked to land tenure it concerns not only the land, but also the natural resource on the land (Romano and Muller 2009). Secure forest tenure is a fundamental element in achieving improved livelihoods and sustainable forest management. It is a strong incentive for investing in forest resources and their management. Conflicting issues in tenure and legislation need to be resolved. Incompatibility between traditional tenure rights (land, trees and other resources) and formal land allocation have often led to contradictory (and free access) situations, resulting in the mismanagement of forest resources. These conflicting issues need to be harmonized and streamlined. In this respect, multi-stakeholder participation as well as appropriate rules and regulations to enforce legislation at the local level are key issues necessary. The status of women, landless, tenants and immigrants, in particular, needs to be reviewed as they play an important role in the management of this resource. Forest tenure reform should be implemented as part of a holistic and integrated reform agenda. The reform of forest tenure is a learning process and requires an adaptive, deliberative, reflective and multi-stakeholder approach.

Tenure security. Forest tenure reform should be embedded within the overall development agenda of the country or region. Security of tenure implies that rights are recognized and guaranteed in the long term and cannot be taken away arbitrarily. Tenure security is not necessarily linked to ownership and to titling, but some kind of formal recognition is necessary. When undertaking a forest tenure reform a careful review of current policies and laws is necessary to ensure that they are supportive to the reform and do not present inconsistencies or contradictions to the objectives of the reform. A land-use planning process should take as a starting point the identification of forest user rights and traditional ownership and control of land. Any new tenure system involving local stakeholders should provide adequate incentives for the new owners/managers to invest human and financial resources in SFM. Incentives can be economic, but should encompass also an increased sense of ownership, equity and empowerment in decision making. Stable long term arrangements are preferable over short or medium term arrangements because they provide a stronger sense of security.

Forest concessions are a form of forest tenure. They involve a contract between the forest owner and another party giving rights to harvest specified resources from a given forest area (forest utilization contracts) and/or a contract to manage given resources within the specified forest area (forest management services contracts).
Formal recognition may also “legitimize” customary tenure systems, which otherwise are often in danger of being ignored or undermined, especially when different interest groups compete for the same resources. It may thus contribute to reducing conflict potential in forest areas.

Tenure and gender equity. There are often very different concerns between men and women in respect to the use and conservation of forest resources. These differences also affect the way how forests are managed. The variety of activities and knowledge systems of one group are complementary to those of the other, meaning one group usually depends on the other to be able to

develop strategies to efficiently use and manage the forest, in order to produce the livelihood outcomes they long for. This therefore indicates how important men and women are to the management process and that they should therefore be considered equal partners in this management process. In order to improve on SFM, it is necessary to include both, the local/indigenous men and women in the management process, because sustainability requires an understanding of the construction of gender roles as a function of resource use and management. Gender is also central when considering management, extension and law enforcement. This can influence the decision-making capacity of professional women in forestry. Forestry tends to be a male-dominated field that privileges the experiences and knowledge of men. While the male-experience is important, it is crucial that women in forestry and forest resource management are fully valued and acknowledged for the diversity and distinctive perspective they currently bring to the field. This shift must occur in both policy and practice, within organizations and field level activities.

Voluntary Guidelines for Guiding principle 2 - Security of tenure, access and use rights

Guidelines		Recommended Actions		Indicative stakeholder group
G2.1	**Put in place effective formal systems for ensuring security of forest tenure.**	A2.1.1	Reform legislation to recognize that security of forest tenure is a necessary condition for SFM and to recognize customary and traditional rights.	Government, forest managers, private sector, civil society, research and education
		A2.1.2	Provide secure and long-term access or ownership rights to forest resources, ensuring that forest tenure is supported by related forest policy, legislation and institutional arrangements.	
		A2.1.3	When conducting a tenure reform, verify current land ownership and update cadastral and data management systems in order to keep track of who owns and manages forests..	
		A2.1.4	Harmonize and streamline conflicting issues, e.g. where appropriate through incorporating customary laws into formal land allocation laws.	
		A2.1.5	Address gender equity aspects (including women's tenure security) in national and subnational forest policies and programs related to SFM.	
		A2.1.6	Conceive and implement forest policies in concert with improvements in tenure rights and other issues of resource access.	
G2.2	**Recognize the importance to SFM of clear and equitable rights to forest access and use.**	A2.2.1	Define and document the rights to access and use forests and appropriate duration for use on e.g. goods and services such as NTFP, water rights, rights to carbon.	Government, forest managers, civil society, research and education
		A2.2.2	Recognize and incorporate in the regulatory framework traditional tenure systems and the usufruct rights for forest goods and services.	

		A2.2.3	Formulate administrative procedures for tenure access, and use of forest that are simple, easy to understand and affordable for local stakeholders.	
		A2.2.4	Strengthen knowledge about forest tenure with accurate, detailed, and publicly available information on the ownership and control of forest resources.	
		A2.2.5	Consider setting specific goals to address gender equity as far as rights of access and use are concerned.	
G2.3	**Ensure that traditional use rights are clear, equitable and respected.**	A2.3.1	Put in place measures that ensure re-cognized tenure, access and use rights of local communities and indigenous peoples over state-owned forests are respected.	Government, forest managers, civil society, private sector, research and education
		A2.3.2	Put in place supportive measures to ensure that smallholders and local and indigenous communities know their rights and responsibilities and have the capacities to obtain the benefits provided by access to and use of forest resources.	
		A2.3.3	Provide guidance to simplify the requirements for forest management plans and adapt them to the capacity and scale of management objectives of local forest owners and managers.	
G2.4	**Make sure that concession/logging rights are clear and transparent.**	A2.4.1	Consider extending tenure of Concession/logging rights to a duration of at least two rotation periods.	Government, forest managers
		A2.4.2	Develop and implement conflict Management systems to prevent the invasion of FMUs .	Government, forest managers, civil society, research/education

3.2 Extent and condition of forests

Guiding principle 3: Land-use planning and permanent forest estate

Managing tropical forests sustainably requires that land allocation to different uses and spatial planning within and outside forests ensures that the social, environmental and economic values of forests are maintained or enhanced.

Rationale

Sustainable forestry requires good planning that strategically begins with an integrated land-use plan. This plan serves as the backdrop for the allocation and wise use of the resources in a particular area of forest, and for the conservation of the area's ecological integrity (Canadian Council of Forest Ministers)[7]. Comprehensive land-use planning and land management is important for creating

[7] "An integrated land-use planning seeks to balance the economic, social and cultural opportunities in a specific area of forest with the need to maintain and enhance the health of the area's forest. It is a process whereby all interested parties,

functional landscapes where agriculture, sustainably managed forests, conservation areas and other land uses are integrated in a sustainable manner. To achieve this, integrated, cross-sectoral, landscape-scale planning and development approaches, which simultaneously focus on different economic activities and social and environmental values over broad areas, are needed (IUFRO/WFSE 2010). To sustain biological diversity and ecosystem services, as well as the permanence of carbon stocks, efforts must be made to conserve a large spectrum of forest types across the landscape through the application of sustainable management practices and protected areas. More attention must be directed to reduce landscape fragmentation and to restoration of landscape integrity through biological corridors and landscape connectivity, which facilitate species migration and the long-term viability of populations (IUFRO/WFSE 2010).

Land use planning. Planning thus tends to gravitate to the landscape level, an area large enough that will be able to be resilient and to keep its ecological integrity. Landscape management is an essential approach for the sustainable management of natural resources, one that requires coordinated inter-institutional action and the effective participation and involvement of diverse stakeholders. The failure to use this approach and the lack of land-use planning has contributed in many countries to processes of landscape degradation, unplanned deforestation and fragmentation. A new development that addresses such failures at the national and landscape levels consists in the preparation of national REDD+ Readiness Preparation Proposals (RPPs, see glossary) and the formulation and implementation of national REDD+ strategies. Such strategies will closely be linked with the establishment of a Permanent Forest Estate that guarantees carbon permanence and with periodic forest resources assessments at national and/or subnational levels.

Permanent Forest Estate (PFE). Classifying a PFE is a central requirement for SFM. ITTO defined the PFE as “land, whether public or private, secured by law and kept under permanent forest cover. This includes land for the production of timber and other forest products, for the protection of soil and water, and for the conservation of biological diversity, as well as land intended to fulfill a combination of these functions. A key policy feature of SFM is a commitment by government, endorsed by all stakeholders, to define, and protect a PFE based on secure, long-term land tenure for communities, concession holders and other forest users. Forest set aside for promoting productive and other functions need a balanced management combining productive, environmental and social aspects. The establishment and maintenance of a PFE must have political commitment at the highest levels. In most countries, such a commitment means protecting public forest lands from conversion to non-forest uses (Johnson and Cabarle 1993).

Continuous assessment of natural forest conditions. In order to fully understand the role of natural forests at landscape level and to meaningfully classify the PFE, there is a need to continuously monitor forest resources at a national and/or subnational or landscape scale. This include measurement of forest conditions including quality, growth and development through making repeated measurements of trees in permanently defined areas of forest or *permanent sample plots* (PSPs). Such assessment includes, *inter alia* (FAO 1998):

- Changes in the characteristics of forest stands over time;
- Variations in forest composition and productivity with site and silvicultural treatment;
- The relationships between tree variables, stand variables and increments used for yield forecasting and carbon assessment; and
- Long-term changes in the site and its continuous productive capacity.

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large and small, come together to make decisions about how the land and its resources should be used and managed, and to coordinate their activities in a sustainable fashion." (Canadian Council of Forest Ministers).

Voluntary guidelines for Guiding principle 3 - Land-use planning and permanent forest estate

Guidelines		Recommended Actions		Indicative stakeholder group
G3.1	**Implement a national and subnational land- use planning**	A3.1.1	Develop a land-use policy aimed at the conservation and sustainable use of natural resources in collaboration with all relevant stakeholders.	Government, private sector, civil society, research/education.
		A3.1.2	Make national forest policy as an integral part of a national land use policy taking into account the multiple-use nature of forests.	
G3.2	**Establish a Permanent Forest Estate by a law that defines its demarcation, utilization, and management strategies**	A3.2.1	Allocate as Permanent Forest Estate sufficient and suitable land, whether public or private, to be kept under permanent forest cover.	Government, private sector, civil society, research/education
		A3.2.2	Encourage the use of remote sensing, geographic information systems (GIS) and other up-to-date techniques for forest mapping and zoning to support decision-making.	
		A3.2.3	Based on initial plans of zoning the PFE at landscape level, consult with surrounding populations, taking into account their present and future needs for agricultural land and their customary use of the forest.	
		A3.2.4	Determine areas of the PFE to be maintained and managed primarily for the protection of soil and water and other purposes.	
		A3.2.5	Consider to keep any land for which the final use is uncertain as part of PFE until the need for clearing arises.	Government.
G3.3	**Carry out periodically national or subnational forest resource assessments to provide reliable data at the landscape level.**	A3.3.1	Assemble all relevant and reliable databases and update maps related to forest resources at landscape level and possibly present in web-based portals	Government, forest managers, civil society, research and education.
		A3.3.2	Design a system to assess and monitor the PFE based on permanent sample plots at national or subnational level and periodically monitor and report on the status of forest resources	
		A3.3.3	Where applicable, integrate carbon accounting in national forest resources assessment (e.g. through coordination with national RPP processes).	

3.3 Forest Ecosystem Health and Vitality

Guiding principle 4: Forest resilience and forest-based adaptation to climate change

Resilience is a key tenet of SFM in natural tropical forests and it is essential to maintain or enhance it in order to reduce the risks posed by climate change to their sustainability. Climate change is likely to affect tropical forests as well as people who depend on those forests. Predicted changes in climate will place pressure on the capacity of forests to maintain biodiversity, productivity and ecosystem services.

Rationale

All significant management interventions in natural tropical forests have impacts on forest resilience, and in particular on biodiversity, soil protection, water flows and the way forest react on changing environmental conditions, including those related to climate change and climate variability. Thus, due consideration to strategies and specific measures in forest management planning and implementation in respect to forest resilience are primordial for sustainable forest management. Forest management should be adaptive according to the specific circumstances where it is applied. This implies to maintain the functions of the ecosystems in the long term. Addressing forest resilience, including biodiversity, the protection of soils and water flows, and the effects of climate change contribute to the ecosystems' stability and durability that guarantees in the long term ~~for~~ the production of timber and other products.

Managing intact natural tropical forests. It is generally understood that forest resilience can best be accomplished by the establishment and management of a system of protected areas containing representative samples of all forest types linked as far as possible by biological corridors or 'stepping stones'. Well managed natural production forests can fulfill many of the objectives of protected areas and effectively fulfill the role of stepping stones. Management measures in production forests can make an important contribution to forest quality and thus address forest resilience. In well managed forests, biodiversity plays an important role in ecosystem resilience. A good understanding of forest successions and the gap dynamics of primary forests is essential to maintain or increase resilience of forests to adverse effects. Of particular interest are the habitat requirements of the different species of interest for production and conservation. Efforts to implement SFM need to consider numerous ecological interactions such as the pollination, seed dispersal and symbiotic relationships on which the productive forest depends.

Restoring degraded forest ecosystems. Reducing degradation of natural tropical forests implies reversing the trend of gradual loss of forest productivity, ecosystem functions and carbon stocks through ecological restoration activities. This becomes particularly important in the development of REDD+. The aim of restoring forest ecosystems is to regain the dynamic forest processes, species composition, structure, biodiversity and productivity that are normally associated with the natural forest type expected in the given site.

