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Mapping drivers of deforestation and degradation

UNEP-WCMC

February 2018 | Monrovia

Outline

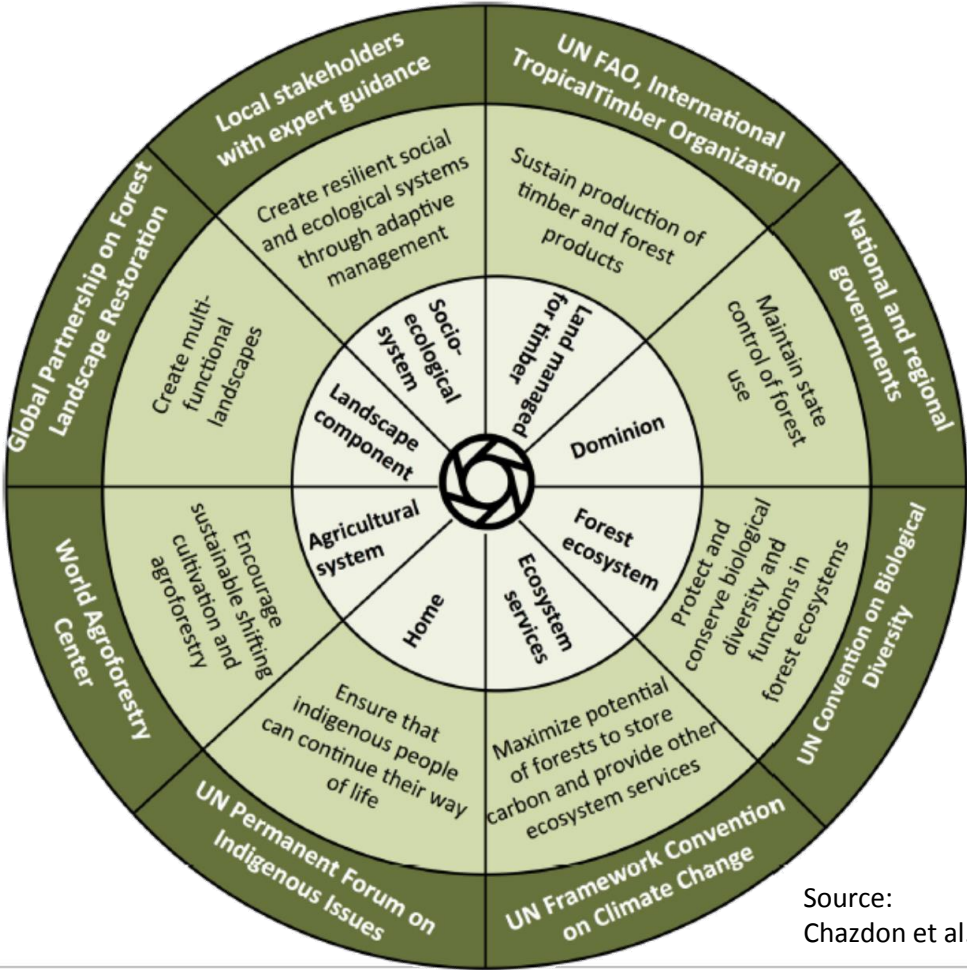
- Definition of forest
- Approaches
- Deforestation and degradation drivers
- Integrated land use planning
- Identifying and map drivers of deforestation and degradation

