

**UNE 162002**

**Sustainable Forest Management. Criteria and Indicators**

## INTRODUCTION

Since the development of the first pan-European indicators for Sustainable Forest Management in the early 1990s, experience has demonstrated the importance that Criteria and their respective Indicators have as a tool for the European forest policy.

The third Pan-European Ministerial Conference on the Protection of Forests in Europe, held in Lisbon in 1998, approved the six pan-European Criteria for Sustainable Forestry Management with their respective indicators, which served as the basis for UNE standard 162.002 on Sustainable Forest Management, approved in 2001.

The IV Ministerial Conference, held in Vienna in 2003, passed a series of improved pan-European indicators that served as the reference for the first review of UNE standard 162002 after five years in force, the reviewed version being approved in 2007.

This second review of UNE standard 162.002, which aims to incorporate the experience gained thus far and simplify application of the standard, integrates all the criteria and indicators that define Sustainable Forest Management in Spanish forestry into a single document.

## 1 AIM AND SCOPE OF APPLICATION

The aim of this standard is to adopt the Pan-European Criteria and adapt their indicators so as to be applied to Sustainable Forest Management within the territory of Spain. In order to make recognising the indicators easier, they have been given the same numbers as the improved indicators approved at the Ministerial Conference of Vienna (2003).

This standard refers to activities or tasks which are the responsibility of the forest manager and does not include causes of force majeure, natural disasters or legal obligations.

## 2 STANDARDS FOR CONSULTATION

The documents named below are essential for the application of this standard. The only valid edition of those documents is the version that bears the date on which they were published. On the contrary, for documents that do not bear any specific date, the latest edition (including amendments thereto, if any) shall be applicable.

UNE 162001 *Sustainable Forest Management. Vocabulary, terminology and definitions.*

## 3 DEFINITIONS

For the purposes of this document, the terms and definitions included in the UNE standard 162.001 shall be applicable, as well as the following:

### 3.1 hunting and game:

A series of hunting-related actions that constitute a further business line for the forest; such actions go beyond the forest itself to extensive rural areas.

### 3.2 load capacity:

The number (or weight) of organisms of a specific species or grade that can survive in an ecosystem without deteriorating it, in the least favourable conditions that may occur over a determined period of time.

### 3.3 criterion:

The category of condition or process against which Sustainable Forest Management can be assessed.

**3.4 sustainable development:**

The act of satisfying the public's needs without jeopardising the possibility of future generations doing so (Brundtland report).

**3.5 forest management guidelines:**

A series of guidelines, recommendations, silviculture models, instructions or standards for sustainable forest management at a level superior to the management unit and which may deal with silviculture aspects and others, such as health issues, preservation of biodiversity, wood logging, etc.

**3.6 biological diversity:**

The total specific, taxonomic or genetic wealth contained in the management unit. It comprises intraspecific, interspecific and ecosystem diversity.

**3.7 protected area:**

An area legally declared as such and managed on the basis of conservation and improvement of the high ecological value ecosystems it contains.

**3.8 significant species:**

A species present in the management unit which is prominent because of its abundance, rarity or endemism, or because it is included in the catalogue of endangered species or species to be protected.

**3.9 source of information:**

Initial data used by the forest manager to draw up the documents.

**3.10 extensive cattle farming:**

The management system of a farm which feeds its livestock from rough grazing on meadows, wood pastures, heathland and moors, whether owned by the farm, by others or common land, either permanently or temporarily, and for which the animals are fundamentally outdoors and which does not substantially force animal feeding or reproduction patterns.

NOTE extensivity is a relative concept that depends on the load capacity of the medium and outdoor grazing period.

**3.11 sustainable forest management:**

The stewardship and use of forests and forest lands in a way, and at a rate, that maintains their biodiversity, productivity, regeneration capacity, vitality and their potential to fulfil, now and in the future, relevant ecological, economic and social functions, at local, national, and global levels, and that does not cause damage to other ecosystems (Helsinki Ministerial Conference 1993 and Forestry Act 43/2003, dated 21 November, article 6).

**3.12 forest manager:**

An individual person or legal entity who, individually or through shared or coordinated management, is responsible for the husbandry operations of the forest resources.

