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## Forest management – Principles, criteria and indicators for planted forests

*Forest management - Principles, criteria and indicators for planted forests*

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Descriptors: *Forest management. Principle. Criterion. Indicator.*

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## **Foreword**

The ABNT – The Brazilian Organization for Standardization – is the National Forum for Standardization. Brazilian Standards, whose contents are the responsibility of the Brazilian Committees (ABNT/CB), the Sectorial Standardization Organisms (ABNT/ONS) and of the Special Study Commission (ABNT/CEE) are prepared by Study Committees (CE), made up by representatives of the sectors involved, including: producers, consumers and neutral participants (universities, laboratories and others).

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This second edition terminates and replaces the previous edition (ABNT NBR 14789:2001.), which was technically submitted to proofreading.

## Forest management – Principles, criteria and indicators for planted forests

### 1 Scope

This standard establishes the principles, criteria and indicators for the forest management of planted forests.

### 2 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

#### 2.1

##### **clearing**

open path in the vegetation of the forest management unit or on its perimeter to prevent the spread of fire, division into parcels or plots or for the movement of goods or people.

#### 2.2

##### **anthropized area**

area of land or vegetation whose original state has been altered by human activity.

#### 2.3

##### **degraded area**

area of land or vegetation that changed into a category with a higher degree of deterioration due to anthropic activity or natural phenomena.

#### 2.4

##### **forest management unit**

clearly defined, continuous or non-continuous area where the forest management plan has been implemented.

#### 2.5

##### **environmental aspect**

element of the activities, products or services of an organization, which can interact with the environment

NOTE A significant environmental aspect is the one which might have a significant environmental impact.

#### 2.6

##### **local community**

human community lying within or adjacent to the forest management unit.

#### 2.7

##### **criterion**

expression of an attitude regarding parameters or requirements, which translates the adherence to a principle related to a state or dynamic of a given system

**2.8**

**rights of use**

the rights for the use of the forest resources which might be defined by local lore, mutual agreement or it might be pre-established by other entities with rights of access.

**2.9**

**legal rights**

rights of use and land tenure obtained in accordance with the federal, state and city laws in force.

**2.10**

**traditional and non-predatory rights**

rights of use of the natural resources of a property, by a local community, avoiding implications of its sustainability.

**2.11**

**biological diversity**

variety of species, communities and populations in a given ecosystem

**2.12**

**ecosystem**

dynamic complex of plants, animals, microorganisms and their abiotic environment, interacting as a functional unit.

**2.13**

**edaphic**

that belongs or is related to the soil

**2.14**

**species**

species, subspecies or geographically isolated population

**2.15**

**endemic species**

native species limited to certain environments or determined geographic area with autoecology restricted to an specific habitat

**2.16**

**threatened species**

species highly vulnerable to extinction, for many reasons, in case direct interventions against it or its habitat continues.

**2.17**

**rare species**

species with few natural population or located in remote habitats

**2.18****forest**

plant community predominantly constituted by arboreal species, in any phase of its development, as by other plants growing closely, their soil, flora and fauna, their state of inter-relatedness, and the resources and values attributed to them

**2.19****environmental impact**

any change to the environment, whether adverse or beneficial, wholly or partially which results from activities, products or services of an organization

**2.20****indicator**

qualitative or quantitative parameter that enables the evaluation, in an objective and unambiguous way, of the characteristics of the forest ecosystem or of the related social system, or that describes elements of forest management and the productive processes carried out in this ecosystem.

**2.21****road network**

set of roads and ways used for locomotion, transport of personnel, machinery and equipment, supplies and products within the forest management unit

**2.22****forest management**

management of the forest aimed at obtaining products and services while respecting environmental and social variables that guarantee the support mechanisms of the ecosystem being managed

**2.23****environment**

set of conditions, natural elements, laws, influences and interactions of a physical, chemical and biological nature, which allows shelter and regulate life in all its forms.