In many places, degradation is not caused by commercial logging but by extraction of various forest products, often for subsistence or local and national marketing (timber, fuelwood, charcoal, etc) or by patchy clearance and re-growth associated with shifting agriculture, by forest dwellers and indigenous communities. In such areas degradation very rarely leads to deforestation – but to a gradual loss of carbon stocks and loss of forest resilience. To deal effectively with many types of degradation, it is important to see them not as the beginning of a deforestation processes but as a form of poor forest management, which needs to be improved.

Addressing the effects of climate change on natural tropical forests. Forests are affected biophysically by climate change in several ways: plant physiology and metabolism; pathology; insect and herbivore animals; the incidence and severity of fire, floods and drought; ecosystem functioning; and spatial extent. Over time, climate-related change could have significant impacts on the availability and quality of forest goods and ecosystem services and on the people who depend on natural tropical forests for their livelihoods. An assessment of the impacts of climate change and climate variability on the physical characteristics of the forest and its productivity, ecological dynamics and ecosystem functions will help forest managers to respond to changing conditions. Forest managers should be aware of such impacts and take early measures to reduce the vulnerability of forests, to increase forest resilience and facilitate their adaptation to changing conditions. Also, the management of forests for the delivery of forest ecosystem services, such as the protection of soil and water resources, could become more important under climate change.

However, the implementation of adaptation measures may be costly. Forest managers should assess the costs of adaptation compared with the potential financial losses caused by climate change. Demonstrating the benefits of adaptation actions will help to leverage financial support for adaptation. Forest managers should modify forest management plans and practices to include adaptation measures, taking into account the biophysical, social and economic impacts of climate change, the costs and benefits of action, and the long-term costs of inaction.

Voluntary Guidelines for Guiding principle 4 - Forest resilience & forest-based adaptation to climate change

Guidelines		Recommended Actions		Indicative stakeholder group
G4.1	**Identify causes and put in place preventative and remedial actions to reduce the vulnerability of forests to biotic and abiotic factors.**	A4.1.1	Develop policies, programs and remedial actions including capacity building, technologies and resources to reduce the vulnerability of forests to abiotic and biotic effects.	Government, civil society, research/education.
		A4.1.2	Strengthen the capacity of forest Administrations and forest managers to address the new and emerging issues regarding forest resilience.	
		A4.1.3	Provide technical support to private and community forest owners to ensure that their activities contribute to increase the resilience of forests to negative abiotic and biotic effects	
G4.2	**Conserve and use biodiversity in ways that maintain forest resilience and enable adaptation to future change**	A4.2.1	Identify forests with high-conservation-value, legally classify them and manage them with emphasis on resilience	Government, civil society, research/education,
		A4.2.2	Improve and apply ecological knowledge to ensure that forest management maintains biodiver-sity and ensures forest functions such as pollination, seed dispersal and nutrient cycling.	
		A4.2.3	Identify and manage species of flora and fauna that are strongly interactive or play a key role in	Government, forest managers, civil society,

			the ecology of other species or have important influences on the overall resilience of a forest.	research/education.
G4.3	**Manage forests in ways that maintain their regenerative capacities and ecosystem resilience.**	A4.3.1	Manage natural forest eco-systems based on a landscape approach that takes into account protected areas and stepping stones with well-defined roles for production..	Government, civil society, forest managers, research/education.
		A4.3.2	Integrate measures to increase resilience and conserve biodiversity in harvesting and silvicultural practices in natural production forests.	
G4.4	**Restore degraded forest ecosystems to enhance native species composition, forest structure, biodiversity, productivity and ecosystem function.**	A4.4.1	Assess and classify, at landscape level (national, subnational levels) the various forms of forest uses that degrade existing natural forests.	Government, civil society, forest managers, research/education, others.
		A4.4.2	Restore, rehabilitate and manage degraded forests taking guidance from ITTO guidelines for the restoration, management and rehabilitation of degraded and secondary tropical forests.	
G4.5	**Assess the impacts and risks of climate change and climate variability on natural tropical forests.**	A4.5.1	Obtain information on recent trends and projected changes in climatic variables and impact assessments relevant to a given area.	
		A4.5.2	Assess at landscape level of the impacts of climate change and climate variability on the physical characteristics of the forests and their productivity, ecological dynamics and ecosystem functions.	Government, Civil society, Forest managers, Research/education
		A4.5.3	Monitor trends in the frequency and severity of climate change-related impacts on natural tropical forests.	
		A4.5.4	Monitor forest responses to climate change as far as ecosystem processes such as hydrology, nutrient cycles, and carbon balance are concerned.	
G4.6	**Assess social and economic effects of climate change as they relate to tropical forests.**	A4.6.1	Identify emerging and likely future socio-economic impacts and risks of climate change on forests.	Government, Civil society, Research/Education
		A4.6.2	Monitor changes in markets for forest products due to changes in demand for forest-based energy and for product substitution.	
		A4.6.3	Promote and support research	

			into the analysis of forest adaptation costs and benefits in different forest types and under various management options.	
G4.7	**Manage natural tropical forests for adaptation to climate change.**	A4.7.1	Identify the short-term and long-term risks, costs and benefits of adaptation measures.	Government, Forest managers, Research/Education
		A4.7.2	Modify forest management plans and practices to include relevant adaptation measures.	

Guiding principle 5: Management of threats to forest ecosystem integrity

It is essential to identify, prevent, monitor and manage threats to the forests protect forests by preventing the start of any destructive agents, including uncontrolled illegal activities in forests, insect or disease outbreak, invasive species and other stress factors.

Rationale

Sustainable forest management cannot be achieved in the absence of a firm commitment and action to effectively protect a forest management unit. Protection measures against unauthorized access or illegal activities, from conversion to other land uses, from fire and other potential threats are amongst the most critical to be implemented, irrespective of the objectives. Also, in particular in intensively managed logging concession, waste management is an important protection function. Effective planning, implementation and enforcement of protection measures and related security arrangements should actively seek collaboration and cooperation with local forest communities.

Fire prevention and control. A fire management plan for the FMU and adjacent lands should be formulated and implemented. Fire is a serious threat to future productivity and environmental quality of the forest. Increased fire risk in areas being harvested and even more so in areas which have been harvested, demands stringent safety measures.

Management of pest and diseases. There has been a significant increase in the incidence of pest and disease outbreaks in forests and woodlands in recent years. Climate change is likely to exacerbate these threats in the future. It is vital that all those involved in forest management take a proactive role in monitoring damage, keeping abreast of emerging threats and deciding when intervention is necessary. The management of pests and diseases should be an integral part of an FMU's forest management plan. In some cases, specific management practices can be selected to promote natural regeneration and minimize the impacts on the ecosystem (FAO 2011). The deliberate introduction in forestry operations of plants, animals, fungi and other microorganisms that might be invasive should be avoided and prompt action taken to eliminate established populations of invasive species.

Management of wastes and chemicals. All waste (organic and inorganic residues, e.g. fuel, oil, human excrements, etc.) derived from forest management activities should be adequately handled, stored and disposed of properly with due attention to the local legislation and according to practices and procedures that avoid or minimize the risk to affect human health and environment conservation.

Voluntary Guidelines for Guiding principle 5 – Management of threats to forest ecosystem integrity

Guidelines		Recommended Actions		Indicative stakeholder group
G5.1	**Protect the FMU from illegal and unsustainable activities.**	A5.1.1	Assure that FMU is protected from illegal activities, especially those that are incompatible with SFM.	Government, Forest managers
		A5.1.2	Demarcate and signal the FMU boundaries and identify areas of high risks of encroachment.	
		A5.1.3	Develop collaboration (e.g. alert systems) with local authorities communities and other stake-holders, in case of trans-gressions to the FMU and facilitate access by enforcement personnel.	Government, Forest managers, Civil society
		A5.1.4	Develop and enforce local rules with regards to subsistence hunting and actively inform forest workers about its observance.	Government, Forest managers
G5.2	**Formulate and implement fire management plans for the FMUs and adjacent lands.**	A5.2.1	Integrate fire management considerations into forest management planning.	Government, forest managers, civil society, research/education.
		A5.2.2	Prepare FMU fire management plan where appropriate, taking guidance from the ITTO guidelines on forest fires and integrate it into forest management planning.	Government, Forest managers.
		A5.2.3	Encourage the involvement and participation of local communities in the planning and/or implementation of fire management.	Government, Forest managers, Civil Society
		A5.2.4	Monitor the effects of both fires and control activities in order to achieve a balance between stopping the fire and protecting the resource.	Forest managers, Civil society
G5.3	**Integrate the management of pests and diseases into the FMU's forest management plan.**	A5.3.1	Integrate management of pests and diseases where appropriate, in the FMU forest management plan.	Government, forest managers, civil society, research/education
		A5.3.2	Monitor incidence of pest and diseases and undertake contingency measures for controlling serious outbreaks.	
		A5.3.3	Ensure that forestry-activities and the use of associated equipment and tools do not move pests or intensify their impacts.	Government, forest managers
		A5.3.4	Stay alert of the spread of	Government,

			invasive alien species by and take measures to eradicate invasive alien species that has become established and taken over native species.	forest managers, research/education
G5.4	**Ensure that all waste and pollution derived from, and chemicals used in, forest management activities is stored and disposed of properly.**	A5.4.1	Incorporate waste/pollution and chemical management in the forest management plan.	Government, forest managers, research
		A5.4.2	Formulate and enforce procedures and practices that minimize the quantity of waste and chemical, whenever appropriate, recycle the residues.	Government, forest managers, research
		A5.4.3	Provide adequate training for staff on procedures and practices defined in the waste/pollution and chemical management strategy.	Government, forest managers, education, civil society.
		A5.4.4	Organize awareness campaigns, e.g., using written communication and conferences.	Government, forest managers, civil society Forest managers
		A5.4.5	Use appropriate collectors to store dangerous inorganic waste and chemicals, such as oil residues, fuel, containers, filters.	

3.4 Maintaining the multiple functions of forests

Guiding principle 6: Multi-purpose forest management for goods and services

The role of natural tropical forests as providers of multiple goods and services should be safeguarded by the application of sound planning and management practices that maintain ecosystem functions and the potential of the forest to yield the full range of benefits to society.

Rationale

Natural tropical forests can be managed for multiple, complementary objectives: production of goods (timber, fiber, fuelwood, NWFP, carbon), protection of soil, water and air and other environmental services, conservation of biodiversity, provision of socio-cultural services, livelihoods support and poverty alleviation. Multiple-purpose forest management has been envisioned as a promising and balanced alternative to single timber-dominated strategies of natural tropical forest use. It can be found in existing livelihoods of forest dependent peoples, the operations of some forest industries and is even supported by some regional forest legislation. However, in practice, multiple-purpose management is not a dominant strategy and is often a marginal activity in forest sector. Incipient efforts are emerging ranging from managing small community forestry lots to national programs to develop comprehensive REDD+ strategies (Guariguata *et al.* 2008). Under the right conditions, multiple-purpose forest management could diversify forest use, broaden forest productivity and provide incentives to maintain forests. In addition, multi-purpose management could provide a venue for reducing social conflict and exclusion related to remaining forest resources.

Multi-purpose forest management combines four “protection-oriented purposes” with the productive functions of forests:

- The conservation of soil, water and carbon pools in forests that has a bearing on maintaining the productivity, health and condition of the forests themselves;
- The crucial role forest plays at landscape level in maintaining downstream benefits, e.g. water quality and flow and in reducing flooding and sedimentation;
- Conserving biodiversity, particularly rich in natural tropical forests, is among the top priorities for humankind because genetic diversity will be essential as a buffer against changing environmental conditions and as a pool of variation to be used in crop and forest tree improvement and breeding (Blaser and Gregersen 2013); and
- Ensuring the permanence of forest carbon stocks which will be a major future challenge for foresters.

The multi-purpose approach applies to the management of tropical primary as well as secondary and degraded forests. In tropical secondary forests, in particular, the multiple-purpose (edible fruits, firewood, wood for rural construction and handcrafts, medicinal compounds, etc.) of many species growing in those stands is one of the most important features to take into account for management purposes. Secondary tropical forests are also of great interest in carbon management due to their high rate of carbon sequestration. Conflicts over use can be minimized by clearly defining the main objective of management and then by legally protecting management systems whose economic and social value are the most appropriate given the circumstances for a given site. Timber might still be the most important use in many natural tropical forests. But there are also other examples, e.g. the case of Brazil nut (*Bertholletia excelsa*) trees in Western Amazon, where due to its social and economic importance, the tree is protected for supporting extractive communities to collect wild nuts. Other examples of this nature exist throughout the tropics. In many other cases the degree of conflict between concurrent uses may be culturally and geographically specific which complicates the implementation of multi-purpose forest management at wider spatial scales.

Biodiversity conservation at FMU level. Conserving biodiversity will help ensure the healthy functioning of their forests. In the long run, forests will produce more valuable products and will be more resistant to external changes, including climate change, if they retain as much of their natural biodiversity as possible. The *ITTO/IUCN Guidelines for the conservation and sustainable use of biodiversity in tropical timber production forests* (ITTO/IUCN 2009) have been specially designed to assist policymakers and forest managers by bringing together in one place the specific actions that are needed to improve biodiversity conservation in tropical production forests, they serve as a prime reference, in particular Principle 9: Biodiversity considerations at the forest management unit level (Guidelines 24 to 37). Monitoring of biodiversity should be in place to ensure that forest management does not impact negatively on biodiversity features identified as having special value. Low-cost monitoring programs for biodiversity in tropical production forests that serve the needs of forest managers should be developed and conducted in ways that facilitate learning and adaptive management and that make information on achievements and failures widely available (ITTO/IUCN 2009).

