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ASEAN CRITERIA AND INDICATORS

FOR

SUSTAINABLE MANAGEMENT OF TROPICAL

FORESTS

2017

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ACRONYMS AND ABBREVIATIONS

AMAF	ASEAN Ministers on Agriculture and Forestry
AMS	ASEAN Member States
ASEAN	Association of Southeast Asian Nations
ASOF	ASEAN Senior Officials on Forestry
CBD	Convention on Biological Diversity
Eurostat	Statistical Office of the European Communities
FAO	Food and Agriculture Organisation of the United Nations
FMU	Forest Management Unit
GDP	Gross Domestic Product
ha	hectare
INDCs	Intended Nationally Determined Contributions
ITTO	International Tropical Timber Organisation
IUCN	International Union for Conservation of Nature
MAR Format	Monitoring, Assessment, and Reporting Format for Sustainable Forest Management in ASEAN
PFE	Permanent Forest Estate
SDGs	Sustainable Development Goals
SFM	Sustainable Forest Management
UN	United Nations
UNECE	United Nations Economic Commission for Europe
UNFF	United Nations Forum on Forests

1.0 INTRODUCTION

1.1 Criteria and indicators for sustainable forest management were developed to provide countries with a framework for defining sustainable forest management and assessing progress towards this goal. They are tools to help identify trends in the forest sector and the effects of forest management interventions over time, and to facilitate decision making in national forest policy processes. The ultimate aim of these tools is to promote improved forest management practices over time, and to further the development of a healthier and more productive forest resource base.

1.2 In this context, the Third Meeting of the ASEAN Senior Officials on Forestry (ASOF) held from 10-12 July 2000 in Yangon, Myanmar, endorsed the "ASEAN Regional Criteria and Indicators for Sustainable Management of Natural Tropical Forests" which was then adopted at the 22nd. Meeting of the ASEAN Ministers on Agriculture and Forestry (AMAF) held from 26-27 October 2000 in Phnom Penh, Cambodia. This set of criteria and indicators was replaced in 2007 with the endorsement of the "ASEAN Criteria and Indicators for Sustainable Management of Tropical Forests," at the 10th. Meeting of ASOF held from 12-13 July 2007 in Vientiane, Lao PDR, and adopted by the 29th. Meeting of AMAF held on 1 November 2007 in Bangkok, Thailand.

1.3 With the formal establishment of the ASEAN Community on 31 December 2015, the post-2015 vision for the forestry sector in ASEAN is to ensure "forest resources are sustainably managed at the landscape level to meet societal needs, both socio-economically and culturally, of the present and future generations, and to contribute positively to sustainable development", which was endorsed at the 17th. Meeting of ASOF held from 12-13 June 2014 in Siem Reap, Cambodia.

1.4 The "Vision and Strategic Plan for ASEAN Co-operation in Food, Agriculture and Forestry" adopted at the 37th. Meeting of AMAF that was held on 10 September 2015 in Makati City, Philippines, further underlined that from "2016-2025, ASEAN will continue to enhance the sustainable management of forest resources, including protection and conservation of forests in an ecologically sound and integrated manner through regionally and internationally agreed criteria and indicators for sustainable forest management". Among the actions to be taken to realise this is to enhance the exchange of knowledge and experiences in implementing SFM and improve forest governance, including having an enabling environment and framework conditions for scaling up sustainable forest management and impact monitoring.

1.5 In addition, the ASEAN Vision 2020, released in December 1997, underscores the region's commitment for a common understanding to "promote the forestry sector as a model in forest management, conservation and sustainable development". This was further strengthened with the adoption of the ASEAN Economic Community (AEC) Blueprint 2025 on the occasion of the 27th. ASEAN Summit held from 21-22 November 2015 in Kuala Lumpur, Malaysia, where one of the strategic measures is to deepen integration of the forestry sector in ASEAN and the world through promoting sustainable forest management.

1.6 The ASEAN Socio-Cultural Community (ASCC) Blueprint 2025 that was also adopted at the 27th. ASEAN Summit held in Kuala Lumpur, Malaysia, has further

identified a number of key measures required to achieve a sustainable environment, including the need to strengthen regional co-operation on sustainable forest management; protect, restore and promote sustainable use of terrestrial ecosystems resources and halt biological diversity loss; promote capacity building and environment management of ecosystems and natural resources; and support the full implementation of the Strategic Plan for Biodiversity 2011-2020 and the Aichi Biodiversity Targets of the Convention on Biological Diversity (CBD).

1.7 The "Strategic Plan of Action (SPA) for ASEAN Co-operation in Forestry, 2016-2025" endorsed at the 19th. Meeting of ASOF that was held from 4-6 August 2016 in Vientiane, Lao PDR, and adopted at the 38th. Meeting of AMAF held on 6 October in Singapore the same year, has underscored in one of its seven strategic thrusts to enhance sustainable forest management through, among others, to "review and assess the implementation of the ASEAN Criteria and Indicators for Sustainable Management of Tropical Forests through the online and offline Monitoring, Assessment, and Reporting Format for Sustainable Forest Management in ASEAN (MAR Format) at both the national and forest management unit (FMU) levels".

2.0 SCOPE AND FORMAT

2.1 Achieving sustainable management of forest is the ultimate goal of forest management practices. All forest organisations and forest owners, especially those directly involved in the management, conservation and development of forest resources are responsible to carry out effective monitoring, assessment and reporting on the forest management practices implemented, based on the principles of sustainable forest management through the use of agreed criteria and indicators.

2.2 In practice, sustainable forest management 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. It also requires effective and accountable governance and the safeguarding of the rights of forest-dependent peoples.

2.3 This document covers criteria and indicators for both natural and planted forests, unless otherwise identified specifically for natural or planted forests, are at the national, forest management unit (FMU) and landscape levels. All criteria are valid at the national, FMU and landscape levels. The level at which an indicator applies is denoted by "++" if fully applicable, "+" if partially applicable, and "x" if not applicable.

2.4 The document has taken into account the recent development in international forest policy dialogues, such as those related to climate change mitigation and adaptation and the emerging issues related to, among others, REDD+; the CBD's Aichi Biodiversity Targets; the Sustainable Development Goals (SDGs); and the recent work of the International Tropical Timber Organisation (ITTO) on Voluntary Guidelines for the Sustainable Management of Natural Tropical Forests, 2015 and the Criteria and Indicators for Sustainable Management of Tropical Forests, 2016.

2.5 More specifically, the seven criteria have been aligned with those adopted in the ITTO's Criteria and Indicators for Sustainable Management of Tropical Forests, 2016.

The order of presentation of the criteria does not indicate any priority or relative importance. In brief, Criterion 1 on Enabling Conditions for Sustainable Forest Management addresses the legal, policy and institutional and governance framework that are necessary to make sustainable forest management succeed, while Criterion 2 on Extent and Condition of Forests lays the basic foundation for sustainable forest management within a well-planned distribution of production and protection forests. Criterion 3 on Forest Ecosystem Health and Resilience is concerned with the (increasing) risk to forests posed by destructive agents and stresses. Criterion 4 on Forest Production and Criterion 5 on Forest Biological Diversity, as well as Criterion 6 on Soil and Water Protection, are concerned with maintaining the multiple functions of forests to deliver products and environmental services. Criterion 7 on Economic, Social and Cultural Aspects addresses the economic, social and cultural values of forests and the extent to which forest management maintains those values.

