

Criteria for developing indicators to monitor forest biodiversity for REDD+ safeguards

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Criteria for biodiversity indicators

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- criteria emphasized will differ slightly depending in type of project:
 - Reduce emissions from deforestation and forest degradation
 - Conservation of carbon stocks
 - Sustainable forest management
 - Enhancement of carbon stocks
 - Need to understand the basic premise for maintaining biodiversity is **not** preservation, **but is** ecosystem functioning

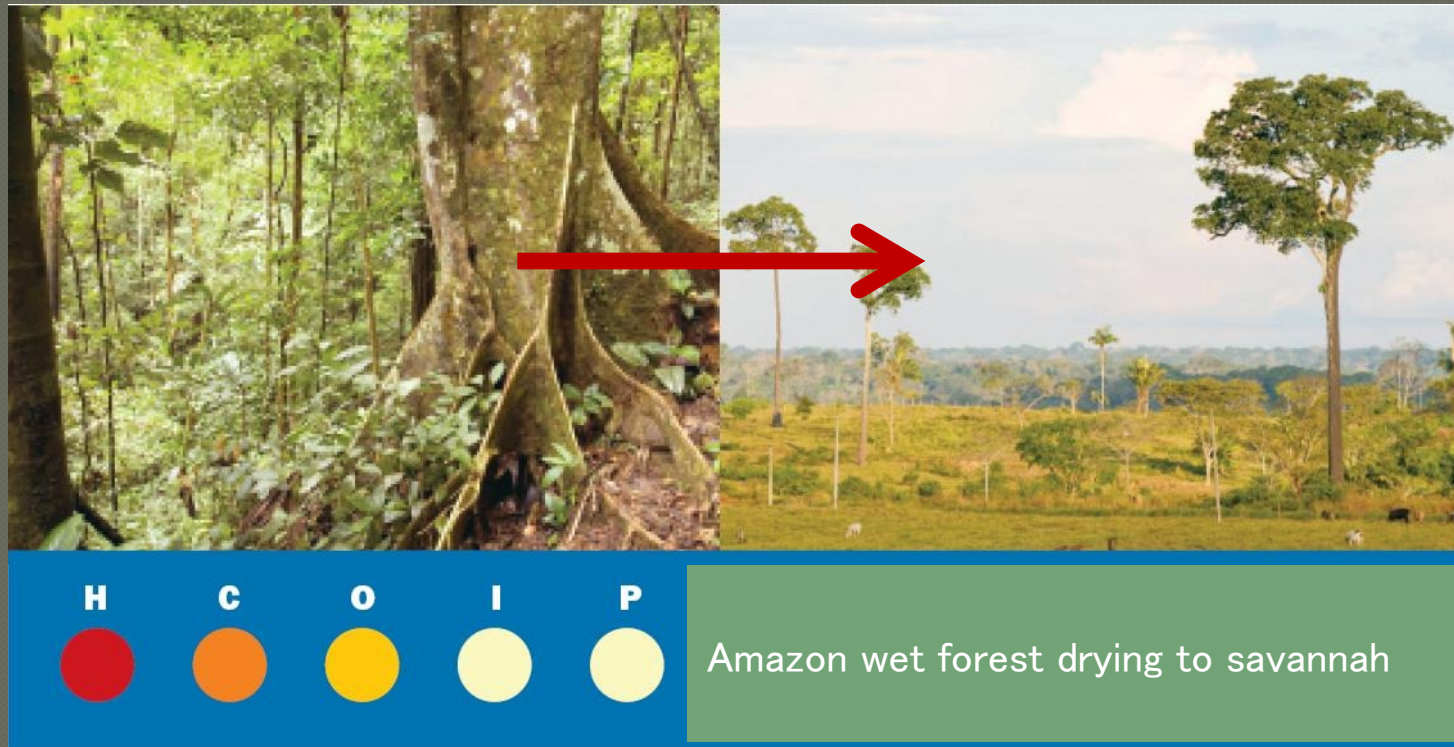
Why is biodiversity important for REDD+

- language of UNFCCC says is a “co-benefit”
- more properly, carbon is a ‘co-benefit’ from biodiversity
- biodiversity supports ecosystem functioning
- clear relationship between species richness and productivity in ecosystems, and
- a clear relationship between biodiversity and many ecosystem services, including resilience

What are the mechanisms by which biodiversity increases ecosystem function?