Managing forest carbon in natural tropical forests. Managing forests for one or several of the five REDD+ options (see chapter 1.2.3) can contribute to global climate change mitigation goals and can potentially yield economic benefits for a country’s forest sector in general and for FMUs in particular. This requires that a country has the appropriate institutional and incentive structures for REDD+ and that rules and regulations for REDD+ governance and management are operationalized. Many ITTO member countries are currently developing their national REDD+ strategies (generally through the so-called Readiness Preparation Proposals, RPP) following international procedures, including *inter alia* stakeholder consultations, forest carbon assessments and determining the safeguard requirements to

avoid negative social and environmental impacts. The implementation of an effective forest carbon measurement, reporting and verification system is essential because the REDD+ incentive structure is based on the amount of carbon sequestered and the volume of greenhouse-gas emissions reduced. Defining the potentials and constraints of managing forest carbon stocks in natural tropical forests is a major new challenge of multi-purpose forest management at national and FMU levels and needs careful attention in planning and implementation.

Voluntary Guidelines for Guiding principle 6 – Multi-purpose forest management for goods and services

Guidelines		Recommended Actions		Indicative stakeholder group
G6.1	**Enable multi-purpose forest management.**	A6.1.1	Review tenure policies and institutions to ensure they are effective in their support for multi-purpose forest management.	Government, forest managers, civil society, private sector, research/education.
		A6.1.2	Develop a comprehensive knowledge of forest resources in order to boost the values of goods and services from the forest and improve usufruct conditions.	
		A6.1.3	Complement national, subnational and FMU level forest resource assessments and inventories (see G3.3), with qualitative assessments on timber and NTFPs, ecosystem services and social aspects using the C&I as a basis.	
		A6.1.4	Integrate into the national multi-resource inventory the specific assessment methods that are proposed at international or national level for forest carbon assessment, as appropriate.	Government, forest managers, research/education.
G6.2	**Ensure soil and water management for maintaining the productivity and health of forests and their hydrological regulation function.**	A6.2.1	Implement conservation of soil and water at FMU or wider water catchment levels including zoning requirements for critical watersheds, soil erosion areas and other special lands.	Government, research/education civil society
		A6.2.2	Ensure that adequate procedures to protect soil productivity and water retention capacity within production forests have been developed at national level and are applicable at FMUs level.	Government, Forest managers, research/education
		A6.2.3	Identify at FMU level areas prone to accelerated erosion: soils into which water infiltrates with difficulty; areas which contribute to the surface flow into streams; the margins of stream beds, etc.	Government, forest managers, research/education.
		A6.2.4	Minimize mechanical disturbance to forest soil through reduced impact harvesting methods.	
		A6.2.5	Integrate biodiversity conservation	

			measures and safeguards in the preparation and implementation of forest management plans at FMU level.	
G6.3	**Give emphasis to biodiversity at all stages of managing natural tropical production forests.**	A6.3.1	Focus conservation efforts on those species or habitats that are of high conservation value. Pay particular attention to the management of species or habitats that are recognized as rare, threatened or endangered.	Government, forest managers, civil society, private sector, research/education
		A6.3.2	Set aside suitable portion of the FMU for conservation purposes. Optimally, it should cover representative areas of all the ecosystem types present and include features of special concern for biodiversity maintenance such as water courses, rock outcrops, salt licks.	
		A6.3.3	Take into consideration the local occurrence of species or habitats of special conservation concern in the preparation of harvesting plans.	
		A6.3.4	Improve silvicultural operations to conserve biodiversity, including retaining hollow trees when harvesting, avoid the use of arboricides and other means.	
		A6.3.5	Implement measures to retain viable populations of seed trees and maintain the genetic diversity of commercially important species, and ensure that the silvicultural requirements of target tree species are known and applied.	
		A6.3.6	Encourage collaboration between conservation NGOs, research and education institutions and timber companies and to adapt manage-ment practices to suit local conditions and to conduct necessary training.	
		A6.3.7	Take measures to control the harvesting and transport of bushmeat and NTFPs.	
G6.4	**Provide guidance and take measures to avoid unsustainable levels of NTFPs and hunting.**	A6.4.1	Minimize forest fragmentation to maintain greater species diversity and reduce the risk of loss of NTFP species.	Government, Forest managers, civil society private sector
		A6.4.2	Accommodate in the method and scale of timber harvesting any existing NTFP harvesting and trade patterns of local communities, as appropriate.	
		A6.4.3	Consider in forest management plans potential human-wildlife conflicts that could arise from	

			logging activities and take appropriate measures to prevent their occurrence.	
		A6.4.4	Take measures that benefit wildlife species such as leaving dead snags and large fruiting trees, having wide riparian corridors for animal access to water, providing migration pathways for the larger wide-ranging predators.	Government, Forest managers, private sector, civil society.
		A6.4.5	When planning the road network reflect on minimizing direct negative impacts on wildlife and limiting access to potential commercial hunting and fishing activities.	Forest managers, private sector, Research/education
		A6.4.6	Ensure that forest management plans provide for biodiversity monitoring (based on widely recognized measures) and that management will be responsive to the results of that monitoring.	Forest managers, private sector, civil society
G6.5	**Monitor biodiversity in the FMU to minimize negative impacts.**	A6.5.1	Consider simple, widely recognized and widely applicable measures for protection, control and impact reduction that can be taken with respect to each human impact.	Government, forest managers, research/education.
		A6.5.2	Involve indigenous and local communities in setting up and implementing a system for biodiversity monitoring where appropriate.	Government, forest managers, private sector, research/education.
		A6.5.3	Forge partnerships for long-term biodiversity monitoring between forest operators and universities and specialized institutions.	Forest managers, civil society, private sector, research/education
G6.6	**Consider to include carbon permanence as a management option in natural tropical forest management, and monitor forest carbon and safeguards as appropriate.**	A6.6.1	Consult with local interested parties on the inclusion of REDD+ in the management of the FMU and clarify rights to carbon in the FMU.	Government, forest managers, private sector, civil society, research/education
		A6.6.2	Identify options for improved carbon management and evaluate the risks, costs and benefits of carbon management options and their implications for other forest management objectives.	
		A6.6.3	Integrate carbon management into the sustainable forest management plan, as appropriate.	
		A6.6.4	Assess and identify means for addressing permanence, addition-ality and requirements for the safeguard of sequestered carbon at the FMU level.	
		A6.6.5	Calculate the REL and/or RL for the FMU using existing approved Methodologies and harmonize with	

			national/jurisdictional REL/RL level, as appropriate	
		A6.6.6	Monitor and assess the carbon stocks in the FMU on a regular basis as per national procedure or voluntary carbon markets.	Government, forest managers, research/Education
		A6.6.7	Update forest inventory procedures to meet REDD+ requirements related to forest carbon measurement, reporting and verification.	Government, forest managers, private sector, civil society, research/education
		A6.6.8	Develop a reporting system to meet the national requirements for reporting on REDD+, including on REDD+ actions taken, forest carbon monitoring, and social and environmental safeguards.	
		A6.6.9	Identify and implement best-practice forest management for climate change mitigation in collaboration with research institutions	

3.5 Implementing sustainable forest management practices

Guiding principle 7: Forest management planning at national/regional level

It is essential to adopt at national and/or landscape level a national forest planning framework defining objectives and strategies for sustainable use of forest resources and ensuring the maintenance and/or improvement of multiple use and functions of forests.

Rationale

Land use planning at landscape level should balance the developmental needs of a country as a whole, or for specific states or provinces within a country, with those of natural resources conservation, including SFM. Landscape management is an essential approach for the sustainable management of natural resources, one that requires coordinated inter-institutional action and the effective participation and involvement of diverse stakeholders. The failure to use this approach and the lack of land-use planning has contributed in many countries to processes of landscape degradation and fragmentation. As stated in Principle 3, a fundamental component of national land use planning is the identification of a Permanent Forest Estate (PFE).

Planning is an integral component of managing PFEs. It is about determining and expressing the goals and objectives which government, rural communities or private sector have, and for deciding the targets and steps that should be taken in order to achieve those objectives. Decisions in forest management have long-term effects, requiring a good planning of actions both at the FMU as well as its surrounding environment. Under real-world conditions, management will always involve dealing with conflicting priorities, local insights or innovations (Meijaard et al. 2005).

Adaptative management as a key principle of planning. A key aspect of planning involves the concept and application of adaptive management, or learning by doing (Holling 1977). Adaptive management involves the use of research results to support best practices, planning and monitoring against expected outcomes and then adapting the practices to improve outcomes based on the original expectations (Blaser and Thompson 2010). Management should be responsive and adaptable

to changing knowledge and needs. Land use planning - both at the micro and macro scale - should be made using a participatory and equitable approach involving all relevant sectors in order to prevent unplanned and uncoordinated changes in land use driven by factors outside of the forest sector. Thus, an overall principle in forest management planning for all kind of FMUs (small community forest lots or large concessions is the application of adaptive management should be applied to improve the effectiveness of management interventions in a flexible and responsive way to deal with uncertainty and change (IUFRO/WFSE 2010). Even the most carefully planned arrangements should be modified as new information becomes available and good management requires early recognition of the need for modification. Adequate and timely information has thus a significant impact on decision-making.

Research and Education. Effective forest management planning and monitoring requires multiple forms of knowledge. In this regard, it is important to consider and link both the scientific as well as the traditional knowledge for practical forest management implementation. Existing local knowledge, experiences and capacities (for instance, to stratify and classify local forest types, on the uses of tree species or in relation to tending practices) can enrich and improve forest management, broadening the benefits obtained (CIFOR 2007).

The complexity of tropical forest ecosystems and the ever increasing demands or expectations on SFM pose serious challenges for forest managers in terms of sound information needed for decision-making on the managerial, economic, environmental and social aspects. In that regard, research and education (both, formal education and on-the-job trainings) play a key role by continuously informing managers on how to improve planning and actions in the forest to maintain a flow of goods and services (Blaser and Thompson 2010).

Communication, transparency and public awareness. One of the core principles of SFM is that it reflects a diverse range of societal values in reference to forest conservation and use. For this reason, the active and informed participation of communities and stakeholders affected by forest management decisions is critical to the credibility and sustainability of management processes. Public awareness raising and communication activities play a critical role in informing and educating the public, thereby allowing them to more effectively participate in SFM decision-making (CBD 2009). Successful awareness-raising activities must conform to the principles of professional communication, such as honesty and reliability, openness and transparency, fairness and continuity, but also the capacity of listening to the public and taking its concerns seriously. Professional communication and public relations offer a whole array of instruments and methods that can equally be used in awareness raising. The choice of the appropriate instruments depends very much on the context, objectives and characteristics of the awareness-raising process (FAO/ECE/ILO 2003).

Voluntary Guidelines for Guiding principle 7 - Forest management planning at national/regional level

Guidelines		Recommended Actions		Indicative stakeholder group
G7.1	**Develop and implement a national forest management planning framework**	A7.1.1	Develop a strategic national /regional forest planning document (e.g. as part of the NFP), focusing on sustainable forest management.	Government, civil society, forest managers, private sector, research/education.
		A7.1.2	Carry out forest management planning and map geographical areas covered by forests and other land uses within the PFE.	
		A7.1.3	Establish FMUs of appropriate sizes based on ecological, socio economic, forestry and/or land administrative considerations, taking into account the PFE	
		A7.1.4	Clarify the ownership and other tenure rights (e.g. customary or traditional) over the PFE and demarcate clearly PFE and FMUs.	Government, forest manager, civil society, private sector
		A7.1.5	Incorporate adaptation and mitigation measures into national forest management planning frameworks.	Government, Forest Managers, Civil Society Research/education
G7.2	**Support research and education in natural tropical forest manage-ment**	A7.2.1	Integrate applied research in the forest management plan and seek collaboration with research and educational institutions to find solutions for the technical or operational problems in the field.	Forest manager, private sector, research/education
		A7.2.2	Test technological innovations and best practices derived from basic and applied forestry research in the FMU.	
		A7.2.3	Support forestry education in natural tropical forest management, both formal training and on-the-job training with due consideration of gender issues..	
G7.3	**Monitor progress and keep the public informed about the state of SFM through clear and open communication and the provision of regular information.**	A7.3.1	Build trust and understanding of different stakeholders through communication, education and public awareness and prepare periodically updates on forest management planning and the status of the PFE	Government, Forest managers, Private sector, civil society, research/education.
		A7.3.2	Use the ITTO Criteria and Indicators for Sustainable Forest Management to assess progress towards SFM based on the 7 criteria and report on them.	
		A7.3.3	Internalize at the proper decision-making levels the results of monitoring and new scientific findings or technical data, so that these are adequately taken into account to improve forest	

			management.	
		A7.3.4	Engage end users in the design and implementation of the monitoring system to increase their confidence in its utility.	Government, civil society, forest manager, private sector, research/education, others.

Guiding principle 8: Silvicultural management planning at FMU level

In timber production forests, it is essential to have for the FMU an approved silvicultural management plan with clearly stated management objectives and measures for achieving them; the plan should be adaptive and periodically revised in the light of accumulated experience, new information and changing circumstances.

Rationale

The present principle is largely focused on silvicultural management planning of larger FMUs that have as a main management objective the sustainable production of timber. Silvicultural planning at the FMU level involves observance of a number of factors related to multi-purpose forest management objectives, including the biophysical setting, the legal and institutional framework, economic as well as social and cultural aspects. The production of timber and other forest products requires full compatibility with the provision of environmental services (Principle 6).

Multi-functional zoning (MFZ) and multi-resource inventory (MRI). Multi-functional zoning is the first step of forest management planning. It identifies the areas where timber and NTFP can be sustainably produced and areas for other functions such as water catchment, social use, biodiversity conservation, flood control, cultural sites, rare ecosystems, etc.). After the forest functions are identified, they are grouped and mapped according to their compatibility with timber production: functions that preclude logging and functions that are compatible with low impact logging. This process is called forest zoning. MRI refers to "data collection efforts designed specifically to meet all or parts of the information requirements for two or more functions, e.g. forest products, wildlife, carbon etc.