2.6 The elaboration of the indicators has also been based on the ITTO's Criteria and Indicators for Sustainable Management of Tropical Forests, 2016, while taking into account the experience and lessons learned in implementing the ASEAN Criteria and Indicators for Sustainable Management of Natural Tropical Forests, 2007.

2.7 In this regard, the indicators have been defined so they are clear and practical to assess and monitor and, to the greatest extent possible, are based on available knowledge and data. The measurement of any one of those indicators over time will provide information that is both necessary and significant in assessing progress towards achieving sustainable forest management.

2.8 It is important to address criteria and indicators at the national, FMU, and landscape levels for three reasons. First, the overall sustainability of the management of a nation's forests depends substantially upon actions taken at the national level, such as legislation and land-use planning. Second, the evaluation of sustainable forest management at the national level depends upon the quality of management of the aggregate of all forest management units. And thirdly, the landscape level affords a means for considering several land-use systems, such as forestry, agriculture and livestock production, in a more integrated manner and to reconcile the varying needs among stakeholders where in practice tradeoffs will usually have to be made in the mix of products, environmental services and values offered by forests.

2.9 The criteria and indicators at the national and the forest management unit generally fall into two categories which are different in kind. First, there are many that are technical in nature - they refer to the state of the forest itself, such as its extent, the quality of its management and the goods and services actually derived from it. Secondly, there are others which may be better described as enabling conditions and mechanisms, where in the absence of these, sustainable forest management is unlikely to succeed. Examples are institutional matters such as sufficient qualified personnel and adequate research, sufficient financial resources and social considerations such as wide consultation, especially on use rights and land tenure. In both sets, quantitative indicators have been suggested wherever possible but, in some instances where this is not possible, qualitative or descriptive indicators are used.

2.10 However, it is clear that information is not readily available for all indicators in any given country as AMS are at varying level of socio-economic development, as well as the uniqueness of each country in terms of quantity, quality, and the diversity of forest

resources,. Where data are lacking, a self-rating system for assessing data quality (for example, “high”, “medium” or “low”) at the indicator level could be used in national criteria and indicators reporting systems, where a rating of “low” data quality might exclude such data from ASEAN’s aggregated reporting.

3.0 DEFINITIONS

The following are key definitions of some of the most important terms used in this document and, unless otherwise stated, are adopted from the ITTO’s Criteria and Indicators for Sustainable Management of Tropical Forests, 2016.

Afforestation	The establishment of a planted forest on non-forested land.
Agroforestry	A collective term for land-use systems and technologies in which woody perennials (trees, shrubs, palms, bamboos, etc.) are deliberately used on the same land-management units as agricultural crops and/or animals, in some form of spatial arrangement or temporal sequence. In agroforestry systems there are both ecological and economical interactions between the different components. (Source: Nair, P.K.R 1993 - An Introduction to Agroforestry. Kluwer Academic Publishers in co-operation with the International Centre for Research in Agroforestry. Dordrecht, Netherlands).
Allowable harvest (cut)	The volume of commercial wood that may be harvested in a given area (e.g. a forest management unit) in a specified period.
Biodiversity	See *biological diversity.*
Biological diversity	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. (Source: Convention on Biological Diversity, Article 2).
Carbon pools	Defined places in forest ecosystems where carbon is stored. The Intergovernmental Panel on Climate Change distinguishes five carbon pools in the category of land-use, land-use change and forestry, namely: (i) living biomass above and (ii) below ground, (iii) dead biomass above ground, (iv) litter, and (v) organic soils.
Criterion	A category of conditions or processes by which

	sustainable forest management may be assessed.
Degraded forest	Forest that delivers a reduced supply of goods and environmental services from a given site and maintains only limited biodiversity. Degraded forest has lost the structure, function, species composition and/or productivity normally associated with the natural forest type expected at that site.
Degraded forest land	Former forest land severely damaged by the excessive harvesting of wood and/or non-wood forest products, poor management, repeated fire, grazing or other disturbances or land-uses that damage soil and vegetation to a degree that inhibits or severely delays the re-establishment of forest after abandonment.
Ecosystem	A dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit. (Source: Convention on Biological Diversity, 1994).
Endemic species	A species native to, and restricted to, a particular geographical region
Environmental services	The benefits people obtain from forest ecosystems. They include provisioning services, such as food and water; regulating services, such as the regulation of floods, droughts, land degradation and disease; supporting services, such as soil formation and nutrient cycling; and cultural services, such as recreational, spiritual, religious and other non-material benefits. Forest environmental services perform a range of functions, such as: moderating weather extremes and their impacts; dispersing seeds; mitigating drought and floods; cycling and moving nutrients; protecting stream and river channels and coastal shores from erosion; detoxifying and decomposing wastes; controlling agricultural pests; maintaining biodiversity; generating and preserving soils and renewing their fertility; contributing to climate stability; purifying air and water; and pollinating crops and natural vegetation. Tropical forests provide all these services and are often particularly important for carbon sequestration, biodiversity conservation, the protection of water catchments and the regulation of regional climates.
Forest	Defined at the national level. In general terms, a forest is land containing trees with a minimum specified percentage tree canopy cover, with trees capable of reaching a minimum specified height *in situ* when mature.

Forest degradation	The reduction of the capacity of a forest to produce goods and environmental services. 'Capacity' includes the maintenance of the elasticity of ecosystem structures and functions.
Forest-dependent species	Species unable to complete at least one part of their life cycle outside the forest.
Forest governance	The process of governance in a forest area.
Forest management unit (FMU)	A clearly defined forest area, managed to a set of explicit objectives according to a long-term management plan. It may be a large contiguous forest concession or community forest, or a group of small forestry operations, possibly with more than one owner; the unifying element is a common system of management.
Forest restoration	A management strategy applied in degraded forests with the aim of restoring the forest to its pre-degradation state (e.g. in function, structure and species composition).
Forest stakeholders	Individuals or groups who are directly or indirectly affected by, or interested in, a given forest and with a stake in it.
Forest type	A naturally occurring community of trees and associated plant species of definite botanical composition with uniform physiognomy (structure) and growing in uniform ecological conditions whose species composition remains relatively stable over time.
Fuelwood	Roundwood that will be used as fuel for purposes such as cooking, heating or power production. It includes wood harvested from main stems, branches and other parts of trees (where these are harvested for fuel) and wood that will be used for charcoal production (e.g. in pit kilns and portable ovens). (Source: Adapted from the FAO/UNECE/Eurostat/ITTO Joint Forest Questionnaire: Definitions).
Governance	The process of determining 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