**2.24****genetically modified organism**

individual whose genome has been altered by means of genetic engineering techniques, with the introduction of genes from another organism [equivalent to transgenic]

**2.25****stakeholder**

individual or group that is interested in or affected by the activities of the forest management unit

**2.26****forest plantation**

plant cover resulting from human activities of planting or seeding, with or without silvicultural treatments, established with arboreal forest species; equivalent to planted forests

**2.27****principle**

legislation or fundamental rule that serves as a basis for action and which is expressed in the form of an objective in relation to the function of the forest ecosystem and the aspects pertaining to the social system that is interrelated with this ecosystem

**2.28  
organization**  
company, corporation, firm, enterprise or institution, or part or combination thereof, public or private, corporation, limited liability company, or under any other form of association, which has its own activities and administrative structure

**2.29  
restoration**  
set of measures and procedures aimed at regenerating and reestablishing the form and function of the vegetation originally use to occur in an area. This term also includes techniques employing direct intervention as well as the promotion of natural regeneration

**2.30  
sustainability**  
use of natural resources in an environmentally responsible, socially just and economically viable manner, such that attending to actual needs will not compromise possibilities of use for future generations

**2.31  
forest worker**  
worker employed in the forest management unit, either as an independent worker or with a direct employment link to the organization or to service providers

**2.32  
management plan**  
document or group of documents atesting that the organization performs forest management

### **3 Principles, criteria and indicators**

The principles established in this Standard are the reference for forest management.

The principles are expanded into criteria, which are the expression of the requirements that describe the state or the dynamics of a forest ecosystem and the social system associated.

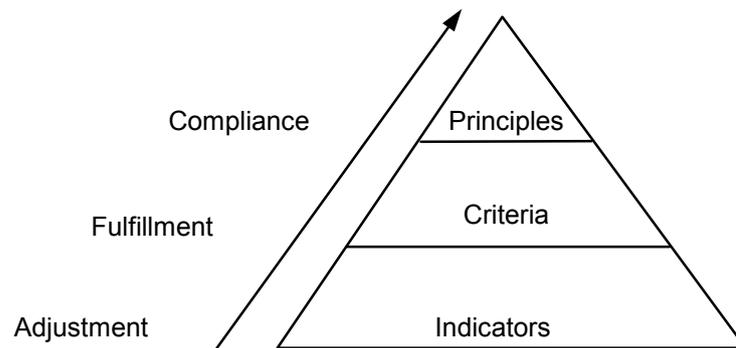
The verification of compliance of each criterion is determined by the assessment of adherence of a set of specific indicators, which may be quantitative or qualitative.

Depending on the location and end purpose of a forest management unit, not all of the indicators will be applicable or present. Nevertheless, it is always necessary to assess all indicators that are pertinent to the local situation.

So, a hierarchic structure of principles, criteria and indicators is defined (see figure 1), whose function is to establish monitoring and demonstrate good forest management, which will serve as a reference for assessing the quality of the forest management.

Implementation of a criterion can be considered successful when it is demonstrated that all the respective indicators have been appropriately attended to. A principle, in turn, can be considered as implemented when compliance with all criteria is confirmed. Finally, forest management can be considered as implemented, in accordance with this Standard, when compliance with principles is evidenced.

Depending on the region and the site, the indicators may have different relative importance.



**Figure 1 — Hierarchical structure**

### **3.1 Principle 1 – Legal Compliance**

The forestry enterprise shall be managed by employing attitudes and actions that ensure compliance with current Federal, State and Municipal legislation. Federal law, as well as international treaties and agreements shall be disseminated to all of those involved in the process of obtaining the forest products. The criteria and indicators to comply with are described in 3.1.1 to 3.1.3.

#### **3.1.1 Criterion 1.1**

The organization must undertake the pertinent activities for establishing and managing forests in accordance with current legislation and other forest and environmental regulations applicable.

Indicators:

- a) existence of procedures for identifying laws and other regulations that are applicable to the establishment and management of the forest management unit;
- b) existence of records providing evidence of compliance with laws and other regulations that are applicable to the establishment and management of the forest management unit.

#### **3.1.2 Criterion 1.2**

The rights of local communities to use and occupy land with natural forests must be respected, according to the law in force.

Indicators:

- a) evidences that the legal and traditional non-predatory rights of the local communities are being respected;
- b) evidences that areas neighboring or contiguous to the forest management unit, where local communities are living, are identified and respected;
- c) existence of a land tenure or land use document which proves the demarcation of the forest management unit and which is consistent with the management plan; and
- d) evidence that the organization acts in an effective way to solve possible conflicts or legal disputes related to land tenure or losses inflicted to third parties.

### **3.1.3 Criterion 1.3**

Labor, social security, fiscal and tax legislations shall be complied with.

Indicators:

- a) evidence that social security issues of all forest workers are in accordance with current legislation;
- b) evidence that all aspects related to labor legislation are in accordance with current legislation, including collective agreements, collective conventions and work regulatory standards;
- c) evidence that the organization is up to date with its fiscal and tax obligations;
- d) evidence that measures are being taken with service providers to ensure that they are also complying with labor, tax and social security laws, labor regulations, collective agreements and conventions; and
- e) existence of an occupational safety and health management program.