**3.13 indicator:**

A quantitative, descriptive or mixed parameter which, by being the object of regular monitoring, indicates the direction of change.

NOTE an indicator describes the content of the criteria in an objective and non-ambiguous manner and may be obtained directly or indirectly from existing data.

**3.12 forest inventory/stock count:**

Reconnaissance that enables quantitative and/or qualitative forest variables to be determined for a given surface area, for the purposes of forest planning, among others.

**3.15 roundwood:**

Cut wood, clean of branches, separated from the crown foliage, not worked in any way, which may or may not have been cut into logs.

**3.16 natural forest:**

Land with natural dynamics as far as the composition of species, existence of stumps, structure of age groups and regeneration processes are concerned, and which furthermore has a sufficiently large surface for its natural characteristics to be preserved and in which no significant human intervention is known of or, if such human intervention has occurred, it was such a long time ago as to allow its natural species and processes to re-establish themselves.

**3.17 forest cover:**

Forest classed as such according to current legislation.

**3.18 semi-natural forest:**

Those forest stands that are neither natural timberlands nor plantations, as well as plantations undergoing a naturalisation process as a result of not having been subjected to intensive management.

**3.19 timberland; forestland:**

Lands on which tree, bush, shrub or grass species grow, whether spontaneously or as a result of seeding or planting, provided that they are not characteristic of or subject to crop farming, in accordance with the exclusions or exceptional circumstances laid down by current national and regional legislation.

**3.20 management plan:**

A document or set of documents which individually or collectively set forth the forest management of a management unit or group of management units over which the manager(s) has/have control.

**3.21 forest plantation:**

A forest stand established by seeding or planting with productive, protective, conservational, recreational, etc. purposes within the context of a forestation or re-forestation process. It contains either artificially planted species or autochthonous species

**3.22 forest tracks:**

Thoroughfares and infrastructures in the forest designed to provide access to it for vehicles not specifically designed for forestry work (automobiles, trucks,...), the distribution of which was the subject of a prior study, which was built according to said study, and for which earth movement work is required, as is regular maintenance by the forest owner.

NOTE The above definition does not include service tracks used to remove cut wood from the forest by purpose-built vehicles (skyder, self-loading trucks), nor temporary tracks that appear as a result of easy access to certain types of terrain (vehicle rut tracks, wild footpaths, etc.).

**3.23 road network:**

All communications infrastructures usable by four-wheeled motor vehicles (automobiles, trucks, etc.) that run through or to the management unit, which are for public use and which may be used by the owner: roads (national, local, district, etc.), paths (municipal, rural or village tracks, etc.).

NOTE The above definition does not include footpaths, cycle paths, bridleways, etc., whose purpose is basically recreational.

**3.24 non forest-based waste:**

Waste products or materials that are left after being used or applied in the forest and which have been used during forestry processes and operations.

NOTE this category does not include forest-based waste such as materials left over after thinning, clearing, logging, pruning, etc.

**3.25 decorked surface:**

The surface area on the stem and branches of a cork tree that is uncovered when cork is removed.

NOTE this is individually restricted by previously setting a de-corking intensity rate.

**3.26 regeneration area:**

Surface of land made over for regeneration within the management plan.

**3.27 growth rate:**

A measurement of the variation in dasocratic values for height, diameter, volume, etc over a specific period of time.

**3.28 management unit:**

A forest area which is the object of sustainable forest management and which must fulfil the indicators set forth in UNE standard 162002, whether at the level of the management unit itself or at a higher level in which the management unit is included.

**3.29 multiple use; multi-functionality:**

The triple role that forests fulfil: protection, production and social use. When determining a management unit, simultaneity and sequence, allocation of priorities or main uses, the relationship between uses and the reversibility of such uses must all be defined.

**4 CRITERIA**

The six Pan-European Criteria are:

**CRITERION 1:** Maintenance and appropriate enhancement of forest resources and their contribution to global carbon cycles.

