

**Global Mapping and Monitoring of Forest Degradation:  
The Intact Forest Landscapes Method**

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Legend:  
■ Intact Forest Landscapes (IFL)  
■ Forest zone outside IFL

**The IFL Method – Overview**

**Purpose**  
To map and monitor forest degradation over large, possibly inaccessible areas (e.g. for a country, a continent, or the world)

**Degradation**  
Defined here as loss of ecological integrity (intactness), or loss of “degrees of freedom” to make trade-offs

**Assessment Logic**

- A binary classification of the landscape (either intact or not)
- Inverse logic (landscape considered intact until proven otherwise)
- Two types of criteria (alteration and fragmentation)

**Data**  
Satellite Images (Landsat or finer), publicly available maps


**Characteristics**

- Method – whole area (no sampling), tested, ready to use, replicable, suitable for monitoring, adaptable, non-prohibitive cost
- Results - Spatially explicit, consistent in time and space

**The IFL Method – Methodology**


**A Simplified Classification of the Landscape**

In reality – a gradient



Degraded Intact

In the IFL method – either intact or not



Degraded Intact

NBI Method allows more classes

**The IFL Method – Methodology**

**Definition**

An *Intact Forest Landscape (IFL)* is

- an unbroken expanse of natural ecosystems
- with no signs of significant human activity
- and large enough to maintain all native biodiversity, including viable populations of wide-ranging species.

An IFL may contain significant portions of naturally tree-less ecosystems.

Minimum size: 50 000 hectares

**Intact – no loss of freedom to make trade-offs**

**The IFL Method – Methodology**

**Inverse Logic - Intact Until Proven Otherwise**

**Step 1:** Assume entire study area to be intact

**Step 2:** Collect evidence of human influence

**Step 3:** Reject all areas where evidence is sufficient

**Step 4:** Intact areas appear as a residual

**The IFL Method – Methodology**

**Criteria, Type 1 - Human Caused Alterations**  
(What's inside a polygon)

- **Settlements** (including a buffer zone of 1 km);
- **Transport infrastructure**, including roads (except unpaved trails), railways, navigable waterways (including seashore), pipelines, and power transmission lines (including in all cases a buffer zone of 1 km on either side);
- **Agriculture and forest plantations;**
- Industrial activities during the last 30–70 years, such as **logging, mining, oil and gas exploration and extraction, peat extraction, etc.**
- **Burned areas** adjacent to infrastructure or developed areas

Old or low intensity human influence is considered *insignificant*, e.g. diffuse grazing by domestic animals, low-intensity selective logging, and hunting.


The IFL Method – Methodology

**Criteria Type 2 – Fragmentation**  
(The geometry of a polygon)

- **Minimal Area** of at least **50,000 hectares (500 km<sup>2</sup>)**
- **Minimal Width** of at least **10 km** (the diameter of a largest circle that can be fit inside the contour of an area)
- **Corridors or appendages** of areas meeting minimal area and width criteria must have a minimum width of **2 km**

The IFL Method – Methodology

**1. Define The Area of Study**

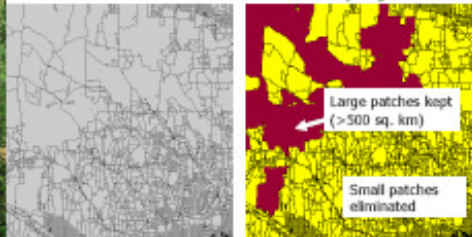


**Included**  
Forest landscapes with a canopy density of at least 20%  
Naturally tree-less areas within forest landscapes

**Excluded**  
Small remote forest patches (less than 4 sq. km)

The IFL Method – Methodology

**2. Eliminate Obviously Degraded Areas**



Large patches kept (>500 sq. km)  
Small patches eliminated

Pre-existing maps are used. Example: TIGER dataset (USA)

The IFL Method – Conclusion

**Advantages**

- Suitable for all countries and continents.
- Cheap and quick to apply.
- Data from public satellite images
- Rigorously defined, replicable, independently verifiable
- Suitable for monitoring
- Can be adapted and refined, e.g. to assess smaller landscapes.
- Suitable for remote and inaccessible landscapes
- Results are consistent and comparable in time and space
- The result is a map with many uses
- The method is tested and ready to use
- High level of transparency