	governments are accountable to their citizens, and how society obliges its members to observe its rules and laws. (Source: Towards Voluntary Guidelines on Responsible Governance of Tenure of Land and other Natural Resources. Discussion paper prepared by the Land Tenure and Management Unit, FAO Rome, 2009).
Indicator	A quantitative, qualitative or descriptive attribute that, when measured or monitored periodically, indicates the direction of change in a criterion.
Indigenous peoples	Indigenous communities, peoples and nations are those which, having a historical continuity with pre-invasion and pre-colonial societies that developed on their territories, consider themselves distinct from other sectors of the societies now prevailing on those territories, or parts of them. They form at present non-dominant sectors of society and are determined to preserve, develop and transmit to future generations their ancestral territories, and their ethnic identity, as the basis of their continued existence as peoples, in accordance with their own cultural patterns, social institutions and legal systems. (Source: Working definition adopted by the UN Working Group on Indigenous Populations. In: E/CN.4/Sub.2/1994/2 dated 5 April 1994).
Industrial roundwood	All roundwood, except fuelwood, comprising sawlogs and veneer logs, pulpwood, round and split, roughly squared or in other form (e.g. branches, roots, stumps and burls, where these are harvested) felled or otherwise harvested and removed. It comprises all wood removed from forests and from trees outside forest, with or without bark, including wood recovered from natural, felling and logging losses. (Source: Adapted from the FAO/UNECE/Eurostat/ITTO Joint Forest Questionnaire: Definitions).
Invasive species	A 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, either pristine or modified by humans.
Managed natural forest	Natural forests managed or exploited for wood or non-wood forest products, wildlife or other purposes. The more intensive the use, the more that forest structure and composition is altered compared with primary forests. Ecologically, such alterations often represent shifts to earlier successional stages. Two major

	categories can be distinguished: managed primary forest, and degraded and secondary forests.
Native species	A species that grow naturally in the wild in a particular region.
Natural forest	Forest composed of native species and in which trees regenerate by self-sown seeds or natural vegetative means. (Source: Wadsworth, F.H. 1997 - Forest Production for Tropical America. Agricultural Handbook 710. United States Department of Agriculture Forest Service, Washington, DC.).
Non-wood forest products	Goods of biological origin other than wood (i.e. they exclude woodfuel) derived from forests, other wooded land and trees outside forests. They include non-timber forest products.
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 fulfill a combination of these functions. The main categories of the permanent forest estate are protection and production.
Planted forest	A forest stand that has been established by planting or seeding.
Primary forest	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.
Production PFE	That part of the PFE assigned to the production of wood and/or other extractive uses.
Protected area	An area of land and/or sea especially dedicated to the protection and maintenance of biological diversity, and of natural and associated cultural resources, and managed through legal or other effective means.
Protection PFE	That part of the PFE in which the production of wood (and commonly other extractive uses) is prohibited.
REDD+	Policy approaches and incentives for reducing emissions from deforestation and forest degradation, including the role of conservation, sustainable

	management of forests and enhancement of forest carbon stocks.
Reforestation	The re-establishment of trees and understorey plants at a site immediately after the removal of natural forest cover.
Resilience	The capacity of a forest ecosystem or landscape to maintain or regain a desired ecological condition 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 forest	Woody vegetation regrowing on land that was largely cleared of its 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.
Stakeholders	Any individuals or groups who are directly or indirectly affected by, or interested in, a given resource and that have a stake in it. Also *forest stakeholders.*
Sustainable forest management	The process of managing forest to achieve one or more clearly specified objectives of management with regard to the production of a continuous flow of desired forest products and services without undue reduction of its inherent values and future productivity and without undue undesirable effects on the physical and social environment.
Tenure	Agreement(s) held by individuals or groups, recognised 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.
Use 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.

4.0 ASEAN CRITERIA AND INDICATORS

Criterion 1: Enabling Conditions for Sustainable Forest Management

This criterion addresses the enabling conditions for sustainable forest management at the national/sub-national, local (FMU) and landscape levels. It covers the general institutional requirements that are necessary to make sustainable forest management succeed. Most of the related indicators cover the legal, policy, institutional and governance frameworks and are mainly descriptive in nature. Taken together, the information gathered under this criterion indicates the extent of a country's political commitment to sustainable forest management.

Indicators	National Level	FMU Level	Landscape Level
Policy, legal and governance framework*:* Indicators 1.1-1.3			
To ensure sustainable forest management it is important that forest resources, especially the PFE, are secured and protected and that they are managed in accordance with best management practices involving all stakeholders, in particular local communities who are dependent on the forest.			
Policies, laws and regulations for governing forests			
1.1 Existence and implementation of a framework of policies, laws and regulations to govern forest management. (a) national sustainable forest management objectives, including production, conservation, protection and investment (b) establishment and security of the PFE (c) forest tenure and associated rights in relation to forests (d) enlargement of the PFE from other forest land areas (e) mechanisms for cross-sectoral policy co-ordination (f) participation of local communities and other stakeholders in forest management (g) control of illegal activities in forest areas (h) control of forest management operations (i) control of forest fire (j) health and safety of forest workers	++	+	X
Forest tenure and ownership			
1.2 Extent (area) of forest tenure and ownership[1] for the following classes and categories:	++	+	X

[1] Annex 1 provides further details of *forest* land ownership categories.

Indicators	National Level	FMU Level	Landscape Level
(a) PFE that belongs to the Public sector (i) state/federal (incl. concessions) (ii) municipalities, communal or public associations (iii) other public (please specify) (b) PFE that belongs to the Private sector (i) private investment firms (ii) foundations (iii) private associations of smallholders, communities (iv) individuals, families (c) PFE that belongs to indigenous communities (d) Non-PFE that belongs to the Public sector (i) state/federal (incl. concessions) (ii) municipalities, communal or public associations (iii) other public (please specify) (e) Non-PFE that belongs to the Private sector (i) private investment firms (ii) foundations (iii) associations of smallholders, communities (iv) individuals, families (f) Non-PFE that belongs to indigenous communities			
Forest governance Forest governance can best be described as the ways and manner by which officials and institutions acquire and exercise authority in the management of forest resources. It would include adherence to the rule of law, transparency and low levels of corruption, stakeholder inputs in decision making, accountability of all officials, low regulatory burden and political stability.			
1.3 Extent of implementation of forest governance which is characterised by the following questions: (a) does the forest law include a specific statement that constitutes the national (or sub-national, where applicable) policy for, or objective of, sustainable forest management? (b) are the laws governing the use of forest resources consistent and clear? (c) do laws recognise traditional and indigenous rights to forest resources, including the principle of free, prior, informed consent? (d) are there mechanisms in government to address forest-related policies and implementation cross-sectorally? (e) does the law protect non-marketed goods and services (e.g. ecosystem integrity, water quality, cultural resources)?	++	X	X

Indicators		National Level	FMU Level	Landscape Level
	(f) are stakeholders able to provide input to the creation of forest policies, public forest management plans and subsidiary rules? (g) are inventory data, management plans, laws and budgets for state-owned forests easily accessible to the public? (h) is the collection, sharing and redistribution of forest taxes, royalties, charges and rents effective? (i) does the administration's effort to combat forest crimes encompass the whole forest supply chain (transport, processing and trade)? (j) do serious conflicts exist between the state and stakeholders that interfere with forest use? (k) does the public have opportunities to report corrupt practices to appropriate authorities? (l) are there regular audits of the forest agencies, and is action taken on the findings? (m) do communication strategies and feedback mechanisms exist to increase awareness of sustainable forest management?			
Economic framework*:* Indicators 1.4 and 1.5				
	One of the most important requirements for sustainable forest management to succeed is the availability of financial resources, as well as the provision of appropriate economic instruments and incentives that promote and support sustainable forest management. Capturing the full value of forests, including forest products and environmental services, and ensuring the equitable distribution of costs and benefits, are essential for sustainable forest management.			
1.4	Amount of funding in forest management, administration, research and human resource development from: (a) government sources (i) national government (ii) sub-national government (b) international development/aid partners (i) grant (ii) loan (c) private sources (i) domestic (ii) foreign	++	X	X
1.5	Existence and implementation of economic instruments and other incentives to encourage sustainable forest management.	++	X	X