**CRITERION 2:** Maintenance of forest ecosystems' health and vitality;

**CRITERION 3:** Maintenance and encouragement of productive functions of forests (wood and non-wood).

**CRITERION 4:** Maintenance, conservation and appropriate enhancement of biological diversity in forest ecosystems;

**CRITERION 5:** Maintenance, conservation and appropriate enhancement of protective functions in forest management (notably soil and water); and

**CRITERION 6:** Maintenance of other socio-economic functions and conditions.

**5 INDICATORS**

These criteria are developed as indicators which may be quantitative (C), descriptive (D), or mixed (M).

**CRITERION 1:** Maintenance and appropriate enhancement of forest resources and their contribution to the Global carbon Cycle.

**1.1 Indicator: Forest area (C)**

**Justification:** a description of the management unit and monitoring of changes.

**Aim/target:** to maintain or increase the forest area, especially wooded land, except for decreases as a result of actions to protect the forest itself (e.g. against fire) or other activities aimed at improving its multi-functionality.

**Parameters:**

- forest area, wooded and non wooded land (absolute values);
- surface area per species or vegetable formation (absolute values).

**Sources of information:** stock counts, cartographic sources (forest mapping, crop mapping and regional harvesting, etc), aerial photography and satellite imaging, LIDAR data, land registry, National Forest inventory, forestry statistics, agrarian census, catalogues.

**1.2 Indicator: Wood or cork stock (M)**

**Justification:** Measuring the growing stock of wood or cork is one of the main characteristics and indicators with which to gauge the quality and sustainability of the stewardship.

**Aim/target:** to attain stock levels in accordance with management objectives and regional forestry directives, when applicable.

**Parameter:** stock levels or de-corked surface area

**Sources of information:** regional forestry guidelines, reference figures (growth tables, production tables, empirical data from the area, etc), inventories.

**1.3 Structure of the stand (C)**

**Justification:** description of the forest lands that comprise the management unit and the structure of existing stands (age structure, diameter distribution, forest type, or others).

**Aim/target:** to adjust the stand structure to the management objectives.

**Parameter** (absolute and/or relative values): Forest area per type of structure

**Sources of information:** inventories, cartographic sources, National Forest inventory, forestry statistics, forest mapping.

**1.4 Indicator: Carbon fixation (C)**

**Justification:** forest stands and their products are characterised by their ability to sequester carbon. Forest management that tends to generate products with a long life cycle or which can substitute other more pollutant products multiplies that effect.

**Aim/target:** to strengthen and maintain the long-term carbon sump effect of forest stands and their wood products.

**Parameter:** estimation of carbon sequestered in the aerial tree biomass

**Sources of information:** the actual management plan and related indicators, National Forest Inventory, forestry statistics, research, specialist bibliography.

**1.5 Indicator: Forestry legislation (D)**

**Justification:** Sustainable Forest Management calls for a legal framework that sets forth, among other things, the rights and obligations of forest owners and other users of forest land and which establishes rules for preserving and defending forest resources.

**Aim/target:** to enhance accessibility to current forest legal framework in force.

**Parameter:** existence of a mechanism to understand the legal requirements applicable in forestry matters.

**Sources of information:** forestry and supplementary legislation, international agreements and related websites.

1.6 Indicator: Forestry information (D)

**Justification:** The growing complexity of demands made of the forest and their scope in terms of time and space call for transparent, accessible and efficient information systems, as well as significant research, together with effective ways of participating.

**Aim/target:** To make sources of information available (internal information, inventories, statistics, R+D+i, etc.) and to create mechanisms for participation.

**Parameters:** existence of a mechanism to enable access to available data, for example concerning:

- forest inventories;
- forestry statistics (logging, damage, replanting, investment, etc.);
- Forestry R+D+i;
- participative forums;
- general or sector-specific studies.

**Sources of information:** information from the regional entity, forest inventories, forestry statistics, forestry legislation, related websites.

**CRITERION 2:** Maintenance and improvement of forest ecosystem's health and vitality.

2.1 Indicator: Depositions of airborne pollutants (only applicable at national level)

**Justification:** The deposition of airborne pollutants, such as nitrogen, sulphur dioxide, ozone or other heavy metals, represents a menace for the forest ecosystem, both directly or via acidification or eutrophication of the soil. Atmospheric pollution can cause lower resilience of the forest to external agents, such as drought or pests.