The IFL Method – Conclusion

**Limitations**

- Skills in GIS and image interpretation are required.
- Measures the presence/absence of human impact
- Current criteria are only suitable for large areas (province, country, region, the world)
- Current criteria are not geographically differentiated
- Fire classification is an issue

**Possibilities**

- The method can be modified.
- Alteration criteria can admit more human influence
- Fragmentation criteria can admit smaller areas
- Classes of alteration and fragmentation can be created
- Criteria can be geographically differentiated ("quilt" type assessment)

**But differentiation may cause loss of consistency!**

The IFL Method – Conclusion

**Opportunities**

- IFL method is ready to use
- IFLs are strongly associated with permanence, biodiversity, indigenous peoples
- IFLs allow countries to make MRV-able commitments in early phases of implementation
- Integrate in emerging "REDD-Plus" mechanism

**Recommendations**

- Maintain consistency within study area
- Consider adding classes of alteration/fragmentation
- Integrate in FRA (global and/or national assessments)
- Integrate in "REDD-Plus"
- CBD?
- Support additional development and assessment work

### Definition

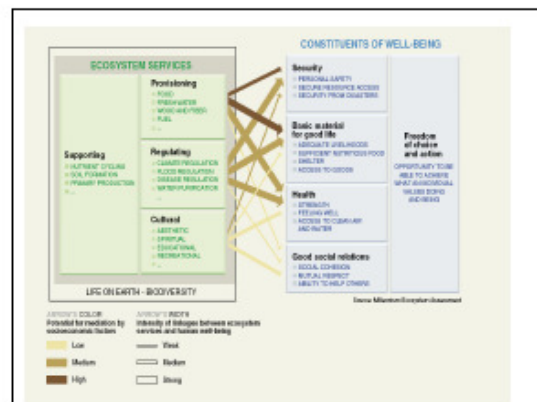
- **Reduction of the capacity of a forest to provide goods and service**
- Agreed that the definition was sufficient and no need to refine

### Key issues / conclusions

- Degradation is location-specific
- Degradation is scale dependent (spatial and temporal)
- Degradation is both a state and a process (thresholds)
- Obvious need for flexibility but also need for some indicators that permit cross site comparability

### Categories of ecosystem function

- **Carbon (biomass)**
- **Biodiversity**
- **Food**
- **Water**
- **Soil**
- Aligns broadly with MA

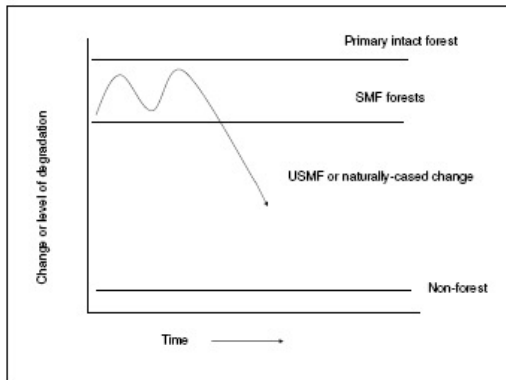


### Possible indicators (from cards)

- Soil / water quality
- Watershed quality
- **Species composition**
- **Species richness**
- **Species presence / absence**
- **Stand density**
- **Canopy cover / structure**
- **Deadwood structure**
- **Comparison to «natural » reference**
- **Biomass**

### Questions for WG 2

- What is the appropriate scale(s) to consider degradation: Does the current definition sufficiently address the issue of scale?
- What are the best indicators?
- Which indicators are best for national-level reporting?
- Which might also be proxy indicators for several different aspects of degradation?
- Which already have adequate definitions and assessment methods?
- What further actions are needed to facilitate regular monitoring of the indicators?



**Thresholds**

- Thresholds may exist and we need to look for them over time with data trends.
- Different thresholds for different indicators
- Or, thresholds might be set for socio/political reasons;
- The utility of thresholds is more apparent at the local level and less apparent at higher levels.

**Levels are:**

- Global
- Regional
- National
- Sub-national by forest type
- Local by landscape
- Stand

- Landscapes can be defined biophysically, functionally, social construct
- Or landscape can be a local level construct.
- Some level of sub-national forest typing
- Appropriate scale is relative to the goods and services being determined.
- Time scale of reporting, depends on what you are measuring.
- Time scale is relative to the indicator or process which you are measuring.