Definition of forest



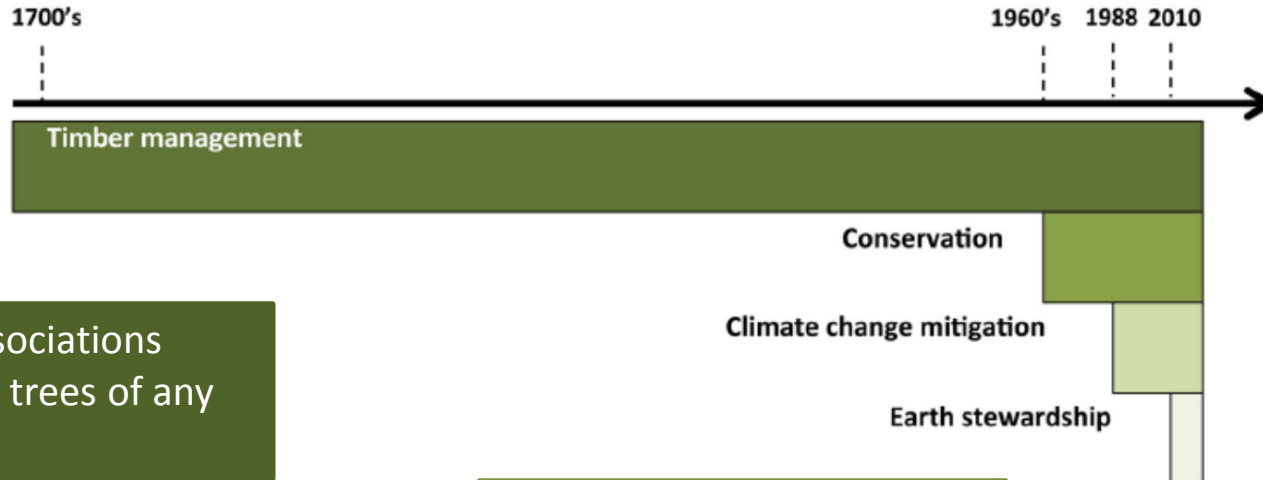
The concept of forest

It largely depends on the goals of management



Source:
Chazdon et al., 2016

Change over time



Vegetative associations dominated by trees of any size

Forest as carbon stock

Dynamic complex of plant, animal and micro-organism communities and their abiotic environment

Ecosystem services of forests are important for poverty alleviation and sustainable development

Liberia National Definition of Forest



30% MINIMUM FOREST COVER
5 METER MINIMUM HEIGHT
1HA MINIMUM AREA

*National Forest Definition Workshop
25-29 January 2016*

Approaches



High Conservation Value approach

“An HCV is a biological, ecological, social or cultural value of outstanding significance or critical importance”

HCV 1 Species diversity

Concentrations of biological diversity including endemic species, and rare, threatened or endangered species (RTE), that are significant at global, regional or national levels.

HCV 6 Cultural values

Sites, resources, habitats and landscapes of global or national cultural, archaeological or historical significance, and/or of critical cultural, ecological, economic or religious/sacred importance for the traditional cultures of local communities or indigenous peoples, identified through engagement with these local communities or indigenous peoples.

HCV 2 Landscape-level ecosystems and mosaics

Large landscape-level ecosystems and ecosystem mosaics that are significant at global, regional or national levels, and that contain viable populations of the great majority of the naturally occurring species in natural patterns of distribution and abundance.



HCV 3 Ecosystems and habitats

Rare, threatened, or endangered ecosystems (RTE), habitats or refugia.

HCV 4 Ecosystem services

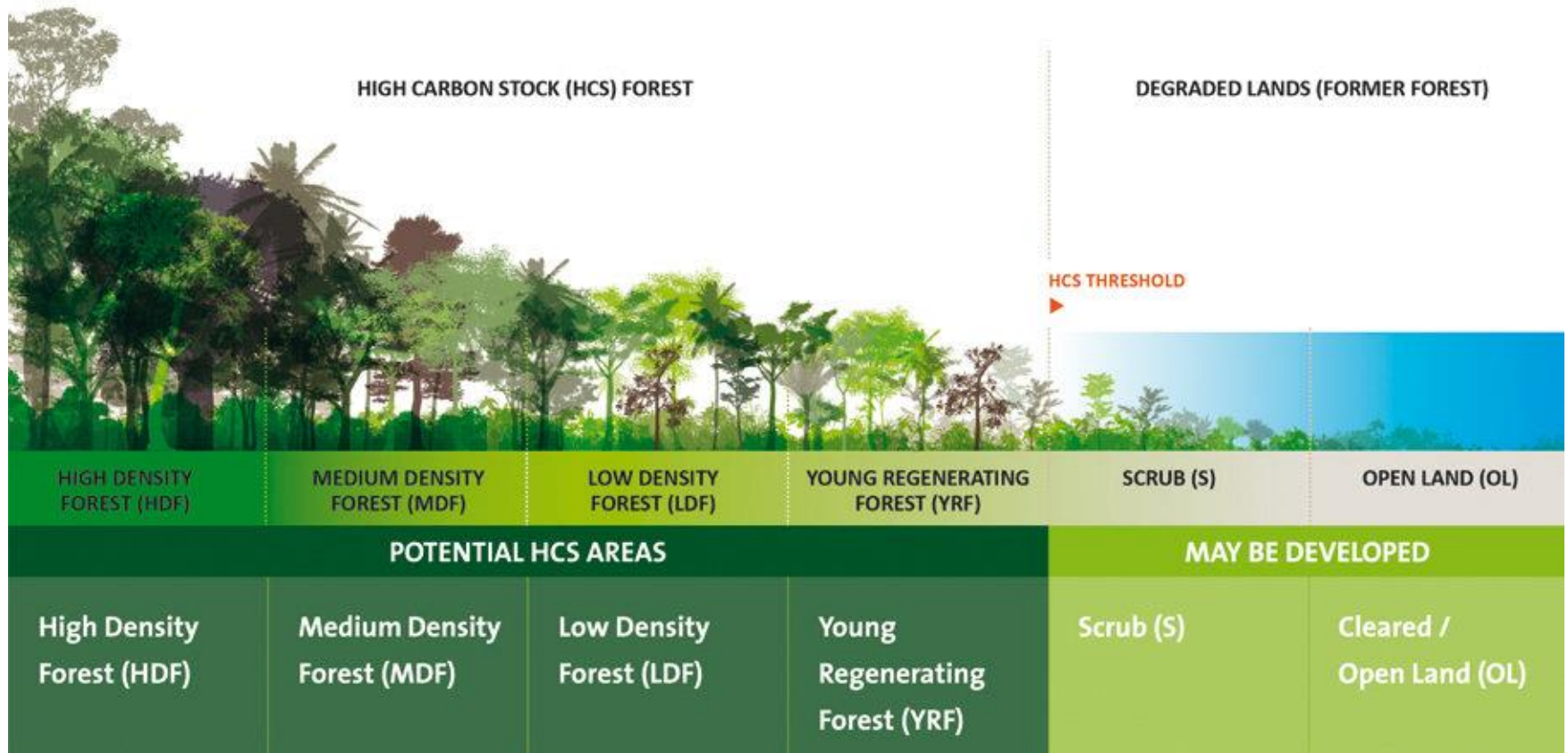
Basic ecosystem services in critical situations, including protection of water catchments and control of erosion of vulnerable soils and slopes.