- complementarity – use multiple resources efficiently
- facilitation – species may enhance another species performance
- sampling effect or higher diversity = higher probability of highly functioning species
- co-evolution – direct requirement of one species for another (pollination, seed dispersal, growth, etc.)
- establishment of complex communities increases resilience and resistance (redundancy)

Tipping points exist where the ecosystem loses resilience and a new state results



Source: CBD, GB03

Impact of drivers:

H = logging/clearing
= over-exploitation

P = pollution

C = climate changes O
I = invasive spp.

Biodiversity supports many ecosystem services

Ecosystem service	Strength of linkage to biodiversity	Quality of evidence
Pollination	High	High
Decomposition	High	High
Carbon sequestration	High	High
Carbon storage	Mixed	High
Erosion control	Low	High
Pest control	High	High
Seed dispersal	High to none (wind)	High
Water quality	Low	Poor
Water quantity	Medium to high	Poor

So, we could grow **trees** and store carbon...

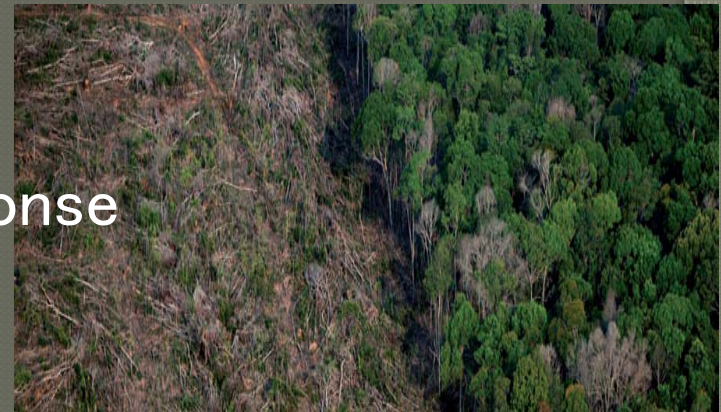


Or, we could foster and maintain **forest ecosystems** with multiple ecosystem services... and store even more carbon



Underlying considerations for developing criteria for biodiversity

- biodiversity has scales
 - genes, species, ecosystems, landscapes
 - diversity occurs at each of these scales
- sustainable use
- maintain ecosystem resilience
- measure pressure, state, and response
- maximise carbon in the system
- meeting Aichi Targets
- meet national biodiversity objectives (NBSAPs)
 - including objectives for endangered species



Criteria and indicators must be useful but not constrain REDD+ projects

- concern from recipient countries is that biodiversity monitoring for indicators will be too demanding
 - Capacity
 - Time
 - Cost
- need to ensure that biodiversity is supported without excessive demand on projects



Key questions for biodiversity indicators under REDD+?

- ⦿ has the biodiversity we are aiming for been maintained, supported, or recovered?
- ⦿ are the desired ecosystem services related to biodiversity sustained?
- ⦿ are the key functional species maintained?
- ⦿ where are tipping points and what are sustainable production levels?
- ⦿ are associated biodiversity benefits achieved (economic, cultural)?

Criteria for biodiversity indicators

- conservation of key species
- conservation/improvement of ecosystems, and landscapes
- ecosystem function
- pressures alleviated
- desired services sustained
- benefits derived
- policies in place



What are the most effective REDD+ investments if biodiversity and carbon are co-objectives?

In rank order:

1. Conserve primary forest (reduce deforestation)
2. Reduce degradation of managed forests (i.e., Sustainable Forest Management)
3. Reforestation and afforestation on deforested lands
4. Many others: improved agriculture, intensive agriculture, controlling fire, etc.



Source: IUFRO 2012, World Series No. 31

Thank you