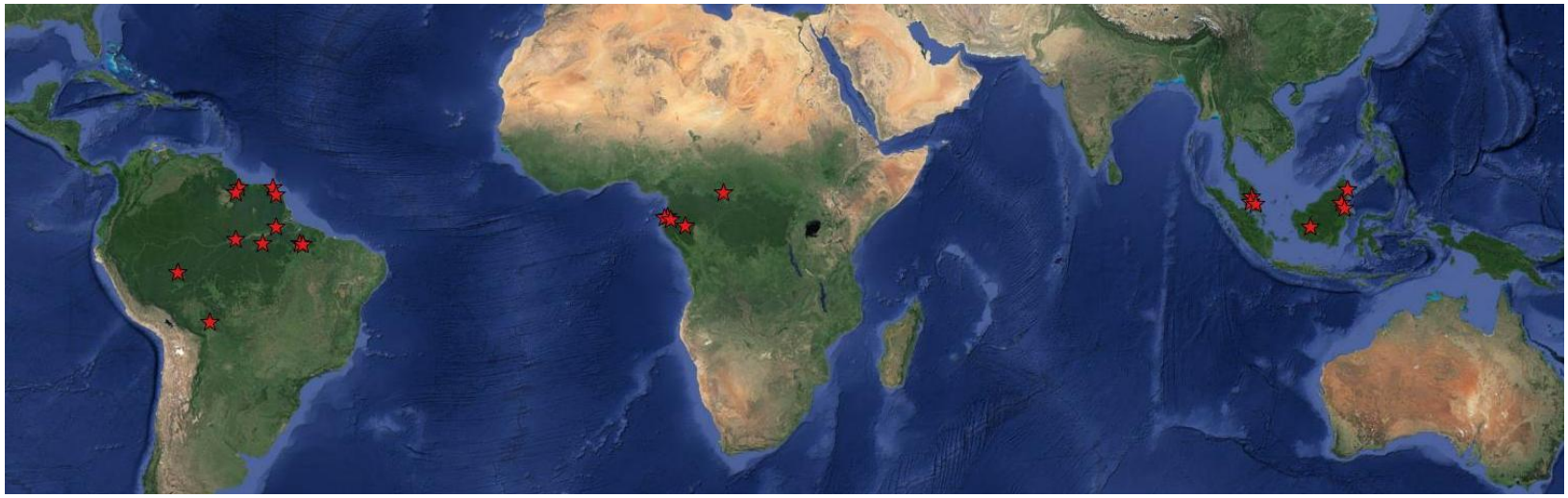
The Tropical managed Forest Observatory: A New Research Tool to Address the Future of Logged Forests

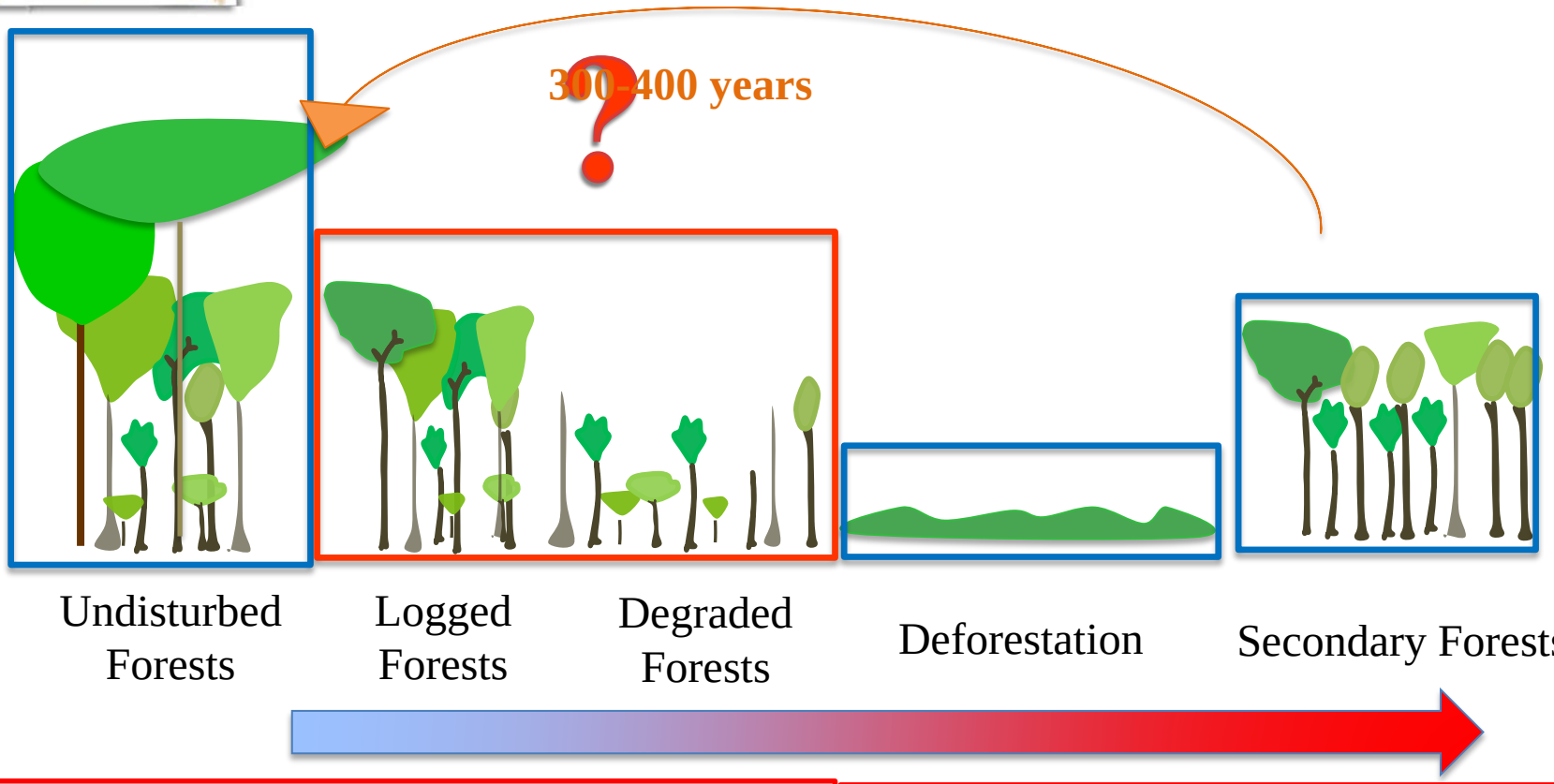
Main Purposes of this Presentation

- Quel is the Objective of this network?
- Who are we ?
- What kind of data do we work with?
- What are our first results in the Amazon?
- Why is TmFO important?
- What are the possible cooperation with others network