**Aim/target:** To ascertain the influence and evolution that the deposition of atmospheric pollutants has on forest lands, especially on the forest ecosystem's health and vitality.

**Parameter:** Quantity (kg/ha) of annual deposition of main airborne pollutants: ammonia, chlorine, ozone, nitrogen oxides and sulphur oxides

**Source:** European Inventory of Damage in Forests (ICP forests), level II Network, other Environmental Data Networks from regional authorities.

2.2 Indicator: Nutritional condition of soil (D)

Not drafted - included in 2.3.

### 2.3 Indicator: Condition of forest landcover (M)

**Justification:** damage<sup>1)</sup> of abiotic, abiotic and anthropic nature on the forestry system may be decisive for the stability and growth of the stand, and knowledge about it is fundamental in order to apply quality management practices.

**Aim/target:** to acquire knowledge of the state of health of the forest landcover by monitoring it, paying special attention to key biotic, abiotic and anthropic factors that affect forest ecosystems' health and vitality, in order to react accordingly.

**Parameter:** identification and extent of damage, the agents that cause it and the degree of its effect.

**Sources of information:** National Forest inventory, forestry statistics, health status monitoring networks; registry of pests/diseases, samples/measurements of stand's state of health, other relevant documents to be defined by the manager.

### 2.4 Indicator: Damage prevention and correction measures in forests (D)

**Justification:** In its planning and realisation, forest management must include suitable measures to minimise degradation of the forest soil and canopy (soil, canopy) due to biotic, abiotic and anthropic causes<sup>1)</sup>. Such measures include suitable use of natural structures and processes to increase the stand's vitality and strength, and the application of suitable stewardship practices, such as the proper execution of forestry operations and, generally, of all actions carried out in the forest.

**Aim/target:** to include measures as part of forest management that minimise the risks of degradation and damage to the ecosystem according to general recommendations or guidelines on matters of health, when applicable.

**Parameter:** existence of prevention and corrective measures, where necessary, and their description.

**Sources of information:** samples/measurements of areas affected by damage, records of pests/disease, current forestry legislation, forest pasture or hunting management plans, specification of terms for Sustainable Forest Management. In the case of phytosanitary treatments: current legislation, bibliography, courses of treatment carried out by official organisms, chemical safety documents. Forestry operations: logging permits, good forestry practices.

### 2.5 Indicator: Prevention and defence against forest fires (D)

**Justification:** Wildfires are one of the major threats to the forest ecosystem. The variables involved in the risk of wildfires include the type and amount of biomass that accumulates as fuel, including waste from harvesting and forestry operations, as well as the characteristics and structure of that biomass, treatment of which is compatible with the nutrient cycle.

**Aim/target:** To control of the risk of wildfires by implementing fire prevention and defence measures.

**Parameter:** existence and application of fire prevention and defence measures.

**Sources of information:** current legislation, cartographic sources, management plan, forest fire-fighting plan, inventory of infrastructures (access roads, sources of water, etc), forest inventories, SFM specifications.

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1) Biotic agents include among others: pests, disease, hunting species and extensive cattle farming. Abiotic agents include among others: fire, electrical storms, wind, snow, drought, landslides and avalanches. Damage of an anthropic nature includes among others: damage caused by logging and forestry operations in the course of extensive cattle farming and hunting activities, by intensive tourism and recreational activities, including nutritional deficiencies in the soil, as a result of intensive management and the management of non-wood waste.



2.6 Indicator: Hunting and extensive cattle farming (only applicable in the event that the forest manager is responsible for such activities) (M)

**Justification:** hunting and extensive cattle farming may be decisive factors in the stability of wildlife biodiversity and the survival of endangered species, as well as a supplementary source of income for the forest

**Aim/target:** To maintain levels of hunting and cattle farming compatible with ecosystem stability.

**Parameters:**

- inventory or census of animal populations;
- existence of current hunting plans, where applicable;
- assessment of the suitability of the load on the territory;
- monitoring of animal health.

**Sources of information:** technical hunting plans, cattle farming census, observation of vegetation (overall state and indicative plants), current legislation regarding animal health.

2.7 Indicator: Techniques for controlling plagues and diseases (M)

Not drafted - included in indicators 2.3 and 2.4.