Indicators		National Level	FMU Level	Landscape Level
Institutional framework: Indicators 1.6 and-1.7				
Besides the availability of financial resources, there must be capable institutions with effective linkages between them and personnel to undertake sustainable forest management. These include effective implementing agencies, research institutions and sufficient appropriately trained personnel to ensure that management is in accordance with scientific, technical, socio-economic and traditional knowledge.				
1.6	Structure, responsibility and staffing of institutions responsible for sustainable forest management.	++	+	X
1.7	Number of professional (degree holders) and technical personnel (diploma/certificate holders) and trained forest workers at all levels, both governmental and non-governmental, to perform and support forest management and downstream forest product industries and trade.	++	++	X
Planning and monitoring framework*:* Indicators 1.8-1.12				
Adequate planning is needed over areas large enough to be resilient in the face of environmental change and to maintain ecological integrity. Landscape-scale planning is thus essential for the sustainable management of natural resources, including forests, and it requires co-ordinated inter-institutional action and the participation of diverse stakeholders, including adequate framework, the use of appropriate technologies and effective monitoring and control.				
1.8	Mechanisms used to formulate land-use policies and the extent to which sustainable forest management planning is part of landscape-level planning where multiple-use forest management is integrated.	++	+	++
1.9	Capacity and mechanisms for management planning and for periodic monitoring, evaluation and feedback on progress.	++	++	X
1.10	Extend of stakeholder participation in land-use and forest management planning, decision-making, data collection, monitoring and assessment, including institutions involved.	++	X	++
1.11	Existence and number of forest management plans, and area covered, for production and protection forests in the PFE.	++	+	X
1.12	Existence of long-term projections, strategies and plans for production PFE and protection PFE.	++	X	++

Criterion 2*:* Extent and Condition of Forests

Sustainable forest management is a long-term enterprise and depends critically upon the stability and security of a nation's forest estate. Hence, this criterion lays the basic foundation for sustainable forest management within a well-planned distribution of production and protection forests. It considers the extent and percentage of land under natural and planted forests and the wider context of land-use planning, the need for production, protection, and the conservation of biological diversity through the maintenance of a range of forest types, as well as other social, economic and environmental services; and the integrity and condition of forest resources.

Indicators		National Level	FMU Level	Landscape Level
Extent and Condition of Forests: Indicators 2.1-2.9				
2.1	Extent (area) and percentage of total land area under comprehensive land-use plans.	++	+	++
2.2	Extent (area) of forests committed to production and protection under: (a) natural forests (i) PFE (ii) non-PFE (b) planted forests (i) PFE (ii) non-PFE	++	++	X
2.3	Extent (area) and percentage of total land area under each forest type for: (a) PFE (b) Non-PFE	X	++	X
2.4	Extent (area) and number of multi-year forest management plans in FMUs. (a) production forests: natural forests and natural regeneration forests, including protected areas in production forests (b) production forests: planted forests (c) protected forests, including for soil, water and biodiversity	X	++	X

Indicators		National Level	FMU Level	Landscape Level
2.5	Percentage of the PFE with boundaries physically demarcated for: (a) production forests (b) protection forests	++	X	++
2.6	Changes in forested area in the PFE and non-PFE[2] as a result of: (a) forest area legally converted to agriculture since previous report (b) forest area legally converted to settlements and infrastructural development since previous report (c) forest area legally converted for other purposes since previous report (please specify) (d) area legally converted to forests since previous report (e) forest area deforested illegally since previous report (estimate) (f) forest area added since previous report (i) planted forest (afforestation) (ii) natural regrowth (as available)	++	X	++
2.7	Forest condition of the PFE and non-PFE for: (a) area of undisturbed[3]/unmanaged natural forest (b) area of managed natural forest (c) area of degraded natural forest (d) area of secondary forest (successional forest) (e) area of degraded forest lands presently unstocked	++	X	++
2.8	Extent (area) of forest areas under compliance schemes (a) forest management certification (i) natural forests, including natural regeneration forests (ii) planted forests (b) other legality assurance system	++	++	++

[2] The baseline for this indicator should be the extent of the PFE and non-PFE at the time of a country's first report. It is only in subsequent reports that changes can be recorded.

[3] Undisturbed natural forests are forests without visible disturbances by humankind.

Indicators	National Level	FMU Level	Landscape Level
2.9 Total amount of forest carbon in the PFE and non-PFE for:	++	X	X
(a) PFE			
(i) above-ground			
(ii) below-ground			
(iii) all five carbon pools[4]			
(b) Non-PFE			
(i) above-ground			
(ii) below-ground			
(iii) all five carbon pools			

[4] The five carbon pools in forests are: (i) above-ground biomass; (ii) below-ground biomass; (iii) dead wood; (iv) litter; and (v) soil organic matter.

Criterion 3: Forest Ecosystem Health and Resilience

This criterion relates to the healthy biological functioning of forest ecosystem and its resilience. Natural tropical forests and planted forests can be affected by a variety of human actions, such as encroachment, illegal harvesting, human-induced fire, pollution and contamination, animal grazing, mining, poaching, invasive species and the spread of pests. Forests are also affected by natural phenomena, such as extreme weather events (e.g. severe winds, heavy rainfall, flooding and drought), fire, and pests and diseases. Sustainable forest management requires attention to forest health, which may include restoring vulnerable and degraded forests and taking measures to increase the resilience of forest ecosystems.

Indicators	National Level	FMU Level	Landscape Level
Addressing threats to, and vulnerabilities of, forests: Indicators 3.1-3.3			
There is concern in tropical countries about the impacts of climate change and climate variability on forest health. Approaches are needed to monitor the threats to, and vulnerability of, forest ecosystems. Specific management practices may be required to monitor damage, keep abreast of emerging threats, and determine when interventions are necessary.			
3.1 Extent and nature of threats to forests caused by direct humans activities and the control procedures applied, for five human activities most damaging to the PFE and non-PFE, for example: (a) encroachment (b) agriculture (c) roads (d) mining (e) dams (f) fire (g) shifting cultivation (h) illegal exploitation (i) inappropriate harvesting practices (j) inappropriate silvicultural practices (k) over-hunting (l) poaching (m) over-grazing (n) invasive species (o) harvesting more than once during the cutting cycle (re-entry)	++	++	++

Indicators		National Level	FMU Level	Landscape Level
3.2	Extent and nature of forest degradation and disturbance due to natural causes and the control procedures applied, for five natural causes most damaging to the PFE and non-PFE, for example: (a) wild fire (b) drought (c) storms (d) insects (e) diseases (f) floods (g) landslides	++	++	++
3.3	Procedures for monitoring the frequency and assessing the severity of climate-change impacts on natural and planted forests, and measures to address resilience of trees and forest ecosystems, including adaption measures.	X	X	++
Restoration of degraded forests and lands: Indicators 3.4 and 3.5 The objective of forest and landscape restoration is to restore degraded landscapes to a healthy and productive state in order to fulfil the needs of people and the environment in a sustainable manner, through collaborative approaches to harmonise the land-use decisions of stakeholders. It aims to restore ecological integrity, forest resilience and economic productivity and enhancing the socio-economic development of local communities.				
3.4	Procedures to identify the degree of forest degradation at the landscape level and the formulation of national/sub-national forest restoration strategy and/or plan, including participatory monitoring of landscape restoration activities with the participation of local stakeholders.	++	X	++
3.5	Extent (area) of formerly degraded forest or forest land restored through natural regeneration/combination of enrichment, or through plantations, including in agroforestry systems.	++	X	++

Criterion 4: Forest Production

The objective of this criterion is to maintain the multiple functions of forests and their capacity to deliver goods and environmental services. Such functions and capacity can only be sustained in the long term if forest management is economically and financially viable, environmentally sound and socially acceptable.