Setting the Context on a Broader Scene

Studies on Forest Degradtion



Importance of Tropical production forests

400 millions d'ha

50 % of all tropical forests

Very poorly studied at regional level

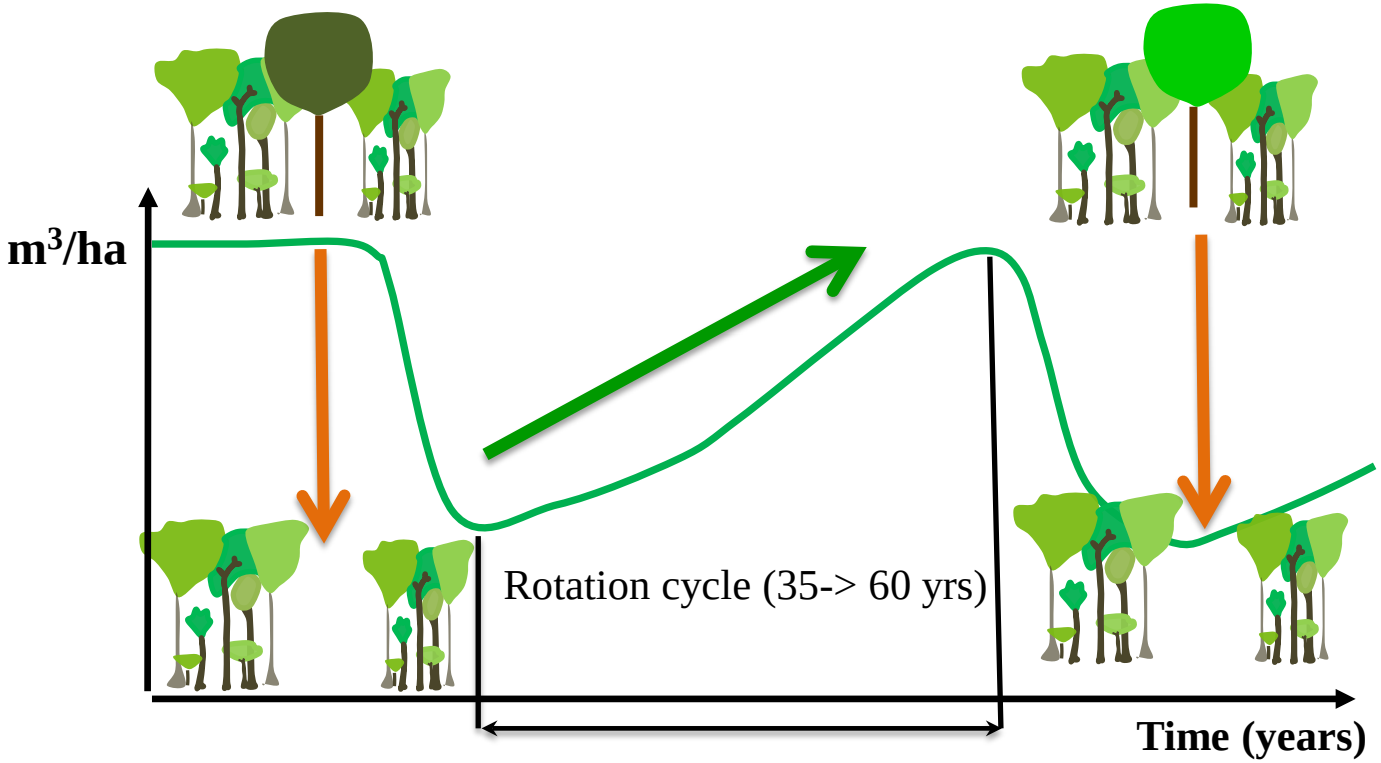
The Constraints

Lack of information about past disturbance

Environmental factors + Disturbance factors

Length and periodicity of monitoring

Selective Logging in the Tropics



- Counting on forest natural regeneration
- Focused on timber exclusively
- But usually: No planning and high damage (50% of the stand)
- Based on a very simple rule: the minimum diameter cutting limit

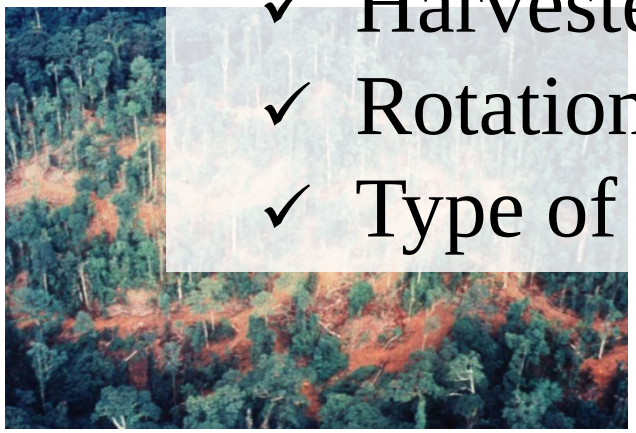
Selective Logging = Degradation: It depends ?