**CRITERION 3:** Maintenance and encouragement of the forest's productive functions (wood and non-wood products)

3.1 Indicator: Tree growth and logging rates (C)

**Justification:** Monitoring and assessing growth and the growth:logging ratios provides valuable information about the characteristics of forest husbandry in the management unit.

**Aim/target:** To monitor and assess overall production in terms of quality and quantity and how it relates to long-term growth.

To adjust logging to the biological growth or production rate, ensuring that any exceptions are duly justified.

**Parameters:**

- tree and/or wood production: in units;
- ratio between logging and wood increment or ratio between logging and biological production;
- amount of wood products (round or cut wood) marketed.

**Sources of information:** management plan. Other related indicators. Forestry statistics and forest inventories.

3.2 Indicator: Roundwood (C)

Not drafted - included in 3.1

3.3 Indicator: Non-wood forest products (C)

**Justification:** Saleable non-wood forest products estimated by the owner or manager could represent additional income for the management unit and for sustainable forest management.

**Aim/target:** To monitor and assess the number or quantity of non-wood forest products sold.

**Parameters:**

- forecast quantities should be in units or value, or where applicable, an estimation of the amount of non-wood forest products;
- proportion of products actually sold compared to forecast amount.

**Sources of information:** management plan, surveys and/or sector-specific data sources. Forestry statistics

3.4 Indicator: Services (C)

**Justification:** Services sold by the owner or manager could represent additional income for the management unit and for sustainable forest management.

**Aim/target:** To monitor and assess, in monetary terms, the services sold by the management unit.

**Parameter:** Services sold, in units or value.

**Sources of information:** Management plan. Surveys and/or sector-specific data sources. Forestry statistics, specialist bibliography.

3.5 Indicator: Management Plan (D)

**Justification:** Sustainable forest management has to be carried out in a well-planned, orderly and technically viable fashion. Suitably sustainable management of the management unit is the basic element that guarantees its persistence and the optimisation of its long-term functions.

**Aim/target:** To be in possession of an effective management plan.

**Parameter:** the existence of an effective management plan, duly approved, validated and authorised by the relevant forestry authorities or approved by the relevant forestry professional body.

**Sources of information:** Regional Forest Structuring Plan (PORF) and other planning documents.

3.6 Indicator: Access infrastructures (M)

**Justification:** Suitable road infrastructure is essential for fulfilment of the objectives of the management system and to ensure proper use and defence of the forest. The infrastructure network may comprise public thoroughfares that provide access to the forest, as well as service tracks in the forest itself.

**Aim/target:** To have a suitable network of roads (in terms of traffic density, conditions, etc.) that serves the management unit for its use of the forest, logging activities, defence needs, etc.

**Parameter:** Assessment of the suitability of the current network of roads, with special attention to forest tracks.

**Sources of information:** Cartographic sources, inventories, aerial photos.

**CRITERION 4:** Maintenance, conservation and appropriate enhancement of biological diversity in forest ecosystems.4.1 Indicator: Estimation of biodiversity (D)

**Justification:** Biological diversity is directly related to the type and characteristics of the vegetation and wildlife it comprises and to the fundamental purpose of the management unit, characterised, among other factors, by the variety of species.

**Aim/target:** to preserve or increase the quality of the biodiversity in a way compatible with the management unit's stated purpose.

**Parameters:**

- characteristic or ecologically important forest habitats/vegetation formations in the management unit (listed or quantified);
- List of most significant species (vegetation and wildlife to be found in the management unit).

**Sources of information:** cartographic sources, specialist literature, stock counts (species and frequency), national inventory of habitats, catalogue of endangered species, forest map.

4.2 Indicator: Regeneration (D)

**Justification:** the variables that affect the biological diversity in forest stands include the type of regeneration used. In each case, the most suitable regeneration method needs to be indicated. Natural regeneration, where appropriate, should be a priority.

**Aim/target:** to use the most suitable type of regeneration in view of the local environment, the forest species used, and the established objectives of the management program, taking into account planning instruments at a higher level or regional directives, where applicable, thereby guaranteeing the quality and viability of the regeneration.

**Parameter:** list and description of the areas under regeneration and the rate actually achieved compared to forecasts.