Annual allowable cut (AAC). A prerequisite for SFM is that removal of forest products does not exceed levels of re-growth. In commercial forests where the major product is timber, this means calculating and implementing sustained yields for timber harvests. This requires information which shows stocking levels, and replacement rates (for example, inventory data and growth and yield data) and which can be used as a basis for calculating sustainable harvest levels. In areas where NTFP are harvested, similar inventory data and calculations will be needed, to ensure that harvesting levels remain within the capacity of the forest for replacement. AAC, a commonly used calculation of the rate of harvest, particularly for timber harvests in natural forest, is defined as the volume of timber which may be cut in one year in a given area. Its calculation is based on the volume of timber in the area which can be harvested, whilst leaving enough stems to provide the next crop. It depends on the standing stock, the growth rate and the size of the forest operation. As a practical measure of the sustained yield for a period, the AAC can be used to monitor forest production and set limits for forest use. The calculation of a sustainable ‘harvest’ for many NTFPs remains problematic, as very little information is currently available on how to estimate the maximum annual harvesting level from the yield for particular non-timber forest plant resources.

Yield regulation. Yield regulation (or yield allocation) is the practice of calculating and controlling the quantities of forest products removed from the forest each year to ensure that the rate of removal does not exceed the rate of replacement (Higman et al. 1999). The knowledge of forest growth provides a confident basis for the measurement of increment which can be used to derive yields of wood or non-wood forest production and construct *yield tables* and *growth models* (FAO 1998). Preliminary planning is paramount to facilitate harvest operations also in order to make operations safer and more efficient. Being an essential component of RIL, harvest planning involves annual harvest estimates based on stand potential in designated harvest areas.

Forest Management Plans. At FMU level, management plans are of three types: Forest Management Plan, Working Plan, and Annual Operations Plan. The three types are an integral part of the forest management planning process.

***Silvicultural system*.** Silviculture is essentially about decision-making on how to treat or manipulate forest stands in order to achieve stand management objectives (Kleine 1997). Silviculture includes all operations that to manipulate forest stands, including harvesting operations. The choice of a silvicultural system is determined by the ecological characteristics of a forest for which sustainable management is being planned (e.g. forest type, site conditions, species composition, regeneration status of desirable species etc.) and by the management goal and objectives for a specific forest management unit.

In forest managed for timber production, silvicultural interventions are generally necessary to overcome the relative depletion of commercial tree species, to compensate for the slow growth rate, and to ensure a future commercial timber value of the forest. Options that can be applied, depending on the condition of the forest stand and the objectives (what major products are expected), include improvement treatments, treatments to stimulate natural regeneration, enrichment planting, and direct planting (Sabogal and Nasi 2005). To guide decisions on silvicultural intervention a simple assessment method called *diagnostic sampling* can be used to estimate the potential productivity of a forest stand and decide whether treatment is necessary or not.

Model Code of Forest Harvesting Practice. Efficiency and sustainability of forest management depend to a large extent on the quality of harvesting operations. Inadequately executed harvesting operations can have far-reaching negative impacts on the environment (such as erosion, pollution, habitat disruption and reduction of biological diversity), may jeopardize the implementation of the silvicultural concept, and increase health risks for field personnel. FAO (1996) provides recommendations for developing strategic and tactical harvest plans, as well as guiding principles and recommended practices for implementing harvesting operations, including detailed explanations on forest road engineering, cutting, extraction, landing and transport operations, harvesting assessment, and the forest harvesting workforce.

Reduced Impact Logging (RIL). Improved logging procedures and techniques are collectively referred as *Reduced Impact Logging* (RIL). The application of RIL pursues two goals: to harvest marketable trees as economically and safely as possible, and to achieve desirable characteristics of the residual forest as they derive from ecological and, to a certain extent, social requirements (TFF 2007). RIL can be defined as timber harvest technologies and practices with the following main objectives (TFF 2007):

- minimize impact on the environment (including wildlife) and related social aspects;
- minimize damage to potential future crop trees (including regeneration);
- provide safe working conditions, and
- improve timber utilization and recovery of the forest.

RIL comprises the entire spectrum of harvesting operations from pre-harvest inventory, selection of merchantable trees and design of infrastructure to felling, extraction and hauling of logs, and finally post-harvest operations such as deactivation of harvested areas and harvesting assessments (see details in FAO 1996 and Applegate et al. 2004).

Monitoring the implementation of activities set out in an approved forest management plan is fundamental to SFM and forms the basis for transparent accountability of operational activities. Monitoring at the FMU should be addressed at two levels: operational and strategic. Operational monitoring provides information on whether appropriate procedures are being followed and management objectives are being met. Strategic monitoring provides data about the long-term effects of the forestry operation, so that potential problems can be rapidly identified and resolved (Higman et al. 1999).

Post-harvest assessment*.* should be undertaken as required, such as the deactivation of harvested areas, erosion mitigation, and the rehabilitation of high-impact areas. Rehabilitation of harvested areas can serve as measures aiming to reduce erosion and sedimentation, to maintain/increase vegetation diversity for wildlife conservation purposes, and to safeguard against unauthorized activities. The quality of harvesting operations should be assessed and the need for corrective actions or measures determined. A harvesting assessment provides information about the quality of operations, including the volumes cut and the condition of a forest following harvesting.

Voluntary Guidelinesuidance for Guiding principle 8 – Silvicultural Management Planning at FMU level

Guidelines		Recommended Actions		Indicative stakeholder group
G8.1	**Conduct preliminary studies and develop a multi-resource inventory plan**	A8.1.1	Carry out preliminary studies in the FMU (socio-economic, environmental, biodiversity) for the elaboration of the management plan and establish a GIS data bank that can be used to prepare forest zoning maps.	Government, Forest managers, private sector.
		A8.1.2	Based on air photographs or satellite imagery, identify and map different vegetation types of plant formations covering the FMU.	
		A8.1.3	Conduct a multi-purpose forest inventory and collect statistical data on timber and NTFPs, natural regeneration, fauna, flora, soil, hydrology, human activities, etc.	
		A8.1.4	Integrate forest resource inventory and forest zoning by forest functions, taking into account customary rights where applicable.	
		A8.1.5	Create wildlife GIS overlays, based on priorit-ies set for wildlife conservation and integrate wildlife conservation areas in the FMU.	
		A8.1.6	Carry out an analysis of management scenarios in accordance with the national legislation, policies and strategies based on inventory data.	
		A8.1.7	Develop a clear understanding of values and goals and establish clear long term and medium term management objectives taking into account the trade-offs needed.	
G8.2	**Define management objectives for**	A8.2.1	Define preliminary forest management objectives and the means of achieving them. Adjust them as new information becomes	Government, Forest manager,

	individual resources (timber,NTFP, carbon, other services)		available through the planning process.	private sector
		A8.2.2	Involve as far as possible all stakeholders through a participatory process in the definition of management objectives	
G8.3	**Use a reliable method for regulating and controlling yield**	A8.3.1	Carry out sustainable yield analysis, with spatial allocation of yield based on the variation of the forest mosaic and taking into account multiple use constraints, buffer zones, species and minimum cutting diameter limits.	Forest manager, private sector
		A8.3.2	Determine the AAC based on the minimum cutting diameter for each species or species group.	Forest manager, private sector
		A8.3.3	Divide the FMU into blocks or compartments and define annual cutting areas and volumes	Forest manager, private sector
		A8.3.4	Close-off the block or compartment after harvesting once the AAC has been achieved until the next felling cycle.	Forest manager, private sector
		A8.3.5	Maintain records of production levels of wood and non-wood forest products for each block or compartment harvested.	Forest manager, private sector
G8.4	**Plan harvest to enable good technical control, minimize costs, and reduce environmental impacts**.	A8.4.1	Conduct a pre-harvest inventory as basis for RIL and other planning processes.	Government, Forest managers, private sector
		A8.4.2	Formulate and apply RIL guidelines.	
		A8.4.3	Develop and implement documented procedures to ensure that harvesting operations are carried out to the highest standards	
		A8.4.4	Make and implement arrangements for effective training of all personnel involved in harvesting operations	
		A8.4.5	Locate and demarcate non-harvest areas that have to be excluded and protected from harvesting in order to reduce negative impact on local populations, resources and the ecosystem.	
		A8.4.6	Properly design and construct forest roads and layout skid trails according to environmentally sound practices	
		A8.4.7	Design and implement forest harvesting operations in ways that accommodate and enhance the multi-resource character of the forest.	
G8.5	**Put the FMU under a forest management plan and a silvicultural system**	A8.5.1	Write, implement and keep up-to-date a forest management plan appropriate to the scale and intensity of the operations. Keep it adaptive in respect to silvicultural planning.	Government, Forest managers, private sector
		A8.5.2	Acquire a good understanding of the ecology of the forest by using diagnostic sampling as a tool for determining stocking, tree species' behavior and regeneration targets.	
		A8.5.3	Consider the likely impact that the chosen silvicultural system or treatment régime might have on the sustainable production of NTFPs.	
		A8.5.4	Document and justify the silvicultural system in the forest management plan to ensure that all levels of management understand what they are doing and why.	
		A8.5.5	Consider how the implementation of a	

			silvicultural system might have an effect on: growth rates of harvestable species, seed production, regeneration and on the various forest services like watershed protection, biodiversity and forest carbon.	
		A8.5.6	Plan silvicultural interventions in combination with the main harvesting operation as harvesting should be the first silvicultural treatment.	
		A8.5.7	Use the first silvicultural interventions within one or two years after harvesting, to target the advanced regeneration of current and potential commercial or useful tree species..	
		A8.5.8	In intensive silvicultural systems, where biodiversity is reduced, protection of exclusion areas for conservation of biodiversity should be considered.	
		A8.5.9	Use indigenous species with proven silvicultural value for enrichment planting.	
G8.6	**Incorporate wildlife and biodiversity concerns into forest management plans.**	A8.6.1	Integrate wildlife management in the FMU management plan	Government, forest managers, private sector, research and education
		A8.6.2	Carry out an initial survey of forest animal resources where no information on those resources exists.	
		A8.6.3	Include wildlife in routine forest inventories of the forest under management information to help limit the negative impacts of logging activities on wildlife	
G8.7	**Enhance the potential for generating income from ecosystem services provided by an FMU.**	A8.7.1	Identify and describe the ecosystem service(s) of interest that could be part of the manage-ment objectives for the FMU, based on forest zoning, the resource assessments, and consultations with the local population and relevant stakeholders.	Government, forest managers, private sector
		A8.7.2	Analyze the economic opportunities for providing environmental services at the FMU, and include them in the FMP if suitable.	
		A8.7.3	Whenever appropriate, provide details in the FMP on activities to maintain and/or restore the environmental services of interest, including forest carbon, and make specifica-tions for compliance, monitoring and evaluation.	
		A8.7.3	Use tools prepared under the CBD (2008) and national case studies to provide support to valuing forest ES.	
G8.8	**Prepare detailed working plans for short and mid-term planning, harvesting and silvicultural prescriptions.**	A8.8.1	Write a working plan to address activities during specific periods of 5 years in greater detail than in the management plan, including the specification of silvicultural system to be applied, the road network and other infrastructures, the extraction methods and equipment, fire control, hunting, monitoring and control measures, description of data management and reporting.	Government, Forest managers, private sector
		A8.8.2	Prepare each year an annual operational plans (AOP) scheduling and specifying all harvesting and silvicultural activities and resources required.	

		A8.8.3	Conduct a pre-harvesting inventory in areas about to be harvested and develop and implement documented procedures to ensure that harvesting operations are carried out to the highest standards	
		A8.8.4	Include in the Working Plan Guidance for post-harvest assessment and measures, including inter alia inspection and evaluation a rehabilitation work as required.	
		A8.8.5	Include in the AOP the annually conducted silvicultural interventions and carry out silvicultural planning and treatment based on post- harvest assessment data.	
G8.9	**Monitor the management implement-tation and apply adaptive management**	A8.9.1	Monitor all operations being carried out under the FMU management plan.	Government, forest managers private sector civil society
		A8.9.2	Internalize at the proper decision-making levels the results of monitoring and new scientific findings, and take them into account to improve forest management.	
		A8.9.3	Prepare and maintain permanent records of forest operations.	
		A8.9.4	Report at least monthly on log harvesting (close control of output, location of logging and trees being cut).	
		A8.9.5	Have a mechanism in place for the periodic collection and use of information in the amount, type and quality needed for the forest management decision making process.	
		A8.9.6	Recognize the knowledge and skills of exper-ienced local people and link traditional forest-related knowledge and practices in forest management planning and implementation.	
		A8.9.7	Support applied research to guide and inform adaptive management.	

3.6 Social, cultural and economic dimensions

Guiding principle 9: Social values and community involvement in natural tropical forest management

Policies on forest management should recognize and aim to meet the social needs from forests. Decisions about SFM should be participatory and inclusive and the costs and benefits of forest management should be shared equitably among stakeholders. Community involvement is essential for SFM to succeed. It is about equal footing, empowerment and capacity building.

Rationale

Natural tropical production forests need to be managed for multi-purpose objectives as described under Principle 6. Social values, such as supporting local livelihoods, are essential ingredients of multi-purpose forest management.