Forests earmarked for timber production are able to fulfil a number of other important forest functions, such as environmental protection, carbon storage and the conservation of species and ecosystems. These multiple roles of the forest should be safeguarded by the application of sound management practices that maintain the potential of the forest resource to yield the full range of benefits to society.

Indicators	National Level	FMU Level	Landscape Level
Resource assessment: Indicators 4.1-4.4			
Forest resource assessments carried out periodically are vital for ensuring the sustainable production of forest goods and environmental services for society. They provide the necessary information not only on the quantities of wood and non-wood products that may be harvested sustainably but also on other forest values and how those might change over time.			
4.1 Extent (area) and percentage of forest in the PFE and non-PFE for which inventory and survey procedures have been used to define the quantity of the following main forest products: (a) timber (industrial roundwood) (b) other wood (locally used, fuelwood) (c) non-wood forest products	X	++	X
4.2 Actual and allowable harvest of wood and non-wood forest products, including total number of species harvested, in natural forests of the PFE and non-PFE for: (a) timber (industrial roundwood) (b) other wood (locally used, fuelwood) (c) non-wood forest products	++	++	X

Indicators		National Level	FMU Level	Landscape Level
4.3	Actual harvest of five most important species of wood and non-wood products in planted forests for product categories: (a) timber (industrial roundwood) (please specify) (b) other wood (locally used, fuelwood) (please specify) (c) non-wood forest products (please specify)	++	++	X
4.4	Forest carbon conserved through sustainable management and conservation of natural forests and through afforestation and reforestation in degraded forests and non-forested areas[5].	++	X	X
Harvesting Planning and control procedures: Indicators 4.5-4.8				
Harvesting planning procedures in natural forests should enable good technical control, provide safe, healthy, working conditions, minimise costs, and reduce environmental impacts. It is through sound and effective harvest planning procedures and control that investment in forestry activities will yield adequate financial, economic and social returns to society while minimising environmental damage.				
4.5	Existence and implementation of: (a) forest harvesting/operational plans in natural production forests (within forest management plans[6]) (b) other harvesting permits (small-, medium- and large-scale permits without forest management plans)	X	++	X

[5] Include all forest-related climate-change mitigation programmes, such as REDD+, forest-related Nationally Appropriate Mitigation Actions, INDCs, Clean Development Mechanism on Afforestation/Reforestation.

[6] The Forest Management Plan, appropriate to the scale and intensity of the operations, should provide:
(a) management objectives;
(b) description of the forest resource to be managed, environmental limitations, land use and ownership status, socio-economic conditions, and information of adjacent lands;
(c) description of silvicultural and/or other management system based on the ecology of the forest in question and information gathered through resource inventories;
(d) rationale for rate of annual harvest and species selection;
(e) provisions for monitoring of forest growth and dynamics;
(f) environmental safeguards based on environmental assessments;
(g) plans for the identification and protection of endangered, rare and threatened species;
(h) maps depicting the forest resource base, including protected areas, planned management activities and land ownerships; and
(i) descriptions and justification of harvesting techniques and equipment used.

Indicators		National Level	FMU Level	Landscape Level
4.6	Extent (area) of compartments/coupes harvested and the number of permits issued in the PFE and non-PFE according to: (a) harvesting/operational plans (b) any other harvesting/cutting permit	X	++	X
4.7	Existence and implementation, including parties involved, *of* forest products tracking systems or similar control mechanisms.	++	X	++
4.8	Availability of historical records on the extent, nature and management of forests.	++	++	+

Silvicultural and harvesting guidelines: Indicators 4.9-4.13

Clear silvicultural guidelines will ensure that all forest operations are carried out according to high standards. In natural forests, these can include pre-harvesting inventories for prescribing sustainable cutting levels for wood and non-wood forest products, post-harvesting inventories for assessing the condition of logged-over forests and the types of silvicultural treatments required to ensure adequate regeneration and long-term forest health. Procedures are also needed to reduce forest damage caused by harvesting and on silviculture in planted forests, forest restoration, and for the monitoring and evaluation of management practices.

4.9	Availability and the extent of implementation of harvesting and silvicultural systems and guidelines for wood and non-wood forest products in natural and planted forests.	X	++	+
4.10	Availability and the extent of post-harvesting surveys to assess the effectiveness of harvesting and silvicultural activities to enhance forest stands and tree regeneration establishment.	X	++	+
4.11	Availability and extent of monitoring data being archived to allow the evaluation of the cumulative effects of harvesting systems and silvicultural treatments over time.	X	++	+
4.12	Availability and the extent of implementation of silvicultural management systems in planted forests (species selection, silvicultural treatments, fire, pests and diseases control, water management, etc.).	X	++	X

Indicators		National Level	FMU Level	Landscape Level
4.13	Extent (area) over which silvicultural systems in natural production forests and planted forests of the PFE are effectively implemented and monitored.	++	++	+

Criterion 5: Forest Biological Diversity

This criterion relates to the conservation and maintenance of biodiversity, including ecosystem, species and genetic diversity, with an emphasis on biodiversity conservation in production forests and at the landscape scale. As such, the establishment and management of a geographic system of protected areas of representative forest ecosystems can contribute to maintaining biological diversity. Biological diversity can also be conserved in forests managed for other purposes, such as for production, through the application of appropriate management practices. The general principles and definitions used here are those established by the Convention on Biological Diversity and the International Union for Conservation of Nature (IUCN).

Indicators	National Level	FMU Level	Landscape Level
Ecosystem diversity: Indicators 5.1 and 5.2			
The conservation of ecosystem diversity can best be accomplished by maintaining functional landscapes and through the establishment and management of a system of protected areas (combinations of IUCN categories I-VI)[7] containing representative samples of all forest types linked as far as possible by biological corridors or 'stepping stones'. This can be ensured by effective land-use policies and systems for choosing, establishing and maintaining the integrity of protected areas in consultation with and through the involvement of local communities.			
5.1 Extent of protected areas classified according to IUCN protected area categories I-II, III-IV, and V-VI: (a) number of protected areas (not necessarily forested; excluding sea) (b) extent of forest in protected areas (ha) (c) range in size (smallest to largest protected area; ha) (d) represented ecological forest types (list) (e) under-represented ecological forest types (list)	++	+	X
5.2 Extent of buffer zone management and number of protected areas connected by biological corridors or 'stepping stones' for IUCN categories: (a) I-II (b) III-IV (c) V-VI	++	+	X

[7] See Annex 2 on Definitions of IUCN Protected Area Management Categories.