### **3.2 Principle 2 - Rational use of forest resources over the short, medium and long term with the objective of ensuring sustainability**

Forest management shall be planned, either through the use of the services of the own organization or through third parties. The organization must promote and adopt attitudes that encourage the rational use of forest resources, both with regard to raw materials produced, secondary products or services rendered by the forest. The forest shall be managed in such a way that the activity does not lead to the depletion of renewable natural resources. The criteria and indicators to comply with are described in 3.2.1 to 3.2.4.

#### **3.2.1 Criterion 2.1**

The organization shall adopt strategies oriented to the sustainable use and management of the forest resources.

Indicators:

- a) existence of procedures aimed at:
  - identify all environmental aspects that can be controlled or influenced, along with the related environmental impacts,
  - identify and characterize significant environmental impacts,
  - characterize, assess and establish measures to avoid or minimize negative environmental impacts on the forest management unit.
  - monitor the implementation of the measures to avoid, mitigate or compensate significant and negative environmental impacts caused by the activity of forest management ;
- b) evidence that the forest species are adequate for the envisioned final uses;
- c) evidence of adopting practices that show efficient use of produced forest resources;
- d) existence of documented procedures for seedling production, tree planting, replanting, silvicultural treatments, road construction and maintenance, harvesting and transportation of forest raw material activities; and
- e) existence of a program of reduction or employment of forest harvesting residues.

### 3.2.2 Criterion 2.2

The forest operations shall be based on an up to date forest management plan.

Indicators:

- a) existence of a documented management plan with defined objectives, which is compatible to the scale of the enterprise, and which contains:
  - management conditions according to regional and local circumstances;
  - silvicultural management scheme to be implemented;
  - justification of the economic viability of the management plans;
  - road network system;
  - age at planned harvest;
  - growth and production estimates by harvest product type;
  - maps or sketches of the forest management unit with indications of land use and occupation;
  - land survey data, classes and types of soils and vegetation, as well as available water resources;
  - existence of a multi-annual program for planting or re-planting, harvesting and maintenance;
  - contingency plans in the case of fires, disasters and fortuitous events;
  - continuous forest inventory; and
  - indication of alternative sources to those in the management plan for obtaining forest raw materials.
- b) evidence that the management plan was prepared and is being monitored by legally authorized professionals;
- c) evidence that the multi-annual management plan is being monitored and revised;
- d) evidence that the results of the monitoring are being incorporated into the management plan;
- e) evidence that the management plan is being divulged to and known by forest workers and local communities, except for confidential information that might compromise competitiveness;
- f) evidence of the implementation of training and capacity building programs aimed at:
  - professional workers capacitation,
  - reduction in the number of work-related accidents,
  - decrease of occurrences placing the integrity of ecosystems at risk.
- g) existence of furtherance to health programs together with local communities.

### **3.2.3 Criterion 2.3**

The organization shall implement forest technology that is suited to local characteristics.

Indicators:

- a) evidence that the silvicultural technology employed is based on the results of research and studies performed under conditions similar to those of the forest management unit;
- b) evidence that documented procedures for the activities of seedling production, tree planting, replanting, silvicultural treatments, road construction and maintenance, harvesting and transportation of forest raw material are updated;
- c) evidence that procedures incorporate shall from the experiments, tests and research performed in the region;
- d) existence of formal mechanisms of technology transference to the forest workers and to third parties of the own organization;
- e) evidence of implementation of forest worker training and capacity building programs, with the following objectives:
  - technical training of forest workers;
  - avoiding diseases and work accidents; and
  - minimizing the occurrences of negative enviornmental impacts;
- f) evidence that equipment, machinery and supplies are suited to local conditions of topography, soil, climate and characteristics of produced forest resources.

### **3.2.4 Criterion 2.4**

There shall be implemented a tracking system of the flow of forest raw materials.

Indicators:

- a) existence of an updated register for the forest management unit;
- b) existence of sales or purchase contracts for the forest raw materials;
- c) existence of procedures for raw material identification at the forest management unit;
- d) existence of procedures for identifying, protecting and handling forest raw material at intermediary storage yards; and
- e) existence of inventory control reports.

