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# Towards Defining Forest Degradation: Comparative Analysis of Existing Definitions

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## Objectives of the Paper

1. To review the existing international and national definitions for forest degradation and degraded forests (considering multilingual aspects),
2. To analyze their elements and parameters within a common framework, and
3. To identify their commonalities and differences as well as options for improvement of their comparability, consistency and coherence

The purpose is not to provide a comprehensive review of scientific literature on forest degradation but rather a review of the existing situation.

The approach is holistic but there is a certain focus on climate change aspects.

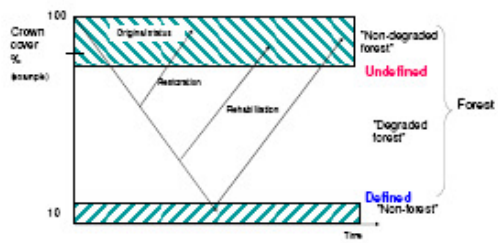
## Purposes of Degradation Defintions: for What?

- **Monitoring of the status and change** in the degree of forest degradation (provision of associated goods and services)
- **Reporting to international conventions** and processes on the status and quality of forest resources
- Design and implementation of **policies, programmes and forest management measures** to take preventive and corrective action
- Design and implementation of **payment mechanisms or other incentives schemes** for forest environmental services such as carbon offsets or conservation easements.

## Specific Criteria for Degradation Definitions

- **Comprehensive** to allow consideration of all forest products and services
- Relate to **human-induced and natural** changes in forests, as appropriate
- Contain **clear terms** which are supported by **applicable variables** and indicators (or their proxies if necessary) that are measurable and detectable
- Consider different **time scales** (temporal and long-term variation)
- Availability of technically and economically feasible options for **measurement and assessment**
- Provision of **reference points** such as time frames, thresholds and levels of absolute or relative changes as appropriate
- Allowance for different levels of **resilience** among forest types.

## Degradation Thresholds




Do we have to define non-degraded forest?

## Levels of Assessment

1. Global/regional/sub-regional (reporting, int. policy)
2. National (national policies, programmes)
3. Sub-national (programmes, projects)
4. Landscape/watershed (projects)
5. Forest management unit (operational decisions)
6. Stand/site (most definitions target at this level)

➔ Implications for (inter alia)
- Choice of indicators
- Choice of assessment methodology

## Degradation and SFM Elements: Summary of Country Suggestions

- A small number of **key commonly supported indicators** under each SFM criterion but also a wide range of individual suggestions.
- There is a **strong overlap** between Extent of Forest Resources, the Productive Functions and the Carbon Cycle (carbon stocks).
- **Two indicators** could be applied under three Criteria: (i) growing stock and (ii) species composition
- Many indicators proposed are **difficult to apply** in practice.
- With few exceptions, indicators under **Socio-economic Functions of Forests do not assess status** of degradation but rather its consequences.
- Many respondents lacked **clarity on how to classify** their proposals for indicators under the individual SFM Criteria

## Potential Indicators Related to Degradation by SFM Element

| SFM element | Potential indicators (examples) |
|---|---|
| Extent of forest resources | Forest cover, crown cover, growing stock, stand density, degree of fragmentation, trees outside forests (TOF) |
| Biological diversity | Ecosystem diversity, species composition diversity, genetic diversity, degree of fragmentation, connectivity, naturalness, crown cover, forest structure. |
| Forest health and vitality | Area affected by pests, diseases, fire, storm damage, area subject to air pollution damage, area with diminished biological components |
| Productive functions of forest resources | Stocking level, MAI, age structure, NTFP yield, wood quality |
| Protective functions of forest resources | Soil erosion, water quality and runoff, managed watershed area, flood protection areas, protective plantation area |
| Socio-economic functions of forests | Value of forest products, recreation and tourism; cultural and community values; employment; income; area available for recreation, area available to indigenous people/social services |
| Contribution to the carbon cycle/climate change by forests | Carbon stock in pools (above/below ground biomass, deadwood, litter, soil), stocking density, removals, TOF |

Question: Can this be validated?

## General Conclusions

- **Generic definitions** of degradation will be difficult to operationalize
- **Need to combine** the holistic approach and specific-purpose definitions
- **Thresholds between non-degraded/degraded/non-forest;** in the climate regime wall-to-wall approach to avoid major leakage, justification for inclusion of degradation in REDD
- **Temporal scale** is crucial for degradation definitions: need for a long-term approach
- **Purpose of definition is linked with the level of assessment;** limitations of stand-level definitions ➔carbon stock reduction

## Conclusions: Elements of Operational Definitions

- identification of **forest goods and services**
- a **spatial context** of assessment (land area identification)
- a **reference point**;
- cover both **process and state** (degradation/degraded forest)
- relevant **threshold** values
- specification of **reasons** for degradation (human induced/natural) when required by the use of definition
- an agreed set of **variables**; and
- **indicators** (and their proxies if necessary) to measure the change of a forest (ecosystem)

➔ As appropriate for specific purposes

## Conclusions: Possible Core Elements by Three Proxies

- Reduction in **biomass** for the growing stock or the carbon stored which can be associated with the reduction of canopy cover and/or number of trees per unit area[1]
- Reduction in loss of **biological diversity** which can be associated with the occurrence of species (dominant and non-dominant) and habitats
- Reduction in **soil** as indicated by soil cover, depth and fertility

[1] Degradation does not necessarily lead to loss of biomass even if the growing stock may decrease.
Source: Lund (2009)

Question: Can this be validated?