**Sources of information:** forestry statistics, literature (specialised in areas of provenance, etc), regional forestry directives, stock count of regeneration areas (quality and quantity).

4.3 Indicator: Degree of naturalness (C)

**Justification:** non-intensive management is closer to natural dynamics and processes than intensive management. The abandonment of a forest area may lead to a degradation of the forest ecosystem and an increase of the risks that threaten its conservation.

**Aim/target:** to maintain or increase the surface area of natural and semi-natural forests within the management unit.

**Parameters:** percentage of natural and semi-natural forest areas within the management unit.

**Sources of information:** background data on the management unit (data of previous forestry actions), forest inventory and map.

4.4 Indicator: Conservation of unique habitats (D)

**Justification:** the particular ecological characteristics of certain forest biotopes (high diversity, special vulnerability, representativity, presence of endemic, rare, protected or endangered species, genetic reserves, etc) make them *unique habitats*, either at the level of the management unit or over a larger area, and therefore call for them to be preserved, whether required by specific regulations or not.

**Aim/target:** maintenance of unique habitats existing in the forest management unit.

**Parameters:**

- Identification of unique habitats in the management plan and corresponding forest maps;

- Existence of measures aimed at conserving unique habitats within the management unit.

**Sources of information:** aerial photography, cartographic sources, specialist literature, current legislation, National Inventory of habitats, samples and stock counts.

#### 4.5 Indicator: Deadwood (M)

**Justification:** the presence of deadwood in forests can contribute to increasing biodiversity. However, an excess of deadwood can encourage fires or pests and may entail a danger from falling branches or trees in the case of highly frequented forests, factors which call for it to be extracted.

**Aim/target:** to achieve a suitable amount, size and distribution of deadwood in line with scientific guidelines and progress, except when justified due to fire, pests or forest usage.

**Parameters:**

- Consideration in the management plan of the need for deadwood to exist in the forest;
- Estimation of the amount, percentage of resources or surface area, and if possible, status (standing/lying) and to what extent it meets the objectives of the management plan.

**Sources of information:** guidelines, scientific research papers, National Forest inventory, stock counts, specifications, specialist literature.

#### 4.6 Indicator: Forest Reproductive Material (M)

**Justification:** forest reproductive material has a direct effect on forest genetic diversity, so that it must be monitored and controlled, including its external quality.

**Aim/target:** the conservation and sustainable use of genetic resources must be taken into account as part of the forest stand management to contribute to maintaining forest genetic diversity.

**Parameter:** origin of forest reproductive material used for artificial reforestation or regeneration programs.

**Sources of information:** technical standards for the use of reproductive material, provenance regions or areas, national catalogue of base materials, strategy for the conservation and sustainable use of forest genetic resources.

#### 4.7 Indicator: Landscape patterns (D)

Not drafted - included in 6.11.

#### 4.8 Indicator: Endangered forest species (D)

**Justification:** endangered species that live or depend on the forest must be identified and submitted to conservation measures. The presence of species classed as endangered in the management unit should be considered in the forest management plan. Forest management plans shall be compatible with conservation plans for endangered species.

**Aim/target:** to identify and preserve all endangered species within the management unit.

**Parameters:**

- Register of endangered species existing in the management unit;
- The extent to which the conditions specified in the endangered species conservation plan and regulations match

the husbandry practices described in the management plan.

**Sources of information:** endangered species conservation schemes, catalogue of endangered species, specialist literature, protected species legislation, stock counts, contract specifications.

#### 4.9 Indicator: Protected forests (D)

**Justification:** sustainable forest management of timberlands within protected natural areas must be carried out in accordance with the applicable regulations and management objectives.

**Aim/target:** to manage forests in accordance with the regulations and objectives governing the protected area.

**Parameters:**

- Identification and mapping of protected areas within the management unit;
- The extent to which the management meets the regulations and objectives laid down for protected natural areas, including PORN, PRUG and similar.

**Sources of information:** regulations governing protected natural areas, mapping of protected areas, specification of terms for forestry operations, management systems in the Natura 2000 network.

### **CRITERION 5:** Maintenance and appropriate enhancement of the protective function of forest management (notably, soil and water).