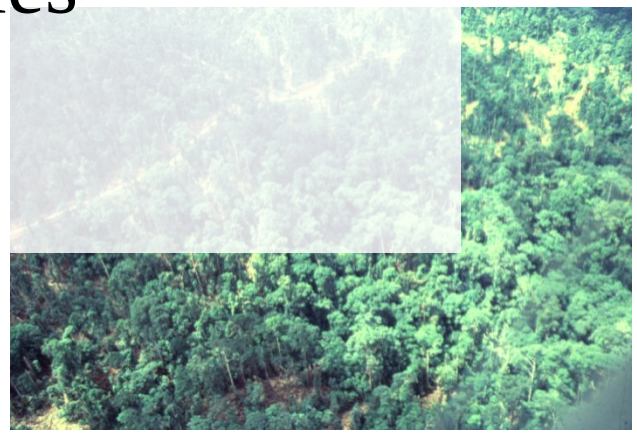
Conventional = YES

RIL = No ?

The main Factors:

- ✓ Logging Techniques
- ✓ Logging Intensity
- ✓ Harvested species
- ✓ Rotation length
- ✓ Type of forest





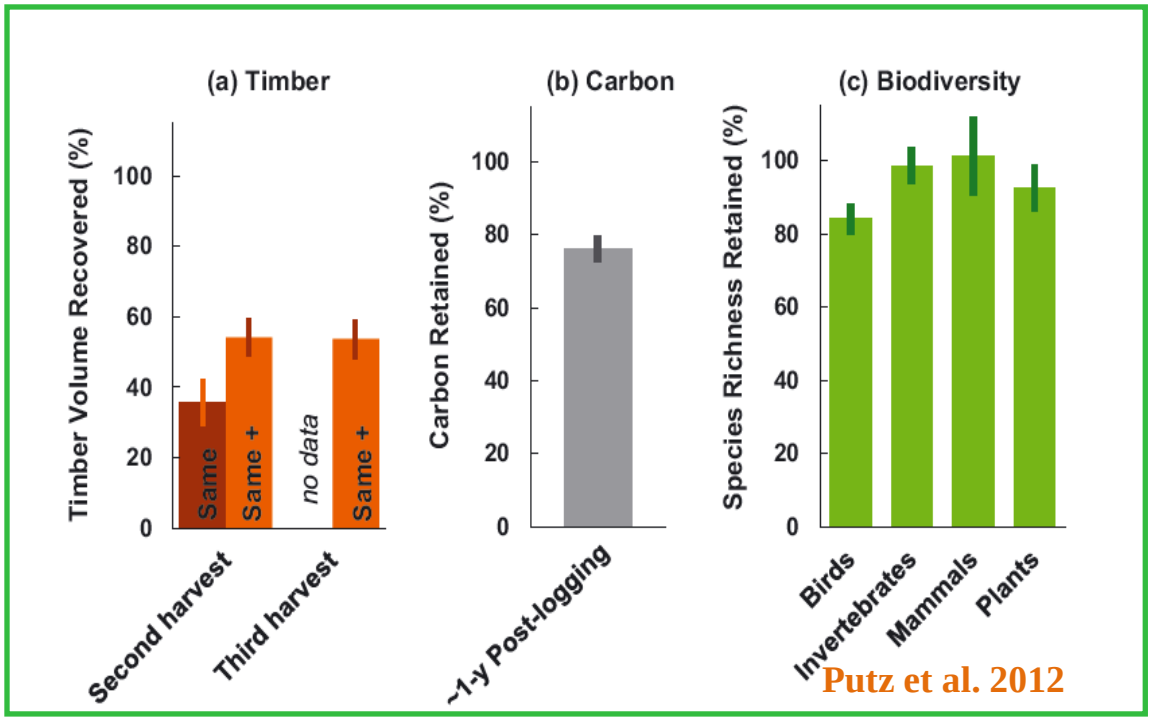
Exploitation = Dégradation ?
ça dépend !!!

Exploitation prédatrice = OUI!

Expl. À Faible Impact = Non?