## Options for Action

- Maintain the **holistic generic definition** of forest degradation to provide a common framework for definitions developed for particular purposes.
- Maintain the understanding that forest degradation can be **further defined for various specific purposes** and that different indicators can be used for its assessment.
- For each purpose **identify what needs to be known, by whom, and for what** the data should be used in order to develop appropriate indicators.
- Recognize that for international purposes forest degradation needs to be geographically assessed at a **higher than stand or site level** without a *priori* specification of the temporal scale in the definition.
- Allow scope for **national interpretation** of international definitions of forest degradation to ensure relevance and cost-efficiency and to harness synergies.
- **Improve the existing definitions** in view of greater clarity, consistency and compatibility with each other.
- Expand efforts to **measure and assess** forest degradation

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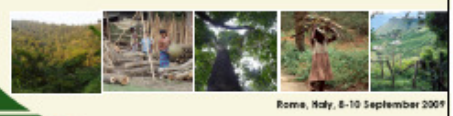
## Assessment and Monitoring of Forest Degradation

**Measuring and Monitoring Forest Degradation through National Forest Monitoring and Assessments**



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## 2. NFMA programme at a glance

### 2.1. Background: Why NFMA is so important (1)

Status of forests...

- Forests cover 30.3% of world land area (FRA 2005)
- Developing countries: ~54% global forests (FRA 2005)
- Forestry & land use change accounts for nearly 20% of global GHG emissions (IPCC, 2008)

...and forest data

- Lack of information, particularly in developing countries, where:
  - 15% of forests covered by NFI (14 countries)
  - 77% by RS & expert estimations (74 countries)
  - 8% by partial FI or no data (54 countries)

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### 2.1. Why NFMA is so important (2)

As a consequence.....

- National decision makers not adequately informed
- International processes (CBD, ITTO, FRA, UNFCCC) rely on unreliable information - Many countries have difficulties reporting to these processes: Climate change, biodiversity, C&I of SFM, etc.

➡ ...creation of NFMA programme

Evolving international processes driving the adaptation of NFMA approach

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## 3. Assessing Forest degradation

### 3.1 Extent of Forest Resources

Parameters assessed

- designated function
- biomass class
- canopy cover
- phenology
- species composition
- management regime
- protection status
- age-class or diameter distribution
- naturalness and development status

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### 3.2 Contribution to the Carbon cycle, forests & climate change

Parameters & Variables assessed

- tree species
- tree height and diameter at breast height (DBH)
- diameter of big tree branches
- standing deadwood DBH
- litter depth
- soil characteristics and type
- soil organic content
- downed deadwood DBH
- regeneration count

Total aboveground carbon and carbon density in the major land use classes and by forest type in Cameroon

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### 3.3 Forest health and vitality

Parameters and Variables assessed

*Tree level*

- Invasive tree species
- Crown condition
- Overall tree condition
- Causative agents

*Forest stand level*

- Environmental problems
- Severity of environmental problems
- Trend of environmental problems
- Fire disturbances
- Human disturbances
- Insect, pest and invasive species categories and name
- Forest types affected by pest and disease
- Severity of invasion, pest and disease

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## 3.4 Biological Diversity

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**Parameters & Variables assessed**

- Species richness (tree composition, wildlife)
- Observations of rare & threatened species
- Forest structure
- Forest type distribution
- Forest area fragmentation
- Protected forest area

**Data analysis**

- Indices of diversity
- Data correlations

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## 3.5. Productive Functions of Forests

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**Parameters & Variables assessed**

- Tree species and derived products (fuelwood, construction material, bush meat, mushrooms, exudates, medicinal plants, soap and cosmetics, handicrafts, fibre, fertilisers, etc)
- Relative importance of tree species
- Demand and supply trends of product/service
- Reasons for changes in supply/demand
- Period and frequency of harvesting
- User groups
- User rights
- Conflicts
- Gender and child participation in harvesting

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## 3.6. Protective Functions of Forests

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**Parameters assessed**

- Total area for all land use/forest cover classes
- Classes of protection level that can include reserves, national parks, multiple purposes conservation, etc
- Occurrence of environmental problems such as: drought, floods, erosion, loss of soil fertility, burning, landslide, wind throw or overgrazing
- Management status (formal vs. no management, ownership, etc)

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## 3.7. Socio-economic functions of forests

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**Parameters assessed**

- historical background of the land use
- information on the local population
- distance of households/access to forest in sampling unit
- ownership
- protection status
- management and ecological problems within sampling unit
- local uses and importance of forest products and services
- temporal changes in land resources, biodiversity and livelihoods
- invasive and threatened species and fuelwood
- consumption of forest products and services

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## Further information on NFMA

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http://www.fao.org/forestry/site/nfma

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