HCV 5 Community needs

Sites and resources fundamental for satisfying the basic necessities of local communities or indigenous peoples (for livelihoods, health, nutrition, water, etc.), identified through engagement with these communities or indigenous peoples.

High Carbon Stock approach

“Rather than defining HCS forest by an ‘absolute carbon threshold’, it uses field data on levels of biomass, vegetation structure and composition, together with a view from above (satellite or Light Detection and Ranging – LiDAR), to create a HCS classification ranging from high-density forest to degraded former forest areas of scrub and open land.”



Deforestation and degradation drivers



Deforestation and degradation

Deforestation occurs when the density of the forest canopy cover is reduced to below 30%. **Forest degradation** is the thinning out of forest to the point where only 30% forest canopy cover remains



Current and future drivers of deforestation and degradation

*REDD+: addressing **drivers** of deforestation and forest degradation and **barriers** to conservation, sustainable management and forest enhancement*

Current:

Where are the drivers of deforestation/degradation now, and where has forest cover change recently happened?

Future:

Where are threats on forests that may lead to deforestation or forest degradation in the future?

Types of drivers

DIRECT drivers include:

- Expansion of infrastructure
- Agricultural expansion
- Fire
- Mining activities
- Expansion of plantations e.g. palm oil

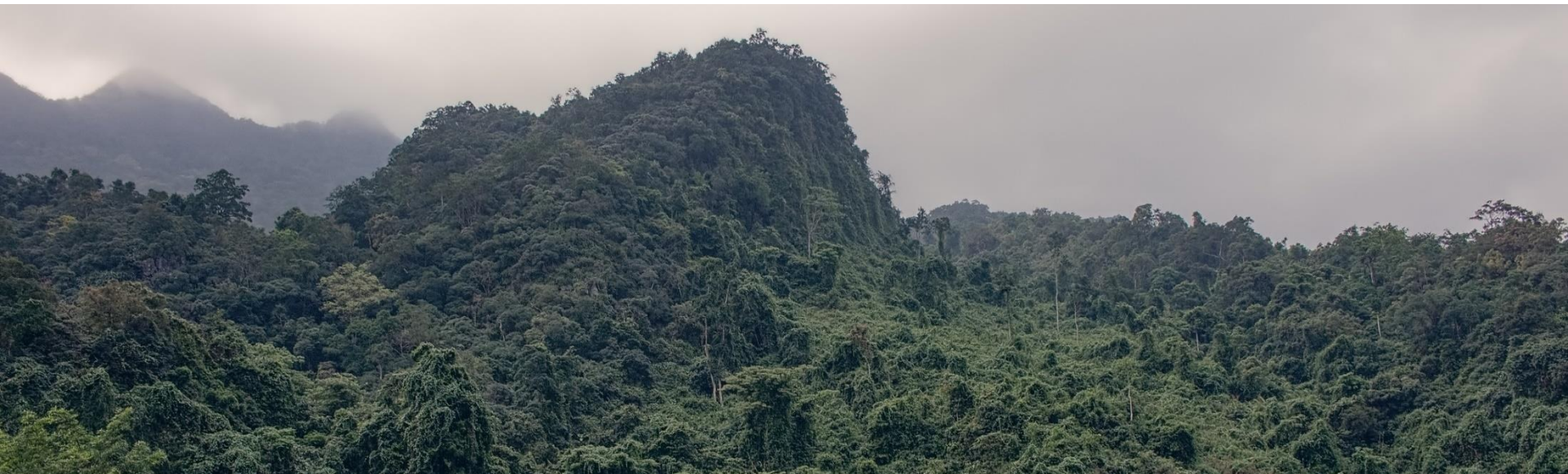
INDIRECT drivers include:

- Population size and density
- Poverty levels
- Financial incentives
- Cultural preferences
- Political decisions



Planning for REDD+ actions to address drivers & barriers

- Current pressures (e.g. the location of current drivers)
- Threats to forests, to help identify where the same or new drivers may be in the future
- Barriers to conservation/restoration/management (e.g. conflict over land)

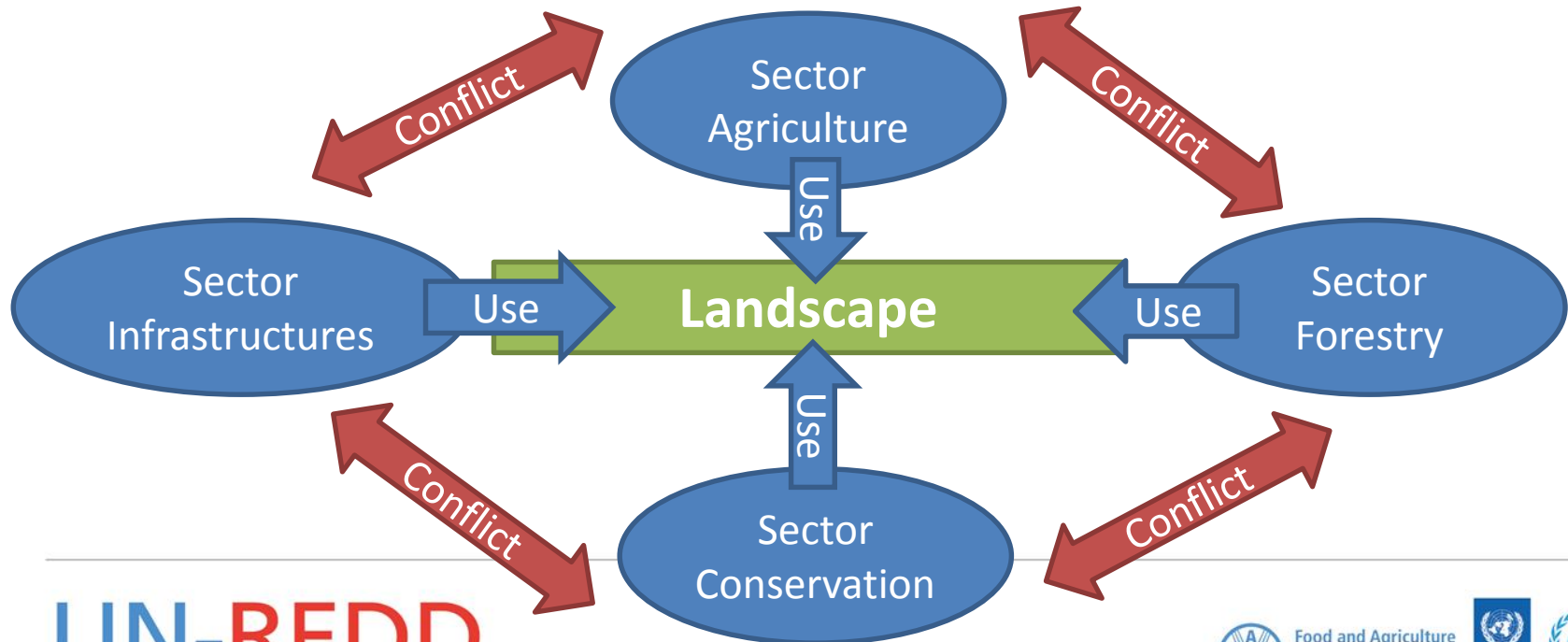


Integrated land use planning



An integrated land-use planning approach

- Different objectives and activities in the landscape
- Facilitate the achievement of different sectors goals, with a minimum of conflicts, and enhancing benefits for society, the economy and the environment
- Future land-use demands may need to be reconciled across sectors



Integrated land-use planning

- Data from other sectors provide information on past, current or future pressures on forests.
- Data from other sectors can often be mapped and highlight particular pressures on forests.