Indicators		National Level	FMU Level	Landscape Level
Species diversity: Indicators 5.3 and 5.4				
Although the conservation of biological diversity is best assured by preventing species from becoming rare, threatened or endangered, it is also important to have national/sub-national procedures for monitoring and protecting species diversity. Emphasis should be given to the monitoring of key tree species in production forests.				
5.3	Existence and implementation of procedures to identify and conserve tree species diversity in natural tropical forests.	X	++	X
5.4	Statistics of number of threatened[8] forest-dependent species in natural tropical forests, including endemic species and those legally protected at national level for: (a) trees (b) flowering plants (except trees) (c) ferns (d) mammals (e) birds (e) reptiles (f) amphibians (g) freshwater fish (h) butterflies (i) others (please specify)	++	+	X
Genetic diversity: Indicator 5.5				
The effective conservation of biological diversity requires the maintenance of the genetic diversity of all species of fauna and flora. This may be difficult to ensure in practice and it is appropriate to focus limited resources on species that are threatened or which have identified commercial values.				
5.5	Report on measures for *in situ* and/or *ex situ* conservation of genetic variation within specified forest flora and fauna.	++	+	X

[8] "Threatened" includes vulnerable, endangered or critically endangered according to the IUCN. See Annex 3 on IUCN Endangerment Status Categories.

Indicators		National Level	FMU Level	Landscape Level
Procedures for biodiversity conservation in production forests*:* Indicators 5.6 and 5.7				
Management measures in production forests can make important contributions to the conservation of biodiversity (for example, logging intensity is directly related to the presence or absence of birds and other seed distributors), which should be fully integrated into forest management plans and harvesting plans and thus contributing to forest quality and making conservation in neighbouring protected areas more effective[9].				
5.6	Existence and implementation of procedures for biodiversity conservation in natural production forests. (a) area set aside for biodiversity conservation in natural production forests (FMU level) (b) measures for retaining undisturbed areas (FMU level) (c) procedures for protecting ecologically important features (e.g. nesting sites, seed trees, niches and keystone species) (d) procedures for protecting particular tree species and other plants for local livelihood needs, cultural values, food security, etc. (e) average volume of wood harvested (FMU level)	+	++	X
5.7	Existence and implementation of procedures for biodiversity conservation in planted forests, including afforestation and reforestation activities, and measures taken to conserve native fauna and flora in planted forest landscapes[10].	X	++	X

[9] Detailed guidelines are given in the ITTO Policy Development Series No. 17- *ITTO/IUCN Guidelines for the Conservation and Sustainable Use of Biodiversity in Tropical Timber Production Forests*.

[10] For example, keeping natural sites along waterways, create biological corridors or stepping stones.

Criterion 6: Soil and Water Protection

The importance of this criterion is two-fold. First, it addresses the crucial landscape-scale role of forests in maintaining downstream water quality and flow and controlling flooding and sedimentation, and second, it plays a crucial role in maintaining the productivity and quality of soil and water within forests and associated aquatic ecosystems, and therefore forest health and condition.

Quantitative indicators of the effects of forest management on soil and water include such measures as soil productivity within the forest and data on water quality and average and peak water flows for streams emerging from the forest. This information is 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 (e.g. slope, geological structure and the inherent erodibility of the soil type).

The protection of soil and water is therefore best ensured by specific guidelines for different situations; these can only be based on experience and research. Valid national indicators can only be derived from the aggregation of data from indicators at the landscape and FMU levels, or from the existence and adequate enforcement of national guidelines in conformity with variations in local conditions.

Indicators		National Level	FMU Level	Landscape Level
Extent of protection*:* Indicators 6.1-6.3				
An essential element of multi-purpose forest management is the landscape-scale maintenance of downstream benefits, such as water quality and flow and reductions in flooding and sedimentation.				
6.1	Extent (area) and percentage of total forest area (natural and planted, PFE and non-PFE) managed primarily for the protection of soil and water; and for other protection purposes (please specify).	++	+	++
6.2	Procedures in both PFE and non-PFE to ensure the protection of downstream catchment values.	++	+	++
6.3	Extent of implementation of procedures to protect downstream catchment values and their integration into national and/or regional disaster risk management.	++	+	++
Protective functions in production forests: Indicators 6.4-6.6				
As an integrative part of multi-purpose forest management, it is important to ensure effective soil and water management as a way of maintaining the productivity and health of forests and their hydrological regulation functions.				

Indicators		National Level	FMU Level	Landscape Level
6.4	Procedures to protect soil productivity and water retention capacity within production forests, and the extent of their implementation to prevent the degradation of forest soils and water.	X	++	++
6.5	Procedures for forest engineering in soil and water protection, including: (a) measures to ensure adequate water management (drainage) during and after wood harvesting (b) requirements of buffer strips along streams and rivers (c) measures to minimise soil compaction by harvesting machinery (d) measures to protect soil from erosion during harvesting operations	X	++	X
6.6	Extent (area) and percentage of areas in the production PFE that have been defined as environmentally sensitive (e.g. very steep or erodible) and protected.	X	++	X

Criterion *7:* Economic, Social and Cultural Aspects

This criterion deals with the economic, social and cultural aspects of forests. A well-managed forest is a self-renewing resource producing a host of benefits, which might include supplying high-quality timber and satisfying the basic needs of people living in and around the forest. It also contributes to the quality of life of the population by providing opportunities for recreation and ecotourism, as well as by generating employment and investment in processing industries. Sustainably managed forest, therefore, can make important contributions to the overall sustainable development of the country.

Indicators	National Level	FMU Level	Landscape Level
Economic aspects: Indicators 7.1-7.3			
The economic challenge for forest management is to make sustainable forest management a profitable activity that is attractive to investors and competitive with other land uses. A viable forest products industry is likely to be an essential element in addressing this challenge.			
7.1 Value and percentage contribution of the forestry sector to Gross Domestic Product (GDP).	++	+	+
7.2 Value of domestically produced wood, non-wood forest products and environmental services in: (a) domestic markets (b) export markets, within and outside ASEAN (c) informal markets, including subsistence and illegal activities (estimate)	++	X	X
7.3 Forest products' industry structure (number of companies and employment) and efficiency (log input and products output) for: (a) primary wood processing (b) secondary wood processing (c) tertiary wood processing (d) industrial non-wood forest product processing (please specify products)	++	++	+

Indicators		National Level	FMU Level	Landscape Level
Social and cultural aspects: Indicators 7.4-7.12				
Sustainable forest management should recognise and aim to meet social and cultural needs as they relate to forests, including by ensuring the provision of education, employment and safe working conditions. Forest management decisions should consider the livelihood needs of forest-dependent people. It should also be participatory and inclusive, and the costs and benefits should be shared equitably among involved parties.				
7.4	Existence of policies and implementation of mechanisms for the equitable sharing of the costs and benefits of forest management[11].	X	++	X
7.5	Existence and implementation of conflict-resolution mechanisms for resolving disputes between forest stakeholders.	X	++	++
7.6	Statistics of number of people depending on forests for their livelihoods: (a) employed in forest management operations (b) employed in forest industry (c) other indirect employment (d) subsistence	++	++	+
7.7	Existing capacity for training and manpower development programmes for the workforce in forest management operations and forest industry.	++	++	+
7.8	Statistics of number and main focus of universities, technical institutions, vocational training and other professional schools with formal programmes on sustainable forest management.	++	++	+

[11] Matters which may be taken into account include:
(a) the equitable treatment of interested parties in activities related to the use and management of forests;
(b) the opportunity for interested parties to be employed under comparable conditions to those in other economic sectors;
(c) the existence of effective mechanisms for communication and the resolution of conflicts between interested parties;
(d) the possession by the public of an effective voice in decisions relating to forest management;
(e) the share of the profits received by forest companies to be reasonable in relation to benefits received by other parties; and
(f) the ability of forest landowners or right-holders (government, private, community, etc.) to receive a fair return for the use of their resources.