### 3.3 Principle 3 - Care for biological diversity

The organization shall manage the forest plantation in such way as to minimize the negative impacts of its silvicultural activity on the native flora and fauna. It shall care for the maintenance of biological diversity, complying with the criteria and indicators described in 3.3.1 to 3.3.6.

#### 3.3.1 Criterion 3.1

The introduction and the utilization of genetic material shall be carried out in a controlled way following biosecurity standards. Previous experience with such material shall be available in order to, besides attesting the forest production potential in the region, allows for the assessment of any possible environmental impacts.

Indicators:

- a) existence of a program implemented to extend the genetic base;
- b) existence of previous experience or some reference in the region or at the site, attesting the forest production potential of the genetic material for the desired objective;
- c) existence of a program implemented for continuous assessment of alternative genetic materials; and
- d) evidence of compliance with biosecurity standards and techniques when using genetically modified organisms.

#### 3.3.2 Criterion 3.2

Forest operations shall be undertaken with protection of remaining ecosystems taken into consideration. Unique ecosystems of environmental, archeological, historical, cultural or social importance shall be preserved.

Indicators:

- a) forest plantations, as well as infrastructure works, must be established in already anthropized areas or in areas that are susceptible to suppression as set forth by legislation;
- b) layout and planning of forest plantations interspersed with patches of native vegetation, thereby contributing to the formation of ecological corridors for resident and migratory fauna;
- c) existence of mapping or demarcation of *habitats* of endemic, rare and threatened species;
- d) evidence of restricted access and implementation of surveillance in areas where threatened species occur;
- e) existence of mapping, demarcation and protection of historic, archeological sites, and those of cultural and social value;
- f) identification of the existing conservation units in areas influenced by the production activity; and
- g) evidence of actions to restore permanent preservation areas that have been degraded.

### **3.3.3 Criterion 3.3**

Forest protection techniques and integrated management of pests and diseases techniques shall be adopted.

Indicators:

- a) existence of an integrated pests and diseases management plan;
- b) existence of a system for prevention, surveillance and control of forest fires, undertaken on its own or in conjunction with other entities. Deliberated fires must be used under proper technical supervision and effective control measures;
- c) existence of monitoring and recording of meteorological, pest and disease conditions;
- d) evidence of procedures aimed at minimizing the use of chemical products in the control of infestation and disease; and
- e) existence of pest and disease prevention or control measures using natural biological control agents, aside from silvicultural, genetic, physical or mechanical techniques.

### **3.3.4 Criterion 3.4**

Natural ecosystems shall be monitored so as to provide information on their biological resources to be used in confirming or revising the management plan. The level of monitoring shall be compatible with the scale of operations.

Indicators:

- a) existence of phytosociological surveys and studies on the structure of remaining native vegetation;
- b) existence of periodic surveys or inventories that are sufficient to detect imbalances in the composition of local wildlife;
- c) evidence that the results of the periodical surveys and inventories are being incorporated into the management plan; and
- d) existence of lists of endemic, rare and threatened species occurring in the forest management unit or its vicinity, and about the plans to protect them.

### **3.3.5 Criterion 3.5**

Areas of relevant ecological interest, as declared by legislation or recognized for their exceptional natural, socio-cultural or environmental attributes, shall be maintained and protected.

Indicators:

- a) existence of maps or sketches indicating permanent preservation areas and legal reserves, with their respective identification;
- b) existence of silvicultural practices or procedures aimed at protecting, restoring and maintaining areas of relevant ecological interest;
- c) existence of measures or plans for conserving or managing refuge areas or wildlife reproduction; and
- d) existence of monitoring of invasive wild plant and animal species that may alter the equilibrium among naturally occurring species.

### 3.3.6 Criterion 3.6

Hunting and fishing activities shall be controlled within the forest management units, in accordance with current legislation.

Indicators:

- a) existence of a hunting and fishing surveillance and control system;

NOTE It is assumed that the activities above mentioned are performed in conjunction with the related agencies.

- b) existence of signage and notification instruments regarding the control of hunting and fishing;
- c) existence of measures favoring the reproduction and movement of local wild animals; and
- d) existence of information for employees regarding the control of hunting and fishing.

## 3.4 Principle 4 - Care for water, soil and air resources

The forest management plan and the technological development program shall foresee and adopt techniques aimed at soil, water, and air resources conservation. The criteria and indicators to comply with are described in 3.4.1 to 3.4.4 .

### 3.4.1 Criterion 4.1

Forest management shall be based on environmental planning prior to the area use.