#### 5.1 Indicator: Forest protective functions: soil, water and other ecosystem functions (D)

**Justification:** the planning of the forest management must contemplate controlling possible erosion caused by the actions of the management programme. Preventive measures must be adopted for all potentially erosive actions and, if they do occur, adequately documented remedial actions are to be taken, taking into account at all times their medium and long-term effects. Forest management shall prevent any adverse effects on water quality. Special care is to be given to regulating the water cycle, stabilising water sources, protecting riverbanks, etc.

**Aim/target:** to afford as much protection as possible to erosion-prone soil, water quality and riverbank forests. To adopt corrective measures where necessary.

**Parameters:**

- Identification of potentially sensitive areas;
- Existence of suitably implemented preventive and corrective measures.

**Sources of information:** cartographic sources, stock counts, specialist literature, registry of erosion-affected areas, National Forest Inventory, National Inventory of Soil Erosion, forestry statistics, aerial photography, specifications or contracts governing outsourced forest operations, regional guidelines, other documents to be defined by the manager.

#### 5.2 Indicator: Forests as protectors of infrastructures (M) - applicable to areas officially declared as such

**Justification:** the planning of management for forests or similar that protect infrastructures must ensure that function is fulfilled and encourage its stability and regeneration by avoiding actions that may put it at risk.

**Aim/target:** to match forest management to the forest's protective function.

**Parameters:**

- Quantity of surface area declared as protective of infrastructures;
- existence of suitably implemented preventive and corrective measures.

**Sources of information:** declaration of protective forest, registry of protective forests, catalogue of forests of public interest, cartographic sources, aerial photography, forestry statistics and national forest inventory, river basin management plans.

**CRITERION 6:** Maintenance of other socio-economic functions and conditions.6.1 Forest holdings (M)

**Justification:** acknowledging and respecting legal and traditional rights of property and land usage is fundamental for the sustainable management of forest lands, as well as a significant social indicator, especially for sustainable development in rural areas.

**Aim/target:** to ascertain the number of forest properties and the type of ownership.

**Parameter:** type<sup>2)</sup> of the property depending on categories of ownership and sizes.

**Sources of information:** land and building registry, SIGPAC, private contracts.

6.2 Contribution of forestry sector to GDP (only applicable at national level).**Justification:**

The contribution of forestry, which includes silviculture and forest exploitation, together with forest-based industry, which comprises manufacturers of wood products, pulp, paper and board, is a way of determining the significance in macro-economic terms of the forestry sector at national and/or regional level.

**Aim:**

To quantify the forestry sector's direct contribution to the economy of the country or of the autonomous region.

**Parameters:**

- Gross Added Value (GAV) or Gross Domestic Product (GDP) generated by forestry and forest-based industry, whether on national or regional scale.
- Percentage of Gross Domestic Product generated by the forestry sector compared to overall Gross Domestic Product at national or regional level.

**Sources:**

National Classification of Economic Activities (CNAE: A-02, C-16, C-17): Eurostat, National Institute of Statistics, MAGRAMA Annual Forestry Statistics Report, regional Annual Statistics Reports.

6.3 Indicator: Net revenue (C)

**Justification:** net revenue, as reported on financial statements, derived from managing the forest is a good indicator of its economic sustainability, although in many cases the most significant benefits are not quantifiable from the monetary point of view. It includes all pre-tax sources of income and expense directly related to the

2) Example: Classification of forest property according to TBFRA 2000 (Temperate and Boreal Forest Resources Assessment):

- a) categories of ownership: public, private or others;
- b) sizes (ha): < 10, from 11 to 100, from 101 to 500, from 501 to 10 000 and >10 000.

forest, including government subsidies.

**Aim/target:** to improve the economic sustainability of forest management.

**Parameter:** amount of net profit - actual or forecast - derived from revenues and expenses related to the forest management.

**Sources of information:** economic reporting relating to the forest.

#### 6.4 Indicator: Investment in the forest (M)

**Justification:** Forest management requires additional funds to produce the goods and services that society demands. Such goods and services are a significant contribution to overall living standards and to reducing natural risks.