Useful datasets can include:

- planned land concessions for agriculture and plantations
- infrastructure development plans
- current and/or projected population density
- timber harvesting areas



Identifying and mapping deforestation and forest degradation drivers

How can we identify and map future threats and drivers?

- Map current direct and indirect pressures, and examine their relationship with forest cover and forest cover change
- Think about how these may change in the future
 - Draw on future models of change, as available
 - Draw on existing land-use plans, as available



How can we identify and map future threats and drivers?

Roads and infrastructure

- Is there a relationship between the locations of past forest-cover change and the distance to roads and infrastructure?
- Where do planned infrastructural developments affect forests and/or increase access to forests?

How can we identify and map future threats and drivers?

Population density and poverty

- Is there a relationship between the locations of past forest cover change and the population density or poverty in these areas?
- How is the population and their livelihoods expected to change (rate of change), and how may this affect forest cover?

How can we identify and map future threats and drivers?

Local practices and political decisions (land-use plans)

- How do the locations of the current drivers of deforestation/degradation relate to the level of forest cover change observed in an area?
- Is there any planned deforestation?
- How will a proposed land-use plan change the extent to which a driver changes forest cover in these areas?

How can we identify and map future threats and drivers?

Hydropower

- Where are planned dams?
- How large are these, and what area of forest would be flooded? Can a topographical map be used to model this?
- What other infrastructure development would be required to access the dam?
- Are there any likely positive impacts on forests from planned dams? (e.g. PES scheme, less dependence on biomass energy)

How can we identify and map future threats and drivers?

Mining

- Where are mineral concessions? Which of these are for exploration and could be active in the future? Which of these are active already?
- Is there a history of forest cover loss within concessions?
- Do concessions include obligations to identify and retain high-carbon stock forests?

How can we identify and map future threats and drivers?

Plantation concessions

- Where is natural forest, and what is its aboveground carbon stocks?
- Are there any plantation concessions within this natural forest, i.e. potentially at risk of conversion to planted forest?
- What type of planted forest is prevalent? What is its carbon stock? Is there a history of forest cover loss within concessions?
- Do concessions include obligations to identify and retain high-carbon stock forests?

Methods for mapping future drivers

Option 1 – Simple overlays of pressures/future threats

Possible outputs:

- Information presented as single maps e.g.
 - Forest shown according to distance to roads and future roads
 - Population density across the province
 - Slope
 - Elevation
 - Poverty
 - Future land use plan
 - Forests showed according to distance from recent forest cover change

Methods for mapping future drivers

Option 2 – Maps are created showing areas selected based on pre-defined criteria

Possible outputs:

- Map showing locations of future pressure/threats based on a number of inputs (using specified criteria and thresholds)
- Maps showing possible future extent of a particular driver based on user-defined workflow
- Maps showing the individual input layers and thresholds used
- Combined map showing number of possible future threats/pressures/drivers

Methods for mapping future drivers

Option 1 – Simple overlays of pressures/future threats

Pros

- Individual can identify areas they feel are most at risk
- Transparent
- May encourage selections based on local knowledge in a participatory environment

Cons

- Areas of potential future drivers are NOT identified
- More difficult to identify specific areas
- Subjective in terms of locations chosen

Option 2 – Maps showing areas selected based on certain criteria

Pros

- Areas of potential future drivers are identified based on input criteria
- Can be useful if presented transparently with a well documented workflow and maps showing the input layers

Cons

- Assumptions more hidden
- Thresholds need to be decided and fed into model
- Subjective in terms of the criteria and thresholds selected (would need to be validated by expert knowledge)
- If expert knowledge to define workflow lacking - can lead to misinformed presentation of data

Summary: Drivers of deforestation and forest degradation and integrating information from different sectors

- Drivers may be **direct** or **indirect**
- **Current drivers** AND **threats** to help identify **where drivers may expand to in the future**
- Data from **different sectors**
- There are **different options for mapping** to be used at different stages in the planning process



A sign showing the road leading to Thailand is seen near Dawei in southern Burma, close to the site of a planned special economic zone and deep-sea port, is pictured in 2011. (Photo: Reuters)



Thank you! Any questions?