Community forest management (CFM) – embracing various degrees of community involvement, including arrangements such as participatory forest management, joint forest management,

collaborative or co- management and community-based forest management – can significantly contribute to improve the livelihoods of rural people, maintain and increase forest carbon stocks, while other environmental and social services. CFM can also be an important vehicle providing employment and income, strengthening community rights on land and resource use, as well as organizational capacities for achieving sustainable development. Community forest management is defined here according to the UNFF (2011) as "the management of forest lands and forest resources by or with local people, whether for commercial or non-commercial purposes". Local people encompass a diversity of actors including native groups, other traditional communities, settlers and migrants. The associated concept of smallholder forest management is also considered, though in this case land and resource use rights are not collective and most management activities are not necessarily shared among.

***Active and informed participation of communities and stakeholders*.** An appropriate understanding of SFM encompasses a wide range of social, economic and environmental processes and interrelationships, including gender aspects that affect decision making. Decision-making processes should embrace the different phases of the forest management cycle (from strategic and operational planning to implementation to monitoring and evaluation). Participatory approaches that link forest stakeholders, empower local communities and strengthen adaptive capacities of communities as well as of local governments are of particular importance. The active and informed participation of communities and stakeholders in forest management decisions is critical to the credibility and sustainability of management processes. Public awareness raising and communication activities play an important role in informing and educating the public, thereby allowing them to more effectively participate in SFM decision-making. An informed, free, and independent development of opinions among indigenous peoples in particular is one of the essential elements for successfully managing natural tropical forests.

The practice of free, prior, and informed consent (FPIC). This consists of giving local people a formal role —and some form of veto power—in the consultations and ultimate decisions about local development projects. It is intended to secure the rights of indigenous peoples and local communities: their rights to self-determination, to control access to their land and natural resources, and to share in the benefits when these are utilized by others. FPIC is a tool for greater equity and a natural pathway to a co-management role for local communities in large development projects.

Rights and responsibilities of local communities. It is important that the rights and responsibilities of those concerned about and making use of the forest be adequately considered in forest management. This approach requires taking into account the rights attained by practice as well as rights attributed by formal laws with regards to use and benefit from the forest. The active participation from and support to local stakeholders in natural tropical forest management provides useful knowledge about local forest use and management strategies. It contributes to efforts to control access to and regulate the use of forest resources and a means for conflict resolution and empowerment.

Voluntary Guidelines for Guiding principle 9 – Social values and community involvement in natural tropical forest management

Guidelines		Recommended Actions		Indicative stakeholder group
G9.1	**Address the local livelihood needs of people, including indigenous peoples and**	A9.1.1	Identify livelihood needs of people, including indigenous peoples and other vulnerable forest-dependent peoples and communities and incorporate them in the national and sub-national forest policies and programs related to sustainable forest management.	Government, forest managers, civil society, research/education
		A9.1.2	Provide guidance and tools for use of	

	other vulnerable forest-dependent peoples and communities.		participatory approaches and tools to facilitate the involvement of local communities in sustainable forest management.	
		A9.1.3	Ensure that there is a clear recognition and respect for the rights of indigenous peoples who live in or have a traditional dependence on tropical forests.	
G9.2	**Assure effective participation of relevant stakeholders in planning and implementation of SFM**	A9.2.1	Put in place a transparent and accountable communication framework and effective conflict-resolution mechanisms.	Government, forest managers, private sector, civil society, research/education.
		A9.2.2	Establish the framework for participation processes and design multi-stakeholder dialogues for the management of natural forests.	
		A9.2.3	Promote gender equity and provide guidance and tools and take steps to enable local and indigenous women participate in managing natural tropical forests.	
		A9.2.4	Develop forest management plans that link traditional forest-related knowledge and practices; recognize and value the knowledge and skills of experienced local people about forest resources.	
G9.3	**Recognize cultural and spiritual values and respect archaeological, cultural and spiritual sites identified in the PFE.**	A9.3.1	Provide in the procedures for forest management planning, the mechanisms for consultation with local people to identify archaeological, cultural and spiritual sites in the PFE.	Government, Forest manager, private sector, Civil society
		A9.3.2	Provide due respect to local decisions and practices on the protection and conservation of cultural and spiritual sites.	
G9.4	**Consultation with local communities on the management of natural forests (PFE, FMU).**	A9.4.1	Free, prior and informed consent in forest management decisions should be obtained in an appropriate, consultative manner.	Government, forest managers, private sector, civil society
		A9.4.2	Include in the consultation process participatory methodologies to ensure participation and voice of marginalized social groups within affected communities.	
		A9.4.3	Inform local communities of their responsibilities in natural forest management, which in turn should be commensurate with their rights to use and benefit from the forest.	
		A9.4.4	Promote participation of communities in all relevant aspects of implementing SFM in the natural tropical forests.	
		A9.4.5	Whenever possible, involve neighbor communities in management decisions that may affect or benefit them.	
		A9.4.6	Promote collaboration amongst people and institutions involved in forest management, including wood production, integrating professional skills and traditional knowledge and resources in order to more effectively support the needs of communities and to minimize conflicts.	
G9.5	**Provide opportunities to local communities to actively**	A9.5.1	In forest management planning, take particular attention to the community needs, the potential of the forest resources, the organizational and technical capacities and the availability of	Government, civil society, forest managers.

	and sustainably manage forests to increase income and improve living conditions.		workforce in the community	
		A9.5.2	Develop and/or strengthen the community's organizational capacity and capability for CFM.	
		A9.5.3	Provide guidance to simplify the requirements for forest management plans and adapt them to the capacity and scale of management objectives of local forest managers.	
		A9.5.4	Clearly define roles and responsibilities of community members in the forest manage-ment process, including processing and marketing of any products and/or services derived from the FMU.	
		A9.5.5	Encourage diversified and value-added forest production and improve profitability and competitiveness through e.g. gaining market access for lesser known species, non-wood products, and to use wood residues more efficiently.	
		A9.5.6	Support communities so that they can qualify and measure the products and/or services in the forest management area, as well as to monitor and assess the impacts of the management interventions.	
		A9.5.7	Strengthen communities bargaining position with outside actors including on timber price information, connections to different timber buyers, written contracts.	
		A9.5.8	Provide means to overcome common challenges related to access to capital and technology, as well commercial opportunities and favorable integration of small and medium forest enterprises into supply and value chains to generate income.	
G9.6	**Strive to ensure that benefits from community forest manage-ment are shared among stake-holders according to their rights, roles and responsibilities.**	A9.6.1	Prepare the community from the beginning to manage the benefits from their forests and seek assistance from other actors, including civil society, private sector, and forest administration	Government, civil society, private sector
		A9.6.2	In assessing the costs and benefits of community forestry, take into account who bears the costs and who receives the benefits.	
		A9.6.3	Identify, valuate and analyze costs and benefits to help community decision makers to define options for distributing costs and benefits on an equitable, efficient and sustainable basis.	
		A9.6.4	Train local decision makers to develop transparent and accountable regulations and to develop appropriate legal and procedural support systems.	

Guiding principle 10: Productive and safe working conditions in forestry

The provision of safe and adequate working conditions and capacity building are essential elements for SFM.

Rationale

Human beings are the most precious asset in any forest management operation and as such every effort should be made to ensure adequate working conditions and capacity building. Forestry in general and logging in particular continue to be among the most dangerous occupations. Accidents are normally caused by poor organization and supervision, inadequate tools and equipment, poor planning, and lack of skills and competence among workers, supervisors and managers (ILO 2011). In this regard, policies should be developed to: i) eliminate risks, ii) control risks at the source, iii) minimize risks by focusing on safety of work methods and organizations, and iv) provide personal protective gear, equip all machinery with safety devices and make sure these are used. Although training of forest workers has made great strides in some countries over the last decades, it is rudimentary or non-existent in most tropical countries. Often training is limited to high level positions of management and to supervisors and does not address the productivity and safety of unskilled and semi-skilled workers (ILO 2011).

Capacity development. Capacity development at all levels of the workforce, including attention to working conditions, is essential for SFM and should be integrated in forest management plans. One of the major constraints for SFM is the lack of skilled personnel (technicians, operators, workers) to plan, execute and supervise management operations. Supervisory and managerial capacity is also inadequate. Forest managers should therefore consider the critical importance of staff training at all level in order to: i) minimize damage to the forest and the environment by implementing RIL in an effective and efficient manner; ii) make staff fully aware of the social and environmental impacts of harvesting; iii) increase work productivity, quality and safety; and iv) reduce harvesting losses as well as direct costs and production costs (FAO 2004).

Voluntary Guidelines for Guiding principle 10 – Productive and safe working conditions in forestry

Guidelines		Recommended Actions		Indicative stakeholder group
G10.1	**Provide a framework of rights and responsibilities to forest workers and forest managers on safety and health in forest operations**	A10.1.1	Consider establishing a framework for rights and responsibilities of forest workers and forest managers to ensure a positive attitude to safety and health of forest operation.	Government, forest managers, private sector
		A10.1.2	Make agreements between forest managers and forest workers on enforcement of regulations and standards relating to working conditions in forests.	
		A10.1.3	In situations of equal qualification and experience, give priority to workers from nearby communities or localities.	

G10.2	**Consider safety management as a top priority.**	A10.2.1	Provide safe and healthy working conditions for all personnel according to international occupational health and safety standards.	Government, forest managers, private sector
		A10.2.2	Train all FMU personnel on first aid and in their awareness so that they are aware and able to identify risk situations and assess the probability of accidents in their work environment.	
		A10.2.3	Provide workers with appropriate safety equipment. Assess protective equipment requirements according to job and circumstances and keep sufficient stocks for the workforce.	
		A10.2.4	Ground workers operating heavy machinery (crawler of wheeled equipment) should be specifically trained in personal safety and safety in team work.	
		A10.2.5	Introduce financial incentives (e.g. bonus system) to encourage workers to observe safety regulations, to reduce negative impacts and to maximize timber recovery.	
		A10.2.6	Foster stability of workforce as a way to reduce the occurrence of hazardous situations and thus risks of accident.	
		A10.2.7	All work accidents or diseases associated to the profession should be communicated and recorded.	
		A10.2.8	Connect crews working in remote areas to the base (cell phone, radio) . Arrange for the rapid evacuation of workers in emergency situations.	
		A10.2.9	Arrange regular medical check-ups for all personnel, especially those exposed to occupational disorders.	
G10.3	**Introduce best practices silvicultural management to ensure safe and efficient operations, minimize damage and reduce environmental impacts**.	A10.3.1	Provide adequate supervision of personnel, and, when appropriate, performance-based incentives for efficient, safe and careful implementation of harvest operations.	forest managers, private sector
		A10.3.2	Adopt recommended practices for felling operations, namely directional felling to reduce damage to both vegetation and soils, and streams.	
		A10.3.3	Adopt recommended guidelines and best practices for extraction with ground-skidding equipment and other extraction systems	
		A10.3.4	Ensure adequate planning of landings and their layout and observe safe and sound practices to reduce risks during operations..	
G10.4	**Develop capacity at all levels of work-force, including attention to working**	A10.4.1	Ensure forest workers receive adequate training and supervision to ensure proper implementation of the forest management plan in particular	Government, forest manager, civil society, research/education

	conditions		silvicultural and harvesting operations	
		A10.4.2	Increase and maintain the professional skills, work performance and work quality of workers, and develop and maintain an awareness of social and environmental issues.	
		A10.4.3	Recognize the knowledge skills and experience of local people about forest resources (ecology, assessment, management and utilization).	

Guiding principle 11: Economic viability of natural tropical forest management

SFM only succeeds if it is properly financed. Capturing the full value of forests and ensuring the equitable distribution of costs and benefits are essential for SFM.

Rationale

The full value of forests include direct use values from timber, fuelwood, NTFP etc.; indirect use values from ecosystem services, such as carbon, water and biodiversity, option values relating to the willingness to pay to conserve the option of use the forests even that no current use is made out of it[8]. The question, though, is how to capture these values and to manage them. The economic challenge in natural tropical forests is how to make SFM a profitable activity that is attractive to invest in, and that is competitive to other land uses. One challenge is how to increase and diversify the revenue streams in a context in which for most ecosystem services to which well managed forest provide there is generally nobody who currently pays for them. It can be predicted that without firm regulations developed at national and eventually international level, there will be no substantial markets for many of the services rendered by forests, such as carbon, biodiversity, and water or soil protection. Another challenge relates to the difficulty to reduce the costs for SFM by increasing the efficiency of the management. The latter requires substantial investments - and associated financing mechanisms – that will barely come from the current profit that is made through natural tropical forest management as it is applied currently. In addition, it can be predicted that new investments in tropical forest management will carefully consider the risks, uncertainties (e.g. in tenure) and the overall framework conditions. What is needed is to increase the economic viability to a competitive level and to develop strategies, mechanisms and instruments to attract the necessary finances and investment for SFM. In this regard, it would be of particular importance to mobilize and leverage private sources.

Forest finance and adaptive management. An important aspect to capture the full value of forests and ensuring the equitable distribution of costs and benefits involves the concept and application of adaptive management. It relates to the availability of financial resources and the mechanisms that guarantee that costs and benefits are distributed in fair way amongst all stakeholders that contribute to SFM–and that markets are existent and accessible to the types of products and services that are delivered by natural tropical forests. Clear incentive structures need to be defined and regularly adapted in order to respect not only the financial return to the immediate stakeholders, but also the economic return to society.

Economic instruments. Policies and laws provide incentives and disincentives which affect the behavior and choices of forest managers, users and other stakeholders, including investors. Forest fees and taxes should be considered as incentives to encourage more rational and less wasteful

[8] Pierce, D.W. (1991). The Economic Value of Forest Ecosystems. Economic Health 7(4): 284-295

forest utilization and the establishment of an efficient processing industry and to discourage high-grading and logging of natural tropical forests which are marginal for timber production. They should be and remain directly related to the real cost of forest management.