Indicators:

- a) documented evidence characterizing the soils existing in the forest management unit;
- b) documented evidence characterizing water resources, taking into consideration the watershed(s) where the forest management unit is located;
- c) existence of procedures for selecting and locating planting and road network areas;
- d) evidence that silvicultural activities are planned and executed by taking local climatic data into consideration;
- e) evidence that the identification of areas of environmental importance take into consideration the particular properties of soil and water resources of the concerned area.

### 3.4.2 Criterion 4.2

Water and soil resource conservation, monitoring and maintenance practices shall be adopted.

Indicators:

- a) evidence of the adoption of techniques aimed at soil conservation;
- b) existence of procedures for base or cover fertilization that consider:
  - the nutritional requirements of the planted species,
  - the levels of essential elements existing in the soil,
  - the intrinsic characteristics of each fertilizer,

— the existing climatic conditions.

- c) existence of monitoring of the qualitative and quantitative parameters of the relevant water and soil resources; and
- d) evidence that the road network and fire breakers are maintained in conditions that do not favor soil erosion.

#### **3.4.3 Criterion 4.3**

The forest producer shall adopt a policy of rational use of chemical products, oils and fuels in general.

Indicators:

- a) evidence that technical recommendations are observed for the handling, preparing and applying of chemicals products required for forest operations;
- b) existence of registers of use of chemical products;
- c) evidence that chemical products banned by current international agreements or national legislation are not being used;
- d) evidence that technical personnel and forest workers who handle or apply chemical products are trained to do so and use the appropriate personal protective equipment;
- e) evidence that storage of chemical products, oils and fuels complies with the manufacturers recommendations and current legislation;
- f) evidence that chemical products, oils and fuels transport between storage areas and the field is done with the appropriate equipment or vehicles and applicable law;
- g) existence of chemical product usage procedures that take into consideration climate, soil, and topographical conditions;
- h) existence of maintenance procedures for the equipments using chemical products; and
- i) existence of control and destination systems for residues and packing, according to the legislation.

#### **3.4.4 Criterion 4.4**

The producer shall adopt and implement a policy aimed at reducing or properly treating solid, liquid and gaseous residues.

Indicators:

- a) existence of an implemented system for the selective waste collection;
- b) evidence that hazardous residues are sent to appropriate treatment;
- c) evidence that residues and other liquid effluents are treated and disposed in accordance with current legislation;
- d) existence of plans for controlling or monitoring spills and runoffs; and
- e) evidence of a program for monitoring and controlling gaseous emissions from vehicles and motorized forestry equipment.

### **3.5 Principle 5 - Environmental, economic and social development of regions where the forest activities are located**

The organization must have a policy of interrelating with employees and communities within the area of influence the forest management unit, and must provide evidence of the benefits of the forest activities on social, environmental and economic aspects. The criteria and indicators to comply with are described in 3.5.1 and 3.5.2.

#### **3.5.1 Criterion 5.1**

The forest producer must encourage programs of interest to the community, with a view toward improving the living conditions of the local community.

Indicators:

- a) evidence of possible influence on the identification of socioeconomic parameters and the resulting impacts;
- b) evidence to avoid, mitigate or compensate resulting and significant negative socioeconomic impacts;
- c) evidence of measures to enhance positive socioeconomic impacts;
- d) evidence that the non-predatory habits and customs of the local, traditional and indigenous communities are being respected;
- e) evidence that the intellectual property of traditional and indigenous populations is being respected.
- f) evidence that priority is given to the inhabitants of local communities participation in the various activities related to the forest management unit, including the supply of goods and services;
- g) existence of measures promoting local enterprises;
- h) existence of implemented health, education, safety and hygiene programs for forest workers, and available for their direct dependents;
- i) existence of actions promoting environmental education programs in conjunction with the local communities;;
- j) evidence of implemented environmental education programs for forest workers.

#### **3.5.2 Criterion 5.2**

The organization shall implement dissemination and communication programs for stakeholders.

Indicators:

- a) existence of procedures or instruments for clearly and objectively disseminating information regarding activities and means of operation of the forestry enterprise;
  - b) evidence of implemented programs to promote communication on matters of common interest of the organization and stakeholders, both internally and externally;
  - c) evidence of the receipt, analysis and response to questions and of adapting conciliatory measures aimed at resolving any disputes between the representatives of the forest management unit and the interested parties, both externally and internally; and
  - d) evidence of good relations with the organizations that represent local society, with government agencies and with related entities.
-