Indicators		National Level	FMU Level	*Landscape* Level
7.9	Existence of policies and implementation of procedures to ensure the health and safety of forest workers.	+	++	X
7.10	Area of forests in the forest management unit (FMU) upon which people are dependent for subsistence and traditional use, and the number of people involved.	X	++	++
7.11	Number and extent (area) of forest sites available primarily for: (a) research and education (b) recreation and tourism	++	X	X
7.12	Number and extent (area) of important archaeological, cultural and spiritual sites identified and protected.	++	X	X
Community and indigenous peoples' rights and participation in forest management: Indicators 7.13-7.15				
Community participation is vital at all levels of forestry operations to ensure transparency and accountability in forest management, conservation and development and that all interests and concerns are taken into account. This requires openness from forest agencies, forest owners and concessionaires.				
7.13	Extent to which tenure and use rights of local communities and indigenous peoples over publicly owned forests are recognised and practised.	++	++	++
7.14	Extent to which indigenous and traditional forest-related knowledge and practices are integrated in forest management planning and implementation.	+	++	X
7.15	Extent of involvement of indigenous peoples, local communities and other forest dwellers in forest management capacity-building, consultation processes, decision-making and implementation, including the basis for their involvement.	X	++	++

5.0 CONCLUSIONS

5.1 This document identifies a total of 7 criteria for monitoring and assessing sustainable management of tropical forests in ASEAN at the national, FMU and landscape levels. A total of 67 indicators has also been elaborated to measure or monitor periodically the direction of change of the criteria at the national, FMU and landscape levels, as appropriate.

5.2 It is intended that specific management specifications and prescription would be developed by individual ASEAN Member States for each of the indicators at both the national and forest management unit levels *as* appropriate, for example, to the harvesting systems used, through which the standard of performance or acceptable levels of sustainable forest management could be ascertained. This is pertinent as differences in the development and implementation of national and forest management unit levels criteria and indicators depend on the particular conditions and the level of socio-economic development of each ASEAN Member State, as well as existing cultural and traditional values, the regulatory framework and the structure of the forestry sector itself.

5.3 The set of criteria and indicators identified in this document should replace the "ASEAN Criteria and Indicators for Sustainable Management of Natural Tropical Forests that was endorsed at the 10th. Meeting of ASOF held from 12-13 July 2007 in Vientiane, Lao PDR, and adopted by the 29th. Meeting of AMAF held on 1 November 2007 in Bangkok, Thailand. This new set of ASEAN criteria and indicators should also be used to monitor, assess and report on the progress of achieving sustainable forest management in the ASEAN region, and as a valuable tool for reporting the attainment of sustainable forest management in the context of the ITTO Year 2000 Objective, as well as to the United Nations Forum on Forests (UNFF).

5.4 Notwithstanding this, this set of ASEAN criteria and indicators for sustainable forest management should be reviewed and refined as necessary to reflect new concepts of sustainable forest management in the light of changing economic, social and environmental conditions. This revision will be based on evolving knowledge about the functioning of forest ecosystem, anthropogenic intervention on the forests whether planned or unplanned, and the changing needs of society for forest goods and environmental services. Furthermore, the capability to assess indicators will increase and scientific knowledge will improve about the nature of 'best' indicators to assess, monitor and report on tropical forest management and its sustainability.

Annex 1

Forest Land Ownership Categories

Term	Definition	Explanatory notes
Forest ownership	Generally refers to the legal right to freely and exclusively use, control, transfer, or otherwise benefit from a forest. Ownership can be acquired through transfers such as sales, donations and inheritance.	Forest ownership refers to the ownership of the trees growing on land classified as forest, regardless of whether or not the ownership of these trees coincides with the ownership of the land itself.
Public ownership	Forest owned by the state or administrative units of the public administration, or by institutions or corporations owned by the public administration	Includes all the hierarchical levels of public administration within a country, e.g. state, province and municipality. Shareholder corporations that are partially state-owned are considered as under public ownership when the state holds a majority of the shares. Public ownership may exclude the possibility to transfer.
Public ownership by the state at the national level	Forest owned by the state at the national scale or by administrative units of the public administration, or by institutions or corporations owned by the public administration.	
Public ownership by the state at sub-national government scale	Forest owned by the state at the sub-national government scale, by administrative units of the public administration, or by institutions or corporations owned by the public administration.	
Private ownership	Forest owned by individuals, families, communities, private co-operatives, corporations and other business entities, private religious and educational institutions, pension or investment funds, non-governmental organisations, nature conservation associations and other private institutions.	

Private ownership by individuals	Forest owned by individuals and families.	
Private ownership by private business entities and institutions	Forest owned by private corporations, co-operatives, companies and other business entities, as well as private organisations such as NGOs, nature conservation associations, and private religious and educational institutions, etc.	Includes both profit and non-profit entities and institutions.
Private ownership by local, tribal and indigenous communities	Forest owned by a group of individuals belonging to the same community residing within or in the vicinity of a forest area or forest owned by communities of indigenous or tribal people. The community members are co-owners that share exclusive rights and duties, and benefits contribute to the community development.	Indigenous and tribal people include: people regarded as indigenous on account of their descent from the population which inhabited the country, or a geographical region to which the country belongs, at a time of conquest or colonisation or the establishment of present state boundaries and who, irrespective of their legal status, retain some or all their own social, economic cultural and political institutions; and tribal people whose social, cultural and economic conditions distinguish them from other sections of the national community, and whose status is regulated wholly or partly by their own customs or traditions or by special laws and regulations.
Unknown ownership	Forest area where ownership is unknown includes areas where ownership is unclear or disputed.	

Source: Adapted from FAO 2015. *Global Forest Resources Assessment 2015*. Synthesis Document. Rome, Italy.

Annex 2

Definitions of IUCN Protected Area Management Categories

IUCN has defined the following six protected area management categories based on management objective:

CATEGORY 1a: Strict Nature Reserve: protected area managed mainly for science Area of land and/or sea possessing some outstanding or representative ecosystems, geological or physiological features and/or species, available primarily for scientific research and/or environmental monitoring.

CATEGORY 1b: Wilderness Area: protected area managed mainly for wilderness protection Large area of unmodified or slightly modified land, and/or sea, retaining its natural character and influence, without permanent or significant habitation, which is protected and managed so as to preserve its natural condition.