Voluntary Guidelines for guiding principle 11 – Economic viability of natural tropical forest management

Guidelines		Recommended Actions		Indicative stakeholder group
G11.1	**Enable the environment for investment in natural tropical forest management**	A11.1.1	Enable the framework conditions (legal, policy, institutions, tenure etc) to attract investments in natural tropical forest management.	Government, Forest managers, Private sector, Civil society, Research/education
		A11.1.2	Develop instruments to support acceptable financial returns for forest use and propose adequate financial compensation for otherwise unpaid ecosystem	
		A11.1.3	Create awareness among the forest operators and stakeholders on the value of adaptive management approaches to improve financial viability of managing natural tropical forests.	
		A11.1.4	Consider the use of an adequate share of the financial benefits accruing from harvesting as funds for maintaining the productive capacity of the forest resource	
		A11.1.5	Intensify national and international marketing efforts in order to realize highest possible value of sustainably produced forest products and improve sustainably utilization of the resources.	
		A11.1.6	Actively explore the generation of income from the ecosystem services provided by an FMU, in particular carbon, water and biodiversity.	Forest managers, Private sector, Civil society
		A11.1.7	Identify options for improved carbon management and evaluate the risks, costs and benefits of carbon management options and their implications for other forest management objectives.	Government, Forest managers, Private Sector
G11.2	**Provide guidelines for optimal efficiency in timber harvesting to reduce log wastes**	A11.2.1	Adopt standards allowing minimizing forest harvesting waste and ensuring that no marketable component of the felled tree is left in the forest.	Government, forest managers, private sector
		A11.2.2	Establish a system of incentives and penalties to encourage practices to reduce waste.	
		A11.2.3	Whenever feasible, extract forest residues as an additional income source, especially for forest dependent communities.	
G11.3	**Monitor the distribution among the principal stakeholders of the costs and benefits of forest**	A11.3.1	Monitor the distribution of the costs and benefits of forest management among the principal stakeholders to promote SFM.	Government, forest manager, private sector.
		A11.3.2	List any mechanisms for the distribution of incentives among all parties involved in forest management	Government.
		A11.3.3	Explore the opportunity of interested parties	Government.

	management		to be employed under comparable conditions to those in other sectors	
		A11.3.4	Consider developing effective mechanisms for the resolution of conflicts between interested parties	Government, forest manager, private sector.
		A11.3.5	Consider and develop the ability of forest land or right-holders to receive a fair return for the use of their forest land	forest manager, private sector, civil society
G11.4	**Encourage economic instruments to supporting natural tropical forest management**	A13.4.1	Encourage SFM through economic instruments, such as fees, taxes, incentives and bonds, and support the establishment of an efficient downstream industry.	Government.
		A11.4.2	Ensure that there are effective measures in place to encourage forest owners and managers to operate legally and sustainably manage the forest resources.	
		A11.4.3	Encourage smallholders and communities to invest in SFM by providing long-term tenure and user rights, assisting in effective land-use planning and facilitating access to appropriate credit and support services.	
		A11.4.4	Create incentives for those that operate responsibly and innovatively.	
G11.5	**Provide preferential access to markets for products from sustainably managed tropical forests.**	A11.5.1	Promote efficient markets as a way of encouraging SFM and give preferential access to products from sustainably managed natural tropical forests.	Government Forest Managers, Private sector, Civil society
		A11.5.2	Support, through adequate policies and, if needed, economic instruments, access to markets of sustainably produced products and services from natural tropical forests.	
		A11.5.3	Recognize the potential contribution of independent voluntary certification to SFM.	
		A11.5.4	Encourage public and private procurement policies to source timber only from sustainably managed forests.	

GLOSSARY

Adaptive management. Also known as adaptive resource management (ARM) is a structured, iterative process of optimal decision making in the face of uncertainty, with an aim to reducing uncertainty over time via system monitoring. In forestry, it means a process by which people adjust their management strategies to better cope with change, while also maintaining the integrity of their forest management objectives.

Allien species. A species or a sub-species or lower taxon introduced outside this normal past and present distribution.

Allowable cut. Total volume of commercial timber that may be harvested from an FMU during the planning period.

Annual allowable cut. Allowable cut in an FMU expressed on annual basis.

Best practices. Methods, processes, incentives, systems, or policies that have been demonstrated to achieve superior results within an area of work.

Biological Diversity / Biodiversity. The variability among living organisms from all sources, including *inter alia* terrestrial, marine, and other aquatic ecosystems and the ecological complexes of which they are a part: this includes diversity within species, between species, and of ecosystems. (Convention on Biological Diversity, Article 2)

Biomass stock. Organic material both above-ground and below-ground, and both living and dead, e.g., trees, crops, grasses, tree litter, roots etc. Biomass includes the pool definition for above - and below - ground biomass

Carbon (stock)/forest carbon. Part of the element C in the biomass. About half of the biomass is carbon (expressed in tons of C per ha (tC/ha) or tons of CO2 per ha. 1 tC is about 3.6 t/CO2).

Carbon pools. Defined places in forest ecosystems where carbon is stored. IPCC distinguishes between 5 carbon pools in land-use, land-use change and forestry: (i) Living biomass above and (ii) below ground; (iii) dead biomass above ground, (iv) litter and (v) organic soils.

Civil society. Groups affecting voluntarily in their capacity as citizens to advance common goals and agendas.

Collaborative Forest Management (CFM). A working relationship between different stakeholders to manage forest and tree resources..

Criterion. A category of conditions or processes by which sustainable forest management may be assessed.

Deforestation. The conversion of a forest into another land-use.

Ecosystem Services. The multitude of resources and processes that are supplied by natural ecosystems. Forest Ecosystem services: Services particularly attributed to forests, in particular biological diversity rendered by forests, protective functions of forests (soil, freshwater flow, carbon stored in the five pools) and recreational values.

Elastic capacity of a forest ecosystem. Dynamic forest processes within a range of changing vertical forest structure, species composition and biodiversity, and productivity normally associated with the natural forest type expected at that site.

Enrichment (planting). The planting of desired tree species in a natural forest with the objective of creating a high forest dominated by desirable tree species.

Externality. A consequence of an action affecting others for which the actor is neither rewarded nor penalized through the market.

Food security. Food security exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life *(World Summit on Food Security, Rome, November 2009)*

Forest. Forest is defined at national level. In general terms, forests is land spanning over a minimum area, a minimum height that trees can reach *in situ* when mature, and a minimum canopy cover over the given area. UNFCCC (2001), CBD (2002) and UNFF/FAO (2001) have provided generic definitions of forests. For details, ITTO Guidelines for the restoration, management and rehabilitation of degraded and secondary tropical forests, ITTO Policy Development Series No. 13, 2002: Annex 7: pages 82-84.

Forest concessions. Any tract of forest-land under (multi-year) license agreement, lease, or permit with individuals, communities or corporations for the sustainable production of timber and other forest products with obligations for protection and conservation of the goods and services rendered by the forest.

Forest degradation. Reduction of the capacity of a forest to provide goods and services. 'Capacity' includes the maintenance of the elasticity of ecosystem structures and functions.

Forest goods and services. Products utilized from the forest including timber, NTFPs, water, biodiversity, carbon under a carbon valuation/trading scheme.

Forest function mapping. Process to classify forest areas according to defined functions based on spatial, topographical, floral and faunal information (The functions that need that need to be mapped are only those which require restrictions in forest management activities).

Forest zoning. Classification of an area into productive, restrictive and protective zones based on determined functions.

Forest management unit. A clearly defined forest area, managed to a set of explicit objectives according to a long-term management plan. The FMU might be a large continuous forest concession or community forest or a group of small forestry operations, possibly with different ownership. The important element is the common system of management.

Forestry. Forestry is the art and science of managing forests and trees, embracing a broad range of concerns which include providing timber, fuelwood and non-wood forest products, biodiversity management, wildlife habitat management, watershed management and water quality management, recreation, landscape protection and erosion control, employment, and sinks for atmospheric carbon dioxide.

Forest Governance. A policy and political approach related to defining the elements needed to conserve and sustainably managing forests.

Governance. Governance is the process of governing, the way in which society is managed and how the competing priorities and interests of different groups are reconciled. It includes the formal institutions of government but also informal arrangements. Governance is concerned with the processes by which citizens participate in decision-making, how government is accountable to its citizens and how society obliges its members to observe its rules and laws (FAO 2009).

Growing stock. Volume over bark of all living trees more than X (generally 10) cm in diameter at breast height (DBH). Includes the stem from ground level or stump height up to a top diameter of Y cm (generally end of the bole), and may also include branches up to a minimum diameter of W cm

High forest. Generic term used to describe a forest close to its successional climax – most commonly synonymous with “primary forest”, but can also be achieved in managed natural forest under a strict selection system.

Invasive species. Any species not native to a particular ecosystem whose introduction causes or is likely to cause economic or environmental harm or harm to human health.

Landscape. A cluster of interacting ecosystem types, pristine or modified by man.

Native species. Tree species that grow naturally in the wild in a particular region

Non-wood forest products (NWFP). Non-wood forest products consist of goods of biological origin other than wood, derived from forests, other wooded land and trees outside forests.

Permanence of carbon stocks. Maintaining existing forest carbon stocks and continuous sequestration of CO_2 through avoiding deforestation and forest degradation and sustainable forest management.

Permanent Forest Estate (PFE). Land, whether public or private, secured by law and kept under permanent forest cover. This includes land for the production of timber and other forest products, for the protection of soil and water, and for the conservation of biological diversity, as well as land intended to fulfil a combination of these functions. The main categories of land to be kept under PFE are the protection PFE and the production PFE.

Primary Forests. Forest which has never been subject to human disturbance, or has been so little affected by hunting, gathering and tree cutting that its natural structure, functions and dynamics have not undergone any changes that exceed the elastic capacity of the ecosystem

Guiding principles. The overall goals that guide the planning and decision making process.

Private sector. Encompasses for-profit entities that are not owned or operated by the government.

Production PFE: Production PFE: That part of the PFE assigned to the production of timber and/ or other extractive uses.

Protection PFE: That part of the PFE in which the production of timber (or other extractive uses) is prohibited.

Readiness Preparation Proposal (R-PP). A working process, endorsed at national level, to prepare a country for the implementation of REDD+ through multi-stakeholder consultation processes to define the national REDD+ strategy, including the definition of a forest carbon reference level (RL) and a the monitoring, reporting and verification process (MRV) needed to implementing the REDD+ strategy. R-PPs are promoted by the two main initiatives in REDD+, the Forest Carbon Partnership Facility and the UN-REDD Program. In early 2014, 23 ITTO member countries are in a process to prepare or implement their R-PP.

REDD+. Policy approaches and positive incentives on issues relating to reducing emissions from deforestation and forest degradation in developing countries; and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries.

Residual stand. Forest that remains after harvesting and extraction of wood and other resources.

Resilience (ecological). The capacity of a community or ecosystem to maintain or regain the desired condition of diversity, integrity, and ecological processes following disturbance.

Restoration. A management strategy applied in degraded primary forest areas. Forest restoration aims to restore the forest to its state before degradation (same function, structure and composition).

Secondary Forests. Woody vegetation regrowing on land that was largely cleared of its original forest cover (i.e. carried less than 10% of the original forest cover). Secondary forests commonly develop naturally on land abandoned after shifting cultivation, settled agriculture, pasture, or failed tree plantations.

Silviculture/silvicultural. Pertaining to the art and science of producing and tending forests by manipulating their establishment, species' composition, structure and dynamics to fulfill given management objectives.

(Forest) Stakeholders. Any individuals or groups who are directly or indirectly affected by, or interested in, a given resource and have a stake in it.

Tenure. Agreement(s) held by individuals or groups, recognized by legal statutes and/or customary practice, regarding the rights and duties of ownership, holding, access and/or usage of a particular land unit or the associated resources (such as individual trees, plant species, water or minerals) therein.

User rights. The rights to the use of forest resources as defined by local custom or agreements or prescribed by other entities holding access rights. These rights may restrict the use of particular resources to specific harvesting levels or specific extraction techniques

Yield. Clear stem standing volume of timber of commercial species estimated on the basis of trees with a diameter above the minimum cutting diameter. The term **"sustained yield"** is defined as follows: to ensure that the harvesting rate of timber and NWFP does not exceed the rate of replacement (natural and/or artificial) in a given area over the long term.

Yield regulation. The techniques for calculating and controlling the harvesting level to ensure that sustained yield is respected.

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ANNEX

Comments and Revisions: Draft Final Principles and Guidelines for the SFM of Tropical Natural Forests

The reviewers have prepared two versions of the revised guidelines:

- A cleaned up version that contains the latest revised version without making reference to the changes made. This version should be used for a comprehensive reading and review if the document is logical, complete and applicable.

- A version with all marked-up changes, additions, deletions and main comments, so that the reader is able to fully understand what has been changed from the draft that was discussed at the last ITTC session. Countries will recognize their proposals made in this revised version. Some countries provided line-by-line changes in track-change document and thus provided very detailed elements for the revised version of the guidelines. All these line-by-line proposals have been taken into account in the new version. The reviewers nevertheless only accepted such detailed changes when there was no contradictory changes proposed by parties or were the logical flow in the document would not have justified a specific change proposal by a country.

The reviewers followed in particular the concerns and recommendations of the parties, as follows:

- to shorten the document overall (from 115 pages in the last version down to 66 pages);
- to reduce the number of Principles and Guidelines and of recommended actions,
- to present a better balance in between the guidelines and the recommended actions;
- to be more logical in the formulation of guidelines and recommended actions;
- to develop a more comprehensive glossary; and
- to make more implicit links to the C&I.