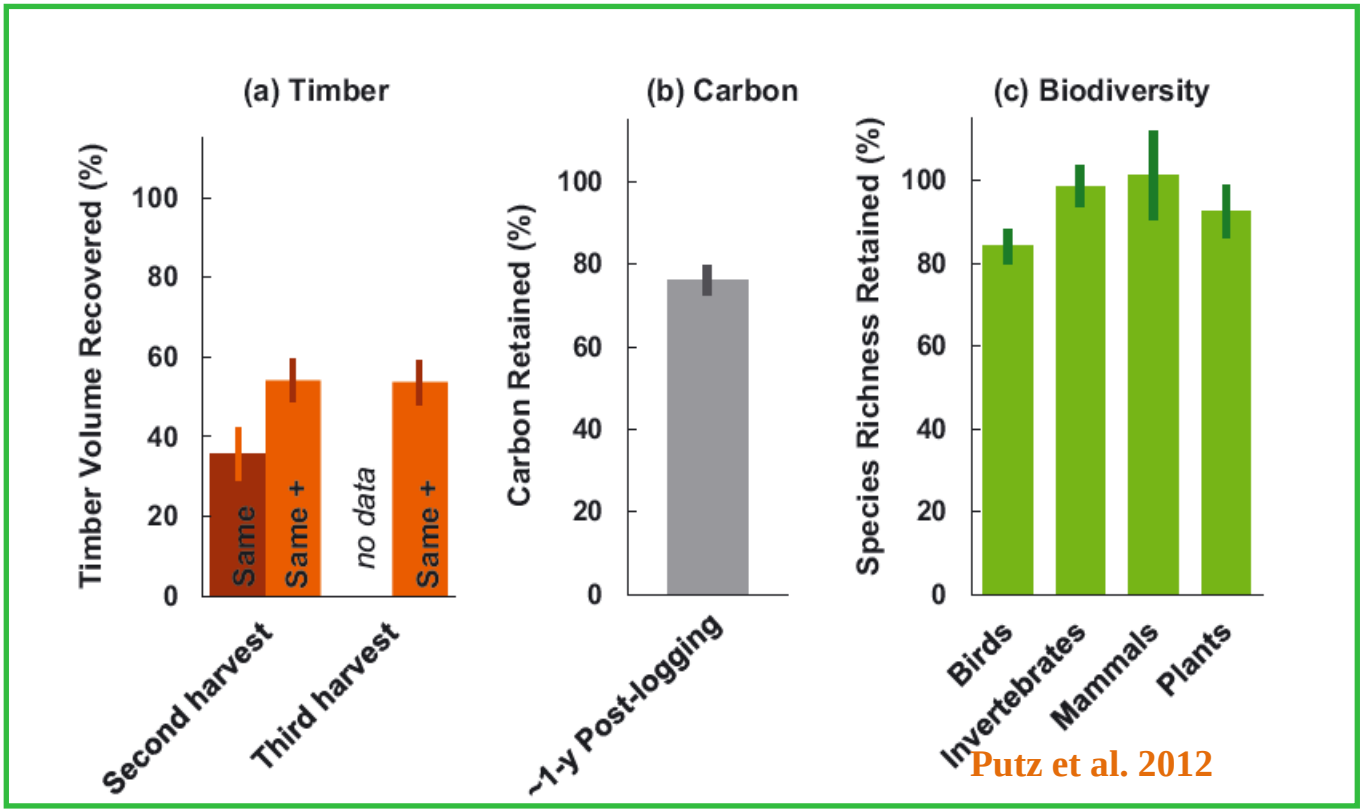
cirad

Beyond Just Timber



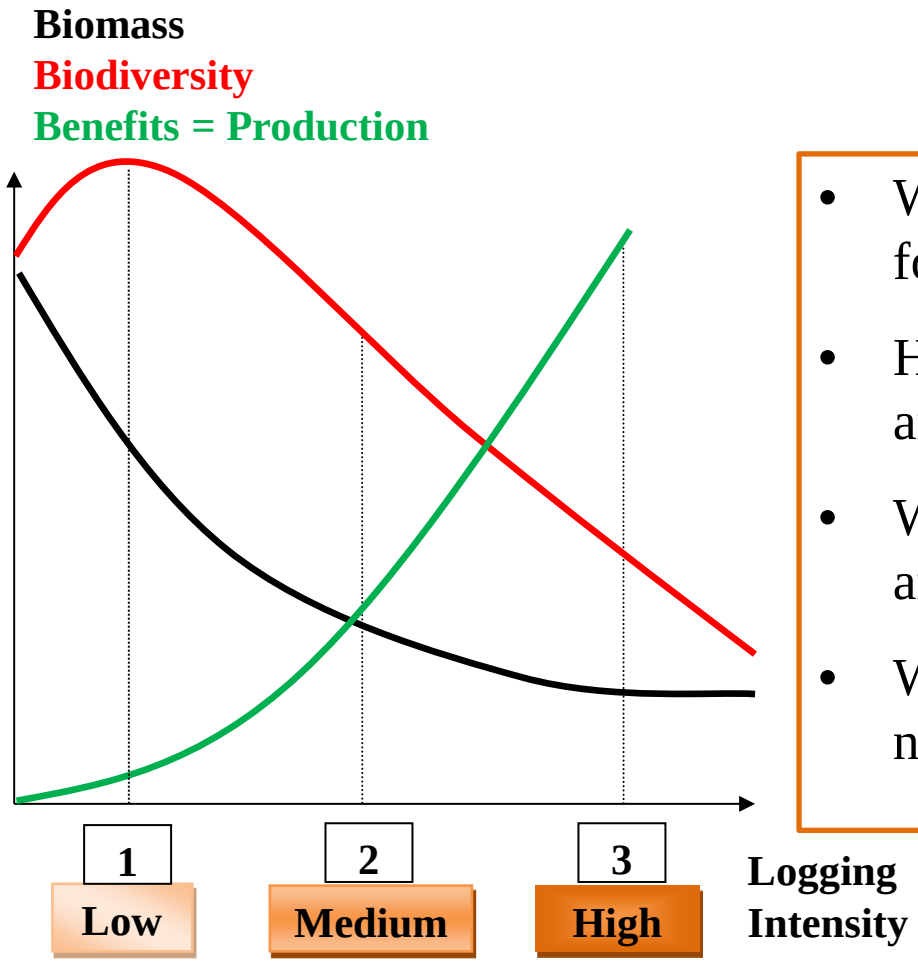
- Logged Forests still harbor high Carbon stocks and high biodiversity…
- The main limitation stands in the recovery rate of timber volume
- Logged forests remain forest (Gibson et al. 2011)

