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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 Definitions: 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
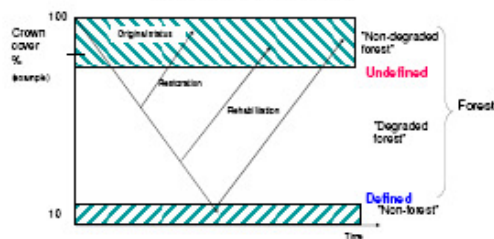
Do we have to define non-degraded forest?

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)
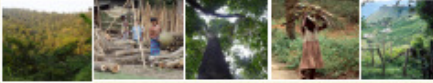
Question: Can this be validated?

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

Slide 1

National Forest Monitoring and Assessment

Assessment and Monitoring of Forest Degradation

Measuring and Monitoring Forest Degradation through National Forest Monitoring and Assessments

Rome, Italy, 8-10 September 2009

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Slide 2

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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Slide 3

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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Slide 4

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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Slide 5

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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Slide 6

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

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

3.5. Productive Functions of Forests

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

3.6. Protective Functions of Forests

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)

3.7. Socio-economic functions of forests

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

Further information on NFMA

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

National Forest Monitoring and Assessment