A particular effort was made to integrate the new challenges posed by climate change under various principles of SFM in a logical and balanced way. With these changes, a valuable compromise between the different viewpoints on integrating climate change between the ITTC parties could be reached. Also an effort has been made to establish a better link between the SFM guidelines and the ITTO C&I.

Due to the considerable reduction of the number of Principles and Guidelines, the split of the guidelines in core and optional components proposed by some ITTC members was not made in the revised version. The new version of the guidelines is comprehensive as a whole and all guidelines and recommended actions under the 11 remaining principles are optional. This is also made clear in the introductory part of the guidelines.

The guidelines present a logical flow of principles; the consultants took particularly care on the fact that the guidelines relate to tropical NATURAL forests and in particular to those forests that are used for PRODUCTION. The multiple purpose management of forests for goods and services is considered as the key principle in the SFM guidelines, which is fully in line with ITTO's overall SFM definition and also reflects well on the sustainable development goals as they are proposed in the post-2015 global development agenda.

A version of the revised guidelines, with all changes marked, has been transmitted to the ITTO Secretariat and can be consulted by the countries. The following table lays out the general comments made by members and explains in general terms how these comments have been addressed. For details please refer to the track change text provided by ITTO on demand. The inputs made by members were the essential element for the revision. All comments were carefully taken into account.

However, there were also contradictory comments and the reviewers had then to make a decision if a specific comment was taken into account or not. The details of the comments made and how they have been taken into account are listed in the following table:

Member Country	Comments on draft revised (2012)	Revisions from revised(2012) to draft final (2013)
Indonesia	• Stress that the Principles and Guidelines are voluntary and adaptive in nature. The P&G should not be compulsory nor legally binding, and their implementation should be adjustable to national and local conditions. • The P&G are paced along with the current developments in the UNFCCC which is the main process addressing climate change. We could only include forest climate change related methods e.g. on RL/REL when guidance on them have been approved by the UNFCCC COP. • More elaborate that the original version. Compatible with our laws and regulations. • Consider adapting revised P&G at pilot stage just like the thematic programme. This is to be followed by piloting and Indonesia is ready to participate as one of the pilot countries.	• These Principles and Guidelines are considered voluntary in nature and not legally binding to ITTO member countries but they can be implemented as appropriate to national and local conditions. Page 4 scope and use of the P&G. • G.1.9 of Principle 1 recognizes the implication on SFM of the legally and non-legally binding intergovernmental agreements at the regional and global level. Phasing with UNFCCC developments is an integral component. • Better elaboration of P&G and compatible with existing laws and regulations of member countries. • Piloting of the P&G implementation can be decided by the ITTC if necessary.
Malaysia	• The addendum on climate change mitigation and adaptation had been included as new Principles 6 and 7 to the draft Revised Guidelines. Malaysia also observed that the issue on climate change had been amalgamated in other principles. • The language in the draft reports is often verbose and lacks consistency. The presentation style varies from one chapter to another. Therefore, it gives the impression that the text is a direct compilation of works from different authors. • There are many overlaps in the recommended actions throughout the draft Revised Guidelines. • Some of the terms used needs to be clearly defined in Glossary as it may be interpreted differently by Member Countries. • Recommended actions are not constructed as action oriented sentences and some of the recommended actions consist of	• Principles 6 and 7 on climate change have been removed and only 11 principles remain with 60 guidelines. • The climate change issues are explained in many parts, particularly in the multiple uses of forests. • Climate change agenda as part of SFM. The wider scope of SFM is focused and not having a separate and more narrow focus on REDD+. • The revised document has been edited for style and consistency. • The recommended actions have been checked for overlaps and moving some where they are appropriate. • The recommended actions have been edited/revised to action oriented sentences. • The guidelines present a logical flow of principles, and we also took care particularly on the fact that the guidelines relate to tropical NATURAL forests and in particular

	only general statements and are difficult to be implemented. • For Principle 6, some of the guidelines have been developed with the assumptions that all tropical countries will be implementing REDD+ and carbon trading. However, both schemes are voluntary in nature and their mechanisms are still evolving. It is thus too premature to include this Principle in the main text of the document. Hence, Principle 6 is to be proposed as an addendum. • For Principle 7, sufficient reliable data is not available to determine trends and projected changes in climatic variables in any given forest area. Even if there are trends, it is very difficult to relate changes in climatic variables to that particular change in that forest variables. Moreover, lack of available acceptable methods to address many of the recommended actions is also observed, and even if there are available methods there is a significant lack of capacity to undertake such analysis. Due to the lack of knowledge, data and available/acceptable methods, it is suggested that Principle 7 be removed from the Revised Guidelines. • Matters dealing with financial aspect for the implementation of SFM should be highlighted in Principle 13, as we realize that pertinent issues in the implementation of SFM particularly in developing countries are insufficient financial resources, capacity building and lack of environmentally sound technologies. Due to the immense cost involved, Malaysia believes that financing of SFM cannot be resolved within the context of national boundaries alone or solely by producer countries. Hence, it is important to make clear the responsibility of consumer countries by preparing specific guidelines and recommended actions in Principle 13. • Being a country that has been recognized as one of the leading countries in implementing SFM,	to those forests that are used for PRODUCTION. The multiple purpose management of forests for goods and services becomes somehow the key principle, which is fully in line with ITTO's overall SFM definition. • A glossary of terms used has been appended in the report. • Due to the considerable reduction of the number of Principles and Guidelines, we did not distinguish between core and optional components as it was proposed to simplifying the draft revised Principles and Guidelines to ensure their practical implementation. The new version of the guidelines is comprehensive as a whole, and all guidelines and recommended actions under the 11 remaining principles are indeed optional. This is also made clear in the introductory part of the guidelines. • The guidelines present a logical flow of principles, and we also took care particularly on the fact that the guidelines relate to tropical NATURAL forests and in particular to those forests that are used for PRODUCTION. The multiple purpose management of forests for goods and services becomes somehow the key principle, which is fully in line with ITTO's overall SFM definition. • Took into consideration the existing national legal framework and mechanisms of countries and highlighted forest certification in Box 2. • Financing, emerging markets and capacity of member countries are highlighted in Principle 11: Economic viability of natural tropical forest management, and its guidelines and recommended actions, • Implementation is voluntary for member countries and hence will consider only appropriate P&Gs within their capacity. • The basic minimum actions are proposed; however member countries can implement as many actions are needed in accordance with their own country forest policy objectives, national forest program, and forest resource

	Malaysia believes that the proposed Revised Guidelines should take into consideration the existing national legal framework and mechanisms which are already being implemented. Malaysia continues to promote that the Revised Guidelines must focus on further improvement to the ITTO Guidelines 1990 (Revised 1997) to achieve the objectives of SFM. In this process, special attention should be accorded to ensure that forest certification be used as a tool to measure the compliancy of SFM implementation. • Moreover, our serious concern on the adoption of the proposed Revised Guidelines at this stage revolves around two fundamental interrelated considerations including:Emerging market requirements, and Capacity of producer members. • There is a wave of green consumerism spreading around the world. And timber is no exception as demonstrated by the public procurement policy of certain consumer countries which demand timber certified for sustainability. In addition, a growing number of consumer countries are demanding timber verified for legality for market access. To this end, the United States is implementing the amended Lacey Act; the EU Timber Regulation has entered into force on 3 March 2013 whilst other countries are in the process of enacting legislation with similar objectives to combat illegal logging and trade in illegal timber. The proposed ITTO Guidelines go well beyond the requirements for either sustainable or legal timber. • The proposed Revised Guidelines, apart from being viewed from the perspective of emerging market requirements, must also be considered from the viewpoint of the capacity of producer member countries to implement. There must be a linkage between what we propose and the realities on the ground • In view of the foregoing, that is, the market requirements for	situation

	sustainable or legal timber coupled with the capacity of producer members, Malaysia is of the view that, the proposed Revised Guidelines, which are more stringent than current market requirements, are really unnecessary at this point of time. And as indicated earlier, ITTO producer members are struggling even to meet the current market requirements. We need to redouble efforts to achieve current market requirements rather than adopt and impose new guidelines on producer countries which are not required by markets and well beyond the capacity of producer countries to comply especially with the current level of funding for capacity building to assist producer countries. We are also unaware of similar guidelines for temperate and boreal forests. Furthermore, rigid and over-ambitious guidelines may become a disincentive to management practices in tropical countries as well as conservation programme becomes impossible to implement. • As a way forward, Malaysia would also like to propose that the ITTO Secretariat compiles relevant information on the implementation of SFM guidelines in selected consumer countries as well as to expose and test the final Revised Guidelines in selected ITTO member countries prior to adoption at the next ITTO Council Meeting. • In conclusion, Malaysia views that this draft Revised Guidelines is too ambitious and is aimed at achieving a 'Utopian Sustainable Forest Management (SFM)' which is beyond the capacity and ability of ITTO's producer member countries. Malaysia would like to urge the ITTO Secretariat and consultants to seriously consider our proposals as we believe that the Revised Guidelines will have significant impact on the balancing act between the management and conservation of tropical forest resources, and sustainable trade of timber and other forest produce. Based on our experience, voluntary and non-legally binding SFM guidelines have created	

	barriers to trade when such guidelines would repeat similar hindrance to achieve the agenda of sustainable development. • 10.	
Australia	• As a consumer country, the three key principles that are priorities for Australia are 1. Forest Policy, Governance, Laws and Institutional Arrangements, 6. Forest carbon management and 7. Climate change adaptation related to tropical forests. However we acknowledge that the other principles could be more relevant to other producer or consumer countries based on their national forestry objectives	• Principles 6 and 7 have been removed as climate change principles and only 11 principles remain with 60 guidelines. • The climate change issues are explained in many parts, particularly in the multiple uses of forests.
European Union and Member Countries	• The document was too detailed and lengthy. • The EU is not in favour of differentiating "core" and "optional" Principles and Guidelines for SFM. • stress the voluntary nature of the principles and guidelines and the importance of implementation in accordance with national circumstances. • The EU would instead be supportive of simplification of the Principles and Guidelines in order to have a more concise report that can facilitate implementation by relevant forest stakeholders, while at the same time avoiding losing valuable content already included in the document. • We consider that the Secretariat could examine the set of tables in the report as a practical way to identify possible overlaps and duplications in the Principles and Guidelines and thereby simplify the text. Such a simplification exercise would require an in-depth analysis and technical inputs and discussion and we would not wish to make an in-depth proposal in this submission. However please find below a few examples to illustrate the potential for simplification, noting that this is a nonexhaustive list: 1. Principles: • Principle 4 "Forest resilience" and Principle 5 "Identification, prevention and management of threats to forest and ecosystem health" present many commonalities and it	• Principles 6 and 7 on climate change have been removed and only 11 principles remain with 60 guidelines. The tables have been checked for overlaps and duplications and simplification of the whole P&G. • There is no need to present the revised P&Gs in 2 components namely core and optional components. Since we made it clear that these are voluntary in implementation among the members it is up for them to select what will be of priority and applicable to their country situations. • These Principles and Guidelines are considered voluntary in nature and not legally binding to ITTO member countries but they can be implemented as appropriate to national and local conditions. Page 4 scope and use of the P&G. • The reduction from 16 to only 11 Principles has effectively combined and simplified related principles and the 60 guidelines with the proposed actions.

	could be considered to merge them; • Principle 6 "Forest carbon management" and Principle 7 "Climate Change Adaptation related to Tropical Forests" are dealing with complementary aspects of Climate change and could be combined; • Principle 10 "Social values of forests and inclusive decision-making" and Principle 11 "Community involvement in SFM" also present many overlaps and commonalities; • Principle 14 "Forest management planning at national/regional level", Principle 15 "Forest management planning at FMU level" and Principle 16 "Adaptive management" are also closely associated with each other and there appears to be room for simplification; 2. Guidelines: Description of the guidelines could be simplified avoiding duplications and simplifying the language used. Furthermore there are several recommendations which are cross-cutting to several principles and others should be transferred from one principle to another. • For instance, Guidelines related to the periodic collection of data and inventory systems could be considered as cross-cutting (e.g. G3.3, G8.1, G14.3, G14.4, G15.2); • Guidelines G15.7 and G15.9; as well as G15.16 and G15.17 could be merged; • Guideline G2.5 could be moved under Principle 8 "Multipurpose forest management"; Guideline G5.1 (at least part of the actions) could be moved to Principle 1 "Forest Policy, Governance, Laws and Institutional Arrangements"; Guideline 10.2 could easily be moved to Principle 13 "Economic viability". Further simplification of the document could be obtained by reviewing the long list of recommended activities, with a view to merging and reformulating where necessary, as well as removing some actions which may be less cost-	

	effective or which add limited value. In addition to the above, the EU would also like to make the following general comments: a) The gender dimension of Principles and Guidelines could be further strengthened, including by making reference to existing gender guidelines by other organisations. In the long term, the ITTO should consider developing its own gender guidelines. b) The importance of creating an enabling environment for investors can hardly be overestimated and should adequately reflected in the guidelines associated with relevant Principles such as "Economic Viability" (principle 13), as well as Principles 1 (Legal, Policy and Institutional Framework) and 2 (Security of tenure, access and use rights). c) Research, capacity building and awareness raising/communication should be considered as a cross-cutting or horizontal principle which should be reflected at all levels. Should other ITTO members have similar views we would suggest that the Secretariat, assisted by the consultants who prepared the document, try to simplify and shorten the report, paying careful attention to maintaining the balance between different elements of the Guidelines, so that a revised draft can be considered and adopted at the next Council meeting. We believe that this document on Principles and Guidelines for the Sustainable Management of Natural Tropical Forests will successfully fulfil its purpose of assisting decision-makers, forest managers and other stakeholders to make informed decisions about forest management interventions if it is recognized as a useful and pragmatic tool by the interested actors. To this end, the ITTO should also consider to use these guidelines as a basis for further developing simple documents for different target groups (investors, policy makers, forest managers, groups outside the forest sector, etc.).	