Indicators	Scales				
	Global	Regional	National	Forest type	Local
Soil quality				X	X
Erosion rate				X	X
H2O quantity		X	X	X	X
H2O quality		X	X	X	X
Species comp.	X	X	X	X	X
Forest stand					
Variable S (canopy, etc/ing etc.)				X	X
Landscape variables (land cover, fragmentation, etc.)	X	X	X	X	X
Carbon pools (5)	X	X	X	X	X

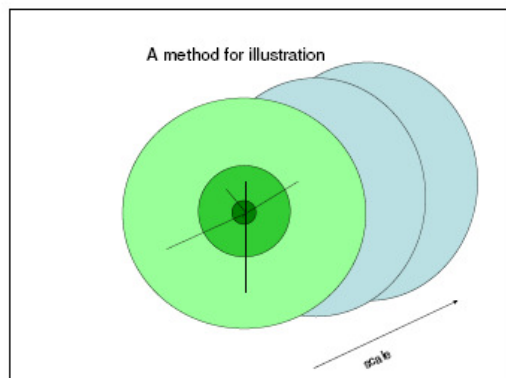
For these indicators, which ones already have adequate definitions and assessment methodologies?

Agreed that methods are available for all.  
Lund's proposed common ground indicators:

- Soil
- Biodiversity
- Biomass (carbon)

- As a minimum to define degradation we need to measure species composition, landscape pattern, and carbon pools in some way

Further actions needed to facilitate regular monitoring of these indicators (e.g. harmonization of definitions, capacity building, R&D), e.g., NFIs not in all countries and not standardized  
By whom?





## Groupes de travail 3 - présentation



### Complex issues with many confounding factors and drivers

- Globalization
  - Pension fund in Europe funding US bank funding industrial company funding local investor logging in Sarawak...)
- Policy environment and legal framework
- Societal choices
  - Use of natural capital to build physical capital
- Institutional settings
  - Lack of capacity to manage / control


### A wicked problem

Problem Attributes	Complexity Spectrum	
	Simple Problems	Wicked Problems
Definition	Clear, all agree	Fuzzy, much disagreement
Objectives	Single	Multiple
Stakeholders	Aligned	Fragmented
Factors influencing objectives	Few, controllable	Many, beyond control
Uncertainty	Low	High
Relative risks	Low variability	High variability
Role for science	Leads to clear choice	Informs choices
Coping strategies	Not contentious	Contentious
Decision analysis	Less valuable	More valuable



### Forest products (goods)

- Goods differ (wood and wood-based, NTFP...)
- Indicators can be developed at the forest management unit level
- FMU level indicators can be scaled up to national or international levels



<b>GOODS:</b> • Timber • Fuelwood • Medicines • Mushrooms/berries • Meat • Honey Etc...	<b>STOCKS</b> • Standing timber • Deadwood • Etc...	<b>SUSTAINABLE PRODUCTION LEVELS (SPLs)</b>
<b>Indicator: set of ratios SPL/AP</b>		
<b>ACTUAL PRODUCTION LEVELS including for local consumption (APLs)</b>		



### Socio-economic services

- Linked to the "goods" but in a non-linear, monotonic way (→ secondary indic.)
- Indicators can be developed at the forest management unit level
- FMU level indicators cannot be scaled up to national or international levels

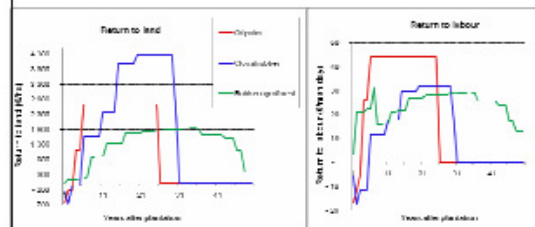
## Agroforests vs. clonal plantations



Biodiversity,  
Ecosystem services  
Income

No biodiversity  
Some ecosystem services  
Much bigger income

## Comparison of different smallholders' plantations



	Oil palm	Clonal rubber	Rubber agroforest
Return to land (€/ha)/year	2 154	2 717	1 172
Return to labour (€/man.day)	36	18	22

## Possible socio-economic indicators

- Local demographic trends
- National population trends
- Employment (forest and extra-sectoral)
- % Household income from forest goods



## Recommendations

- Develop meaningful macro-economic indicators for national scale socio-economic services
- Provide training and capacity building to assess indicators at local level
- Use a common conceptual framework to analyze indicators



*What sort of forest degradation can we really address with the instruments at our disposal?*

*Where is REDD likely to fail or to succeed?*