Exploitation : Pas que le bois



Putz et al. 2012

The Issues to be Addressed Tropical Forests for the Future



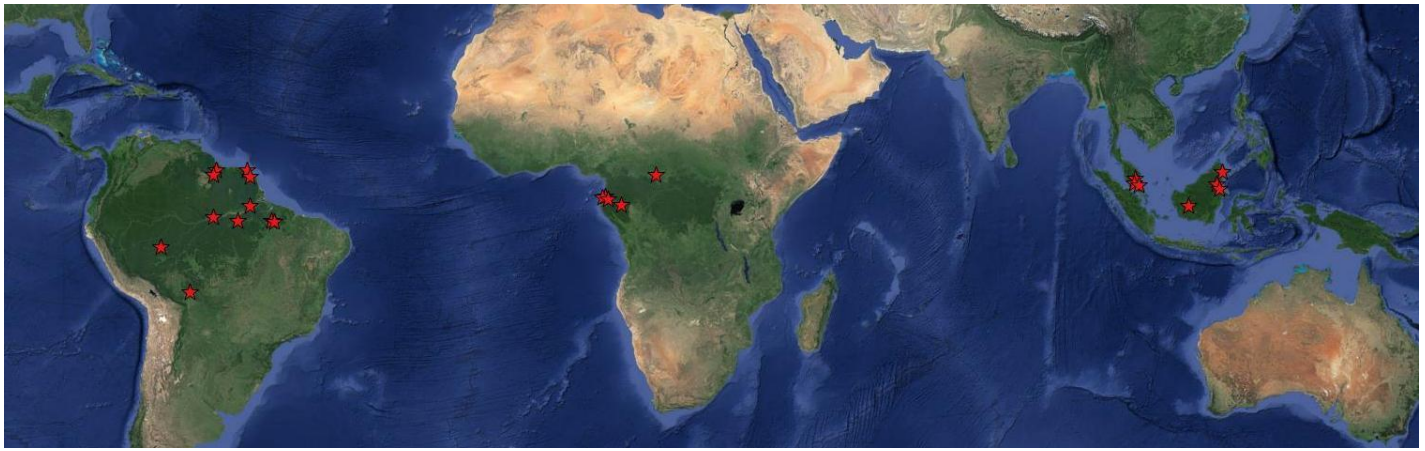
- What are the general responses of tropical forests to logging ?
- How do those responses vary across regions and continents ?
- What are the trade-off between economic and environmental values ?
- What is the conservation value of managed natural forests ?

A Pan Tropical Network

- Started in Mid 2012
- 3 continents, 9 countries, 17 Research Institutions, 40 researchers
- 24 experimental sites, 490 Plots (921 ha)
- Annual budget of ~150.000 US Dollars

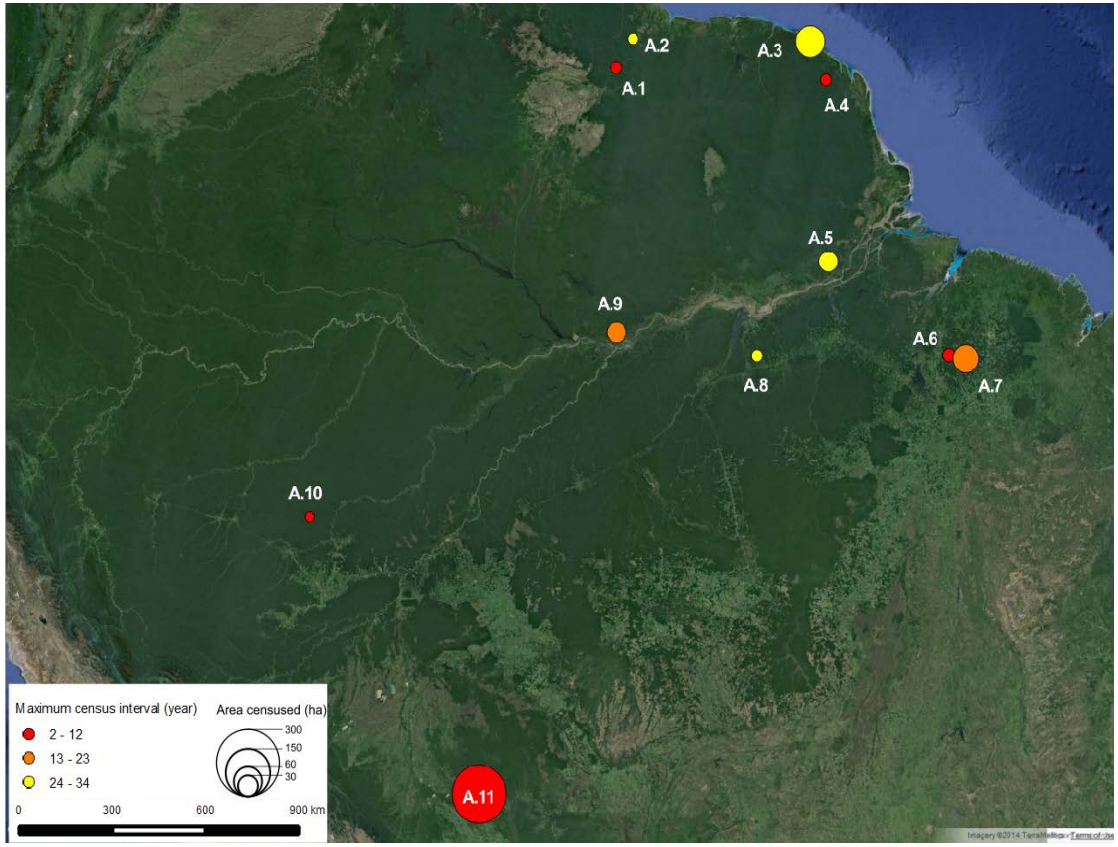
Sites Selection

- located in tropical forests with total surface ≥ 1 ha
- all trees ≥ 20 cm diameter measured
- good reliable species identification
- mean annual precipitation ≥ 1000 mm
- consistent information on logging treatments;
- at least one pre-logging and at least two post-logging censuses