Honduras	• Specify the purpose and functionality of the guidelines and principles. • Specify links from the guidelines and principles with criteria and indicators for sustainable forest management and emerging forest. • Consider a proposal linked to the complementary functionality of the theoretical foundations raised in all the principles (1 to 16). • Clarificatory texts/elaboration of Principles 1-12 of the revised version	• The purposes and functionality of the P&G are contained in the introductory sections pages 1-5. • Part II provides an overview of the Principles' and connectivity with ITTO's C&I. Table 1 shows the connectivity of the Principles with the ITTO C&I. • The P&G for the Sustainable Management of Natural Tropical Forests use the ITTO C&I, as revised in 2005, as an important reference document and draw on them in the development of both principles and specific guidelines. They complement the other ITTO guidelines on various aspects of tropical forest management. • The 11 Principles have been elaborated on and edited including focus on theoretical foundations.
Tropenbos International Netherlands	• In its elaboration of the principles, however, the document essentially remains one that is focused on the traditional actors: forest administrations; on larger scale (industrial) forest managers en very much on timber production, in spite of some clear efforts to widen it. It would be good to have some check reading by people from the small- scale forestry sector to see what they can find in it. • In its original guidelines, ITTO played a frontrunner role in defining SFM and making it a subject of international debate. However, this role has been so effective that knowledge and awareness about forest management and about the roles and contributions and requirements of a range of actors have increased (and documented) to such an extent that one may wonder in what way an updated version of the guidelines can add value to this. It is highly likely that specific target groups mentioned in this document would resort to more specific guidelines when in need of guidance. It is not yet too clear to what extent, and if so, why, these guidelines would be different from, e.g., the FAO model code of practice; or SFM requirements/C&I for certification; or some of ITTO's guidelines on	• The focus for actors has been widened from traditional to include even forest small-holders and communities and others below: Forest managers, such as state and local forestry agencies, timber companies, producer associations, natural-forest smallholders and rural and forest communities. Policymakers and legislators such as political parties, government agencies dealing with forests, conservation, the environment and land-use planning, development and extension agencies, and civil-society organizations. Agencies, institutions and firms interested in the ecosystem services provided by natural tropical forests. Public and private forest research, education and training institutions. International funding and development agencies, public and private. • The P&G for the Sustainable Management of Natural Tropical Forests use the ITTO C&I, as revised in 2005, as an important reference document and draw on them in the development of both principles and specific guidelines. They complement the other ITTO guidelines on various aspects of tropical forest management. • The remaining 11 Principles, 60

	biodiversity conservation and forest restoration. • The Guidelines are also somewhat hybrid and intermixed in a way that it at one hand contains guidance focused at the forest policy level and at the other hand at forest managers. It may be that these guidelines should be interpreted as the common reference and understanding of all ITTO members on what is SFM. If that is the case, this should be made explicit, and the guidelines should then (probably) be interpreted as the (lowest?) common denominator of thought about SFM. In this case, the document would not be expected to have a significant practical implication for forest managers. • If the document is meant as a practical guideline for the various target groups listed, then it may be considered to split the publication into several ones addressing only a single target group each. This increases the focus, and keeps the document small and practical. More reference can be made to other documents and guidelines of others than ITTO. For example the most recent FAO Voluntary Guidelines on the Responsible Governance of Tenure. This could be done per section or per principle. To keep a position as a frontrunner publication, one could imagine that it moves along with some of the major trends affecting forest management; e.g., a stronger emphasis on: • the interrelations between different sectoral policies and the ways forests are dealt with in these; • Forest governance issues, • Trade issues, both international trade, trade policies and their linkages to forests (FLEGT, RSPO, RTRS, biofuels, procurement) • Small holder forest management and local informal forest management arrangements This would require the document to 'come out of the forest' and address new (non-forest) audiences. This may not be totally compatible with ITTO's scope and mandate, but it is relevant for forest management. Specific comments	guidelines and recommended actions have been revised and re-written. There are 11 principles formulated; the principles relating to management are applicable to SFM in natural tropical forests worldwide, with an emphasis on production forests in the PFE. These P&G are designed to encourage multi-purpose forest management practices that, if applied over the long term, will sustain the yields of multiple products from, maintain the provision of services by, and safeguard the values of tropical forests for the benefit of multiple stakeholders. While conceptualizing SFM at a broad policy level, the guidelines should also be useful to a wide diversity of forest managers working under a variety of management and tenure arrangements. The recommended actions provide specific means to implement the guidelines. The basic minimum actions are proposed; however member countries can implement as many actions are needed in accordance with their own country forest policy objectives, national forest program, and forest resource situation.

	In the attached document several detailed comments are made to which is referred to. Other comments are the following 1. Clarify the position of this document in relation to other ITTO guidelines and documents, and those of others (FAO etc.), and indicate what the major changes are. 2. Box 1: For me an emerging trend is the increasing number of claims – much of these are competing and incompatible by an increasing number of stakeholders on the same forest source; the number of uses for the same piece of wood will also increase; wood for timber, for paper, for energy, for biomass/bio-based products; the particularly the latter three uses require mass production/bulk (pellets); and may increase the pressure on natural forests; the increasing pressure also underpins the need to integrate forest functions in a smart way in multipurpose management systems, integrated landscape management approaches and look more in the roles of trees/woody species outside the forests. 3. The guide is of course based on bringing the best intentions to practice, but the reality is that the forest is increasingly in an arena of conflict and competing political and economic and sector interests for lands and other resources , unequal powers, which has been up to now always been in disadvantage for forests. This urges for the need to put more attention on the aspects of governance, access to information and transparency, inclusive participation and recognition of disadvantaged groups, reaching out to other sectors, other attitudes of the traditional forest sector. Such a reflection could be a preamble in section 1.2.3. 4. Box 2: I would focus the box on climate mitigation and adaptation and not only on REDD+ to have a more balanced focus on the relation forests and climate; I assume that the adaptation agenda will become much more important in future; and somehow I feel we have been too much focused on forest carbon alone (see also my remarks in the document. 5. The section on Civil society on	

	SFM on page 8 is very much focussed on international NGOs; see my suggestions to reorient it somewhat 6. Principle 8 multipurpose management I would put as one of the first principles as it is in my view an overarching principle: "(participatory) ecosystem based management for the sustainable generation of multiple goods and services". Forest management in principle is never single purpose; not for biodiversity conservation (when you implicitly manage for f.e. water regulation and soil protection functions, carbon storage, etc.) not in timber production, where you try to also to sustain other functions like protective functions, biodiversity (however at – sometimes much - lower levels) through specific management and silvicultural measures. 7. Given my earlier remarks: I would the forest carbon and climate adaptation principles together into one. 8. Principle 10 social values. The scope/descriptions of this section could be wider by including something on the social roles of the public in general: roles in health, food security and nutrition, education, tourism and recreation, the cultural values of forests 9. Principle 13 Economic viability . It reads" A key aspect to capture the full value of forests and ensuring the equitable distribution of costs and benefits involves the concept and application of adaptive management". That sentence is not clear to me. In my view the key challenge is how to make SFM a profitable activity that is attractive to invest in, and that is competitive to other land uses. One challenge is how to increase and diversify the revenue streams in a context in which for most services well managed forest provide there is no payer (we have a lot of unpaid bills in the forest), without firm regulations there will be no substantial markets for many services (see f.e. forest carbon market); second challenge: how to cut the costs by increasing the efficiency of the management. The latter requires substantial investments (and associated financing mechanisms), that will not automatically come with the current profit rates, risks and uncertainties and framework	

	conditions. So what are the key guidance issues and actions to take to increase the economic viability to competitive levels? Is adaptive management enough? It would be good to provide guidance on how to create the enabling environment for increasing the competitiveness of SFM and what strategies, mechanisms and instruments are needed to attract the necessary (investment) finance for SFM, in particular how to mobilize and leverage private sources. 10. In chapter 4.7 the differences between forest policy, forest strategy, nfp and national forest management planning should be better clarified. I also miss something on training and education 11. Principle 15 forest management at FMU is by far the most detailed principle with a strong focus on the technical aspects 12. Principle 16 adaptive management could be easily integrated in principle 15.	
Philippines	• Socially relevant due primarily to Principle 12 on improving productivity and working conditions in the forests and the FMU by providing workers with safety equipment, capacitating them with training and giving incentives for effective work. • Clarify statement on page 7, Box 2: SFM and REDD+ "Forests sequester and store more carbon than most other terrestrial ecosystems. When forests are cleared or degraded, however, their stored carbon is released into the atmosphere as carbon and other GHGs." It is our understanding that forest maintains its carbon stock, unless it is burned or decomposed and not by merely clearing the forest.	• Principle 12 has been maintained among the remaining revised 11 principles and now labelled as principle 10 with appropriate guidelines and recommended actions. • Box 2 on SFM and REDD+ has been removed and replaced with a box on certification. • Clarified on page 11 the carbon sequestration and storage aspects.
Mexico	En términos generales, se considera que los principios, directrices y medidas propuestas son relevantes para tomar en cuenta al promover la implementación del MFS, por lo cual no se hace una propuesta para dividirlos en principios centrales y opcionales, tal como se sugiere en la solicitud del Director Ejecutivo. Sin embargo, se considera que aún es posible realizar un esfuerzo para	The división in compulsory and optional princples has not been done as proposed by Mexico. Document has been shortened

	mejorar su redacción y, por lo tanto, reducir la extensión del documento. Por lo anterior, los presentes comentarios se emiten con el propósito de simplificar y mejorar el documento. 1. Se considera relevante que los fundamentos de los principios se revisen con el fin de redactarlos de una forma más directa y concisa. En muchos casos, en esta sección de fundamentos se destinan párrafos grandes a la definición de términos y, en ocasiones, hasta parecen inconexos. 2. La columna referente al grupo de usuarios, en la mayor parte de los casos, identifica a los mismos sectores; se propone que, en lugar de indicarlos en una columna como se encuentra actualmente, se construya una matriz de actores relevantes donde, por cada principio, directiva y medida, se identifique a los principales actores relevantes. Para ello es relevante incluir una sección breve para describir a los mencionados actores relevantes. Se omite identificar a los legisladores de congresos nacionales y locales, según sea aplicable, como actores relevantes con influencia en la promulgación de legislación relevante con relación a los principios 1. Política, gobernanza, legislación e institucionalidad forestal y el principio y 2. Seguridad de tenencia de la tierra y derechos de acceso y usufructo. Asimismo, es términos de la implementación de los principios, directrices y medidas propuestas es relevante que se identifiquen, también en una matriz, la escala en que éstas se propone que se lleven a cabo (p. ej., unidad de manejo forestal, paisaje, nacional). 3. Si bien es relevante el tema de cambio climático por sus impactos y efectos sobre los ecosistemas forestales y recursos asociados y es ampliamente reconocido el potencial del manejo forestal para la mitigación y la adaptación a tales impactos, no deben considerarse menos importantes el resto de las funciones que pueden ser mantenidas, e incluso mejoradas, a través del manejo forestal sustentable; por lo	The special effort has been done to address recommendation 1 An effort has been done to be more precise here but the column on the indicated stakeholder group has been maintained. However legislators have also been added in the group as proposed. These comments have been specifically taken into account as the climate change principles were integrated in various different principles in the revised guidelines without losing the essential elements that relate to SFM.

	anterior, se propone que los principios señalados en la sección 3.4. Medidas de adaptación al cambio climático y mitigación de sus efectos a nivel de UMF se incorporen a la sección 3.5. Mantenimiento de las múltiples funciones del bosque, como sigue: a. Principio ##. Medidas para la mitigación del cambio climático y la gestión del carbono forestal b. Principio ##. Medidas para la adaptación a los efectos del cambio climático. Asimismo, se considera que las directrices y medidas propuestos con relación a la adaptación de los efectos del cambio climático no son aplicables de manera práctica a nivel de UMF, sino que éstas se refieren , en todo escaso, a una escala de paisaje, sub-nacional o nacional; por lo anterior, se propone que, al nivel de UMF se propongan directrices y medidas más operativas para reducir la vulnerabilidad e incrementar la resiliencia de los ecosistemas forestales a los efectos del cambio climático. 4. En cuanto al principio 5 Detección, prevención y manejo de amenazas a la salud del bosque y el ecosistema se refiere, algunas de las directrices y medidas propuestas para llevarse a cabo a nivel de UMF son relevantes también para llevarse a cabo a nivel de paisaje y nacional, como es el caso de la planeación del manejo del fuego y el monitoreo de plagas y enfermedades. 5. Algunos elementos del principio 10. Valores sociales de los bosques y procesos decisorios inclusivos y principio 11. Participación de la comunidad en el proceso de MFS son repetitivos, principalmente los referentes a la participación de las comunidades en el proceso de implementación del MFS, por lo cual se propone revisarlos para resumirlos en un solo principio. 6. En cuanto a los fundamentos del principio 11, es conveniente que se revise su redacción para que los importantes elementos que se señalan en dicha sección se presenten una forma con una mayor conexión y no como definiciones sueltas.	Comments taken into account in the revised version. Repetitions have been eliminated in the revised version. Addressed through a complete revision and re-organisation of the flow in the reviewed guidelines. Lengthy texts with justification have been systematically eliminated.

	7. Finalmente, en términos generales, es conveniente revisar la redacción de las directrices y las medidas, pues en varios casos se incluyen justificaciones en el texto, cuando esto debe ser considerado en la sección de fundamentos; las directrices y medidas deben redactarse, en general, de forma más directa y concisa, preferentemente en una sola sentencia.	

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