**Aim/target:** to maintain or improve the services provided by the forest by means of investments.

**Parameter:** description of capital investments and amount of expenditure whenever such information is available.

**Sources of information:** economic reporting relating to the forest.

#### 6.5 Indicator: Employment in the forestry sector (C)

**Justification:** the employment generated by a forest is an important indicator of its social benefits, especially for sustainable rural development. At the same time, suitably qualified human resources are required in sufficient numbers.

**Aim/target:** to monitor employment statistics in the management unit and to enhance theoretical and/or practical training on Sustainable Forest Management.

**Parameters:**

- Amount of direct employment (number of days worked or number of employees);
- training and awareness-building programs taught.

Sources of information: current legislation, personal interviews.

#### 6.6 Indicator: Occupational health and safety (C)

**Justification:** forestry continues to be one of the sectors with the highest accident rates. Preventing accidents and occupational illness in the forestry sector is an important social aspect of Sustainable Forest Management.

**Aim/target:** to reduce accident rates in the forestry business.

**Parameter:** number of severe accidents occurring during management activities carried out on the management unit.

**Sources of information:** records created by the manager, current legislation, specifications or contracts for outsourced forestry work, regional guidelines.

#### 6.7 Indicator: Wood and cork consumption (C) (Only applicable at national scale).

**Justification:**

Sustainable Forest Management affects the production of forest products that are subsequently consumed by the public. Wood and Cork are two of the main products from Spanish forests and assessing their *per capita* consumption provides an indicator of the extent to which the forests are being exploited.

**Aim:**

To quantify *per capita* consumption of wood and cork at national level.

**Parameters:**

- Consumption of roundwood equivalent (m<sup>3</sup>) for every 1,000 inhabitants.
- Consumption of cork (tonnes) for every 1,000 inhabitants.

**Sources:**

MAGRAMA Annual Forestry Reports; Regional Annual forestry statistics reports, foreign trade reports (Customs and Excise dept).

**6.8 Indicator: Wood trading (only applicable at state level).****Justification:**

The consumption of wood products has a bearing on domestic and foreign trade of such products and provides a way of quantifying to what extent Spanish forestlands are capable of meeting demand for wood and wood-based products.

**Aim:** To determine wood flow volumes (extractions, production, exports, imports) at national level over one reference year and to see how it compares to previous years.

**Parameters:**

- Quantity (m<sup>3</sup> or tonnes) and economic estimates (€) of wood and wood derivatives exported by Spain, distinguishing between hardwood and softwood.
- Quantity (m<sup>3</sup> or tonnes) and economic estimates (€) of wood and wood derivatives imported by Spain, distinguishing between hardwood and softwood.

**Sources:**

MAGRAMA Annual Forestry Statistics reports, foreign trade statistics (Customs & Excise dept.), Eurostat.

**6.9 Indicator: Energy from wood biomass (C)**

Not drafted - included in 3.1 (wood)

**6.10 Indicator: Recreational values (D)**

**Justification:** social demands for recreation in the forest make the creation and maintenance of areas specially designated for such purposes in forest environments recommendable. The number and quality of such infrastructures are ways of measuring the region's recreational value.

**Aim/target:** to structure the recreational use of forests

**Parameters:**

- Identify and locate recreation areas;
- existence of management practices to ensure they operate properly.



**Sources of information:** inventories, district planning, PRUG, PORN, PORF or similar.

6.11 Indicator: Cultural and spiritual values (D)

**Justification:** forests have certain cultural and spiritual values attached to them for aesthetic, religious, artistic, and historical reasons, amongst others. Although such values are frequently intangible or personal, on occasions they are visible in concrete places and can be identified and, where applicable, protected.

Examples of such areas are archaeological sites, unique specimens of trees, places with a historical significance or where traditional ceremonies are carried out, exceptionally beautiful landscapes, etc.

**Aim/target:** for forestry management to be respectful of clearly identified cultural and spiritual values.

**Parameters:**

- Cultural and spiritual values identified in the management plan;
- Measures and guidelines for preserving cultural and spiritual values, in the event they are deemed necessary for protecting those values.

**Sources of information:** inventory of cultural assets or similar, inventory or registry of unique or comparable trees or settings.

### **BIBLIOGRAPHY**

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