The Network in Details

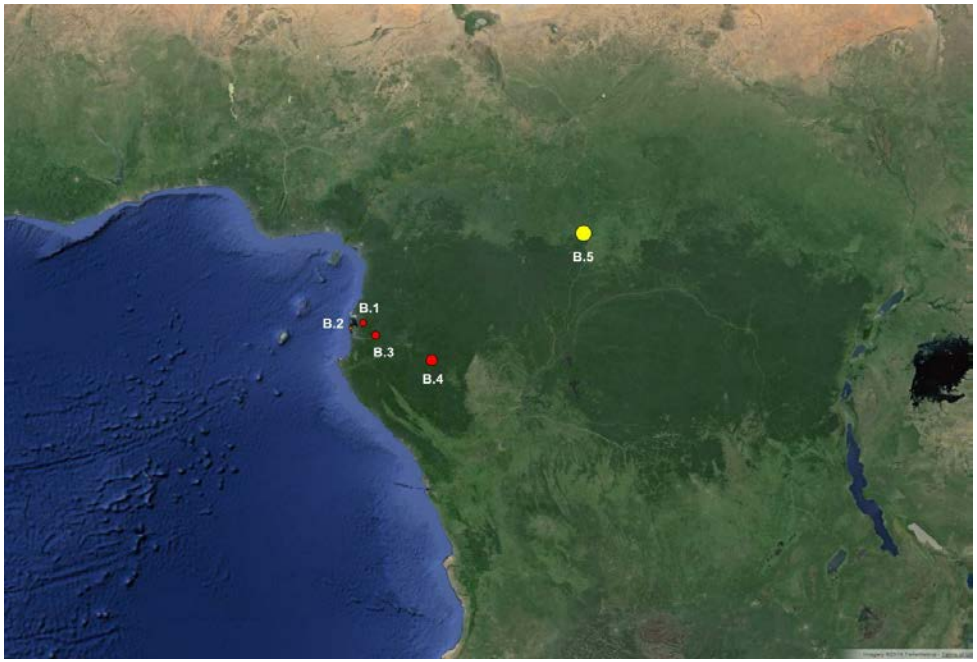
The Amazon Basin



- 11 Experimental sites
- 5 countries
- 245 Plots (672 ha)
- 35 Control plots (164 ha, 25 %)
- Mean period of monitoring 15 years

The Network in Details

The Congo Basin



- 6 Experimental sites
- 2 countries
- 92 Plots (84 ha)
- 13 Control plots (13ha)
- Mean period of monitoring 13 yrs

Parcs Gabon

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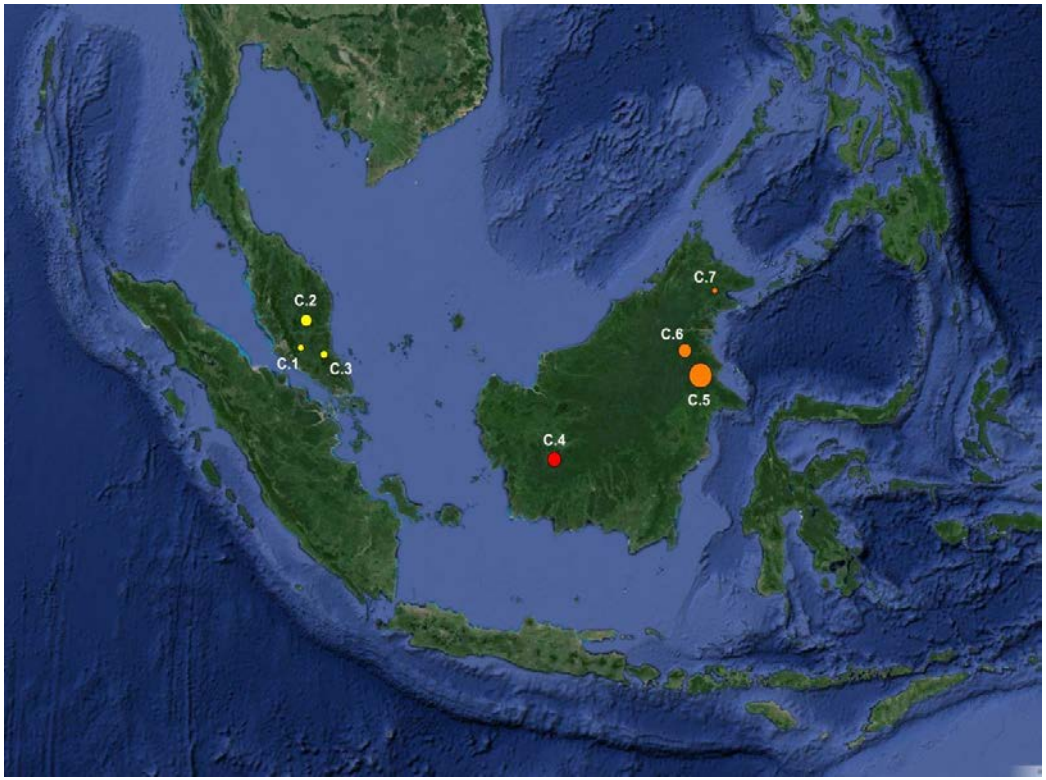
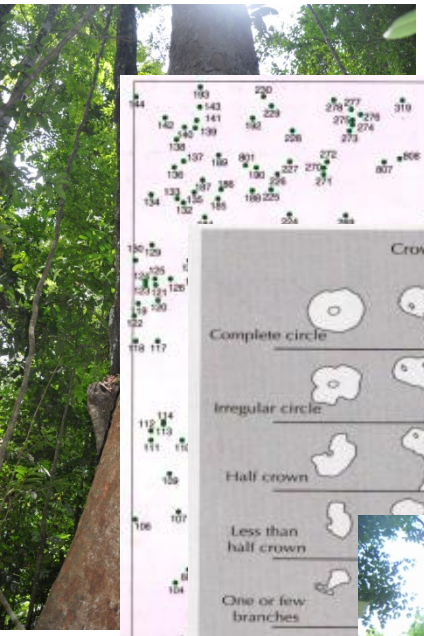
The Network in Details

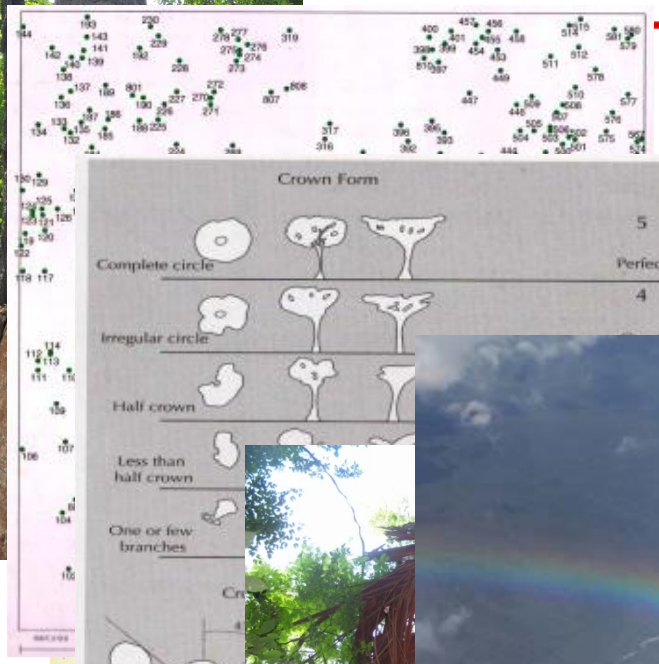
South East Asia

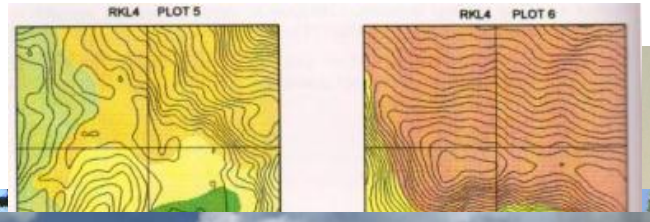


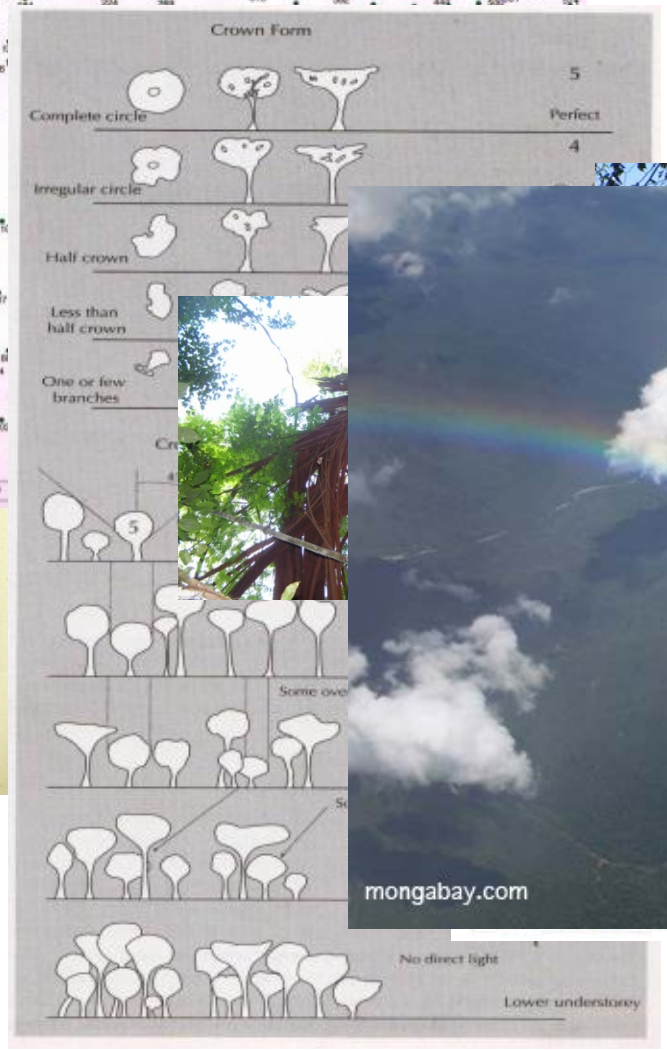
- 7 Experimental sites
- 2 countries
- 153 Plots (158 ha)
- 11 Control plots (69 ha)
- Mean period of monitoring16yrs

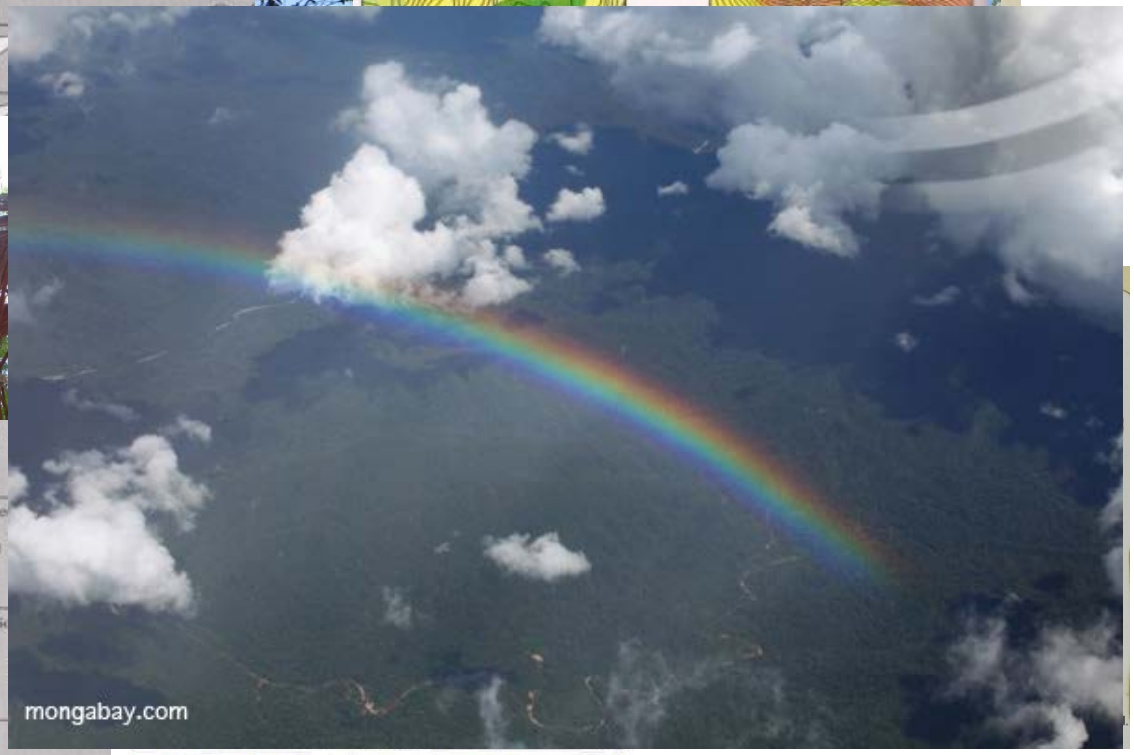
Data We work With



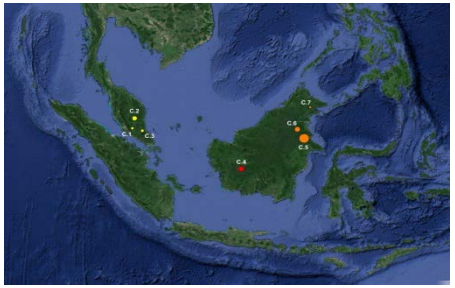








Data Sharing and Flow



Site 1

Site 2

Site 3

Raw data

PARTICIPATORY PROTOCOL

Metadata

Site leaders

Regional TmFO

site	year	AGB10.20	AGB20.30	AGB30.40
Celos	1983	8.2	31.6	28.2
Celos	2000	10.1	42.3	42.3
Celos	2012	9.9	33.0	46.4

Pre-analysis

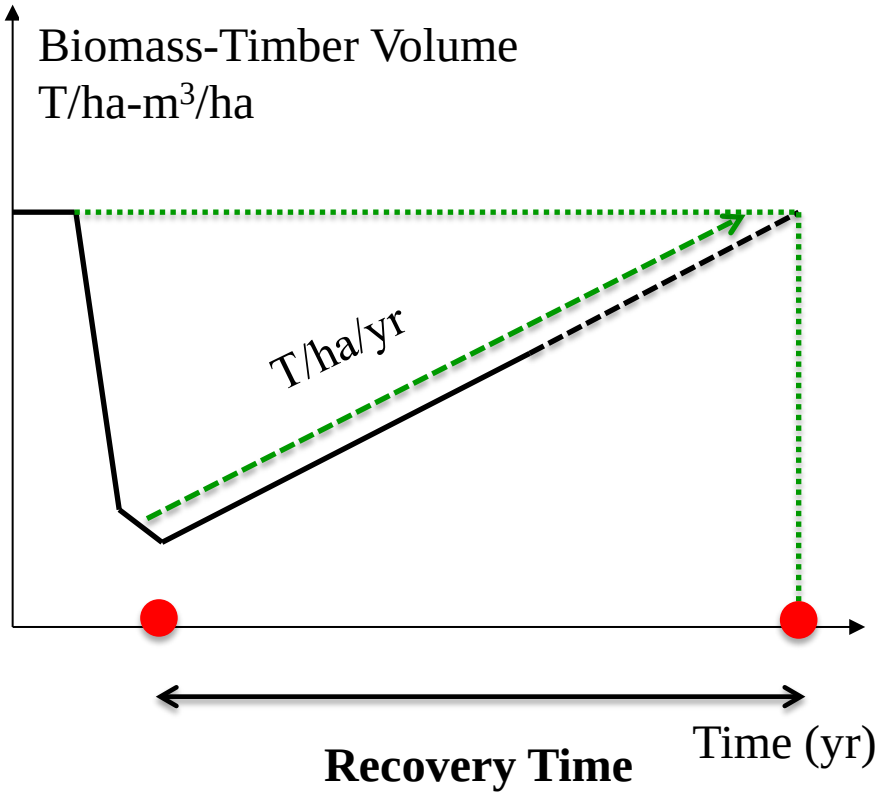
Results

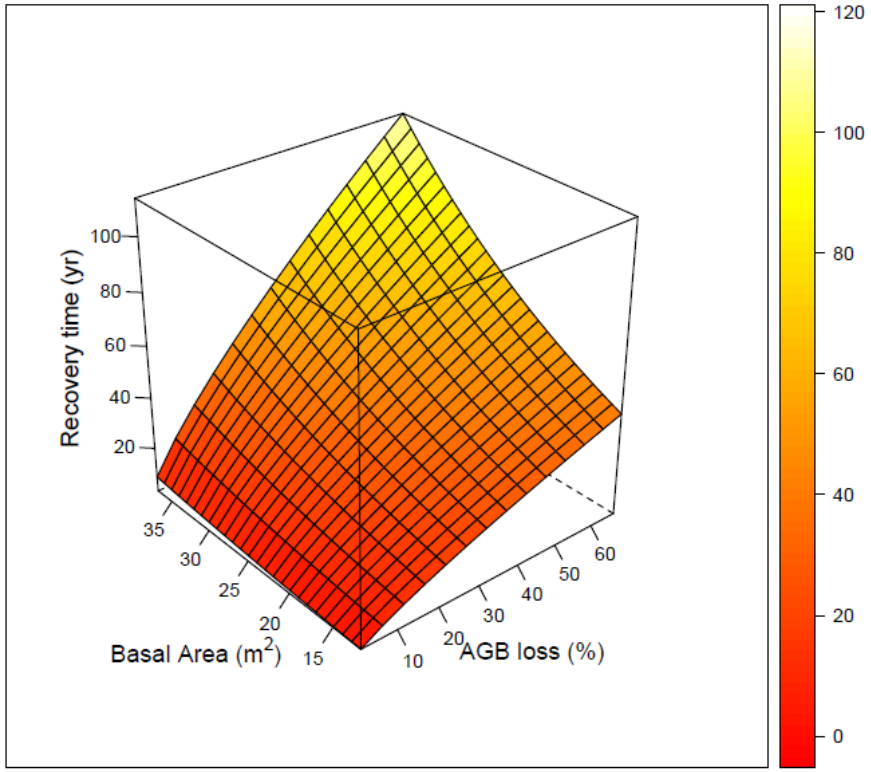
Draft

Publication