Category 1 sites are typically remote and inaccessible, and are characterised by being 'undisturbed' by human activity. They are often seen as benchmark, or reference sites, and access is generally restricted or prohibited altogether. They range in size from vast areas to very small units (typically a 'core' of a larger protected area). Selection should be on the basis of quality and significance.

CATEGORY II: National Park: protected area managed mainly for ecosystem protection and recreation Natural area of land and/or sea, designated to: (a) protect the ecological integrity of one or more ecosystems for present and future generations; (b) exclude exploitation or occupation inimical to the purposes of designation of the area; and (c) provide a foundation for spiritual, scientific, educational, recreational and visitor opportunities, all of which must be environmentally and culturally compatible.

Category II covers national parks and equivalent reserves. Category II sites are characterised by the experience of 'naturalness'. While managed to protect ecological integrity, Category II sites tend to serve as areas that facilitate appreciation of the features protected, and typically include provisions for human visitors. Selection should be on the basis of representativeness and/or special significance, and sites should be large enough to contain one or more (relatively intact) ecosystems.

CATEGORY III: Natural Monument: protected area managed mainly for conservation of specific natural features Area containing one or more specific natural or natural/cultural feature which is of outstanding or unique value because of its inherent rarity, representative or aesthetic qualities, or cultural significance.

Category III covers areas that are typically not of the scale of Category II sites, but can be important as protected components within a broader managed landscape for the protection of particular forest communities or species. Selection should be on the basis of the significance of the features, and should be of a scale that protects the integrity of that feature and its immediately related surroundings.

CATEGORY IV: Habitat/Species Management Area: protected area managed mainly for conservation through management intervention Area of land/or sea subject to active intervention for management purposes so as to ensure the maintenance of habitats and/or to meet the requirements of specific species.

Category IV covers areas managed mainly for conservation through management intervention; habitats and other features may be manipulated to enhance the presence of species or communities of species, through, for example, artificial wetlands or the cultivation of preferred food crops. Category IV sites do not include production units primarily for exploitation, such as forest plantations. Category IV sites should be selected on the basis of importance as habitats to the survival of species of local or national significance, where conservation of the species or habitat may depend upon its manipulation.

CATEGORY V: Protected Landscape/Seascape: protected area managed mainly for landscape/seascape conservation and recreation Area of land, with coast and sea as appropriate, where the interaction of people and nature over time has produced an area of distinct character with significant aesthetic, ecological and/or cultural value, and often with high biodiversity. Safeguarding the integrity of this traditional interaction is vital to the protection, maintenance and evolution of such an area.

Category V areas are characterised by a long-term socio-ecological interaction commensurate with high biodiversity values. Category V areas should be selected on the basis of diversity of habitats of high scenic quality combined with manifestations of unique or traditional land-use patterns and opportunities for public enjoyment through recreation and tourism.

CATEGORY VI: **Managed Resource Protected Area: protected area managed mainly for the sustainable use of natural ecosystems** Area containing predominantly unmodified natural systems, managed to ensure long-term protection and maintenance of biodiversity, while at the same time providing a sustainable flow of natural products and services to meet community needs.

Category VI areas are characterised by predominantly unmodified 'natural systems' that are managed to provide both maintenance of biological diversity and a sustainable flow of natural products and services. The expression 'natural system' can be interpreted many different ways. For purposes of the IUCN categories it can be taken to mean ecosystems where, since the industrial revolution (1750), human impact (a) has been no greater than that of any other native species, and (b) has not affected the ecosystem's structure. Climate change is excluded from this definition. For an area to qualify for Category VI designation, not only must the site meet the definition of a protected area, but at least two-thirds of the site should be, and is planned to remain, in a natural condition. Large commercial plantations must not be included, and, as in all categories, a management authority must be in place. Category VI sites should also be large enough to absorb sustainable resource uses without detriment to sites' overall long-term natural values.

Because many protected areas, particularly forest areas, are established for multiple objectives, at least three-quarters of a designated area must be managed primarily for one of the above management objectives in order for it to be listed under the

corresponding category. The management of the remaining area must not be in conflict with that primary purpose. In cases where parts of a single management unit are classified by law as having different management objectives or where one area is used to 'buffer' or surround another, they would be listed separately.

All protected areas must meet a test of management responsibility and ownership. Management authority may be through national government, local authority, informal community group, non-governmental organisation or private ownership, provided that it provides the capacity to achieve the given management objective. In general more strictly protected sites require state power for full protection, but recent experiments in vesting legal power in private entities for nature conservation objectives leave open the possibility of exceptions. Ownership of a unit must also be compatible with achievement of management objectives in order for the site to be listed.

Annex 3

IUCN Endangerment Status Categories

Extinct (Ex)

A taxon[12] is extinct when there is no reasonable doubt that the last individual has died. A taxon is presumed extinct when exhaustive surveys in known and/or expected habitat, at appropriate times (diurnal, seasonal, annual), throughout its historic range have failed to record an individual. Surveys should be over a time frame appropriate to the taxon's life cycle and life form.

Extinct in the Wild (EW)

A taxon is extinct in the wild when it is known only to survive in cultivation, in captivity or as a naturalised population (or populations) well outside the past range. A taxon is presumed extinct in the wild when exhaustive surveys in known and/or expected habitat, at appropriate times (diurnal, seasonal, annual) throughout its historic range have failed to record an individual. Surveys should be over a time frame appropriate to the taxon's life cycle and life form.

Critically Endangered (CR)

A taxon is critically endangered when the best available evidence indicates that it meets any of the criteria specified in the *IUCN Red List Categories and Criteria* for critically endangered and is therefore considered to be facing an extremely high risk of extinction in the wild.

Endangered (EN)

A taxon is endangered when the best available evidence indicates that it meets any of the criteria specified in the *IUCN Red List Categories and Criteria* for endangered and is therefore considered to be facing a very high risk of extinction in the wild.

Vulnerable (VU)

A taxon is vulnerable when the best available evidence indicates that it meets any of the criteria specified in the *IUCN Red List Categories and Criteria* for vulnerable and is therefore considered to be facing a high risk of extinction in the wild.

Near Threatened (NT)

A taxon is near threatened when it has been evaluated against the criteria but does not qualify for critically endangered, endangered or vulnerable now, but is close to qualifying for or is likely to qualify for a threatened category in the near future.

[12] IUCN uses the term 'taxon' to mean species or lower taxonomic level, including forms that are not yet formally described.

Least Concern (LC)

A taxon is least concern when it has been evaluated against the criteria and does not qualify for critically endangered, endangered, vulnerable or near threatened. Widespread and abundant taxa are included in this category.

Data Deficient (DD)

A taxon is data deficient when there is inadequate information to make a direct or indirect assessment of its risk of extinction based on its distribution and/or population status. A taxon in this category may be well studied and its biology well known but appropriate data on abundance and/or distribution are lacking. Data deficient is therefore not a category of threat. Listing of taxa in this category indicates that more information is required and acknowledges the possibility that future research will show that threatened classification is appropriate. It is important to make positive use of whatever data are available. In many cases, great care should be exercised in choosing between data deficient and threatened status. If the range of a taxon is suspected to be relatively circumscribed, or if a considerable period of time has elapsed since the last record of the taxon, threatened status may well be justified.

Not Evaluated (NE)

A taxon is not evaluated when it has not yet been evaluated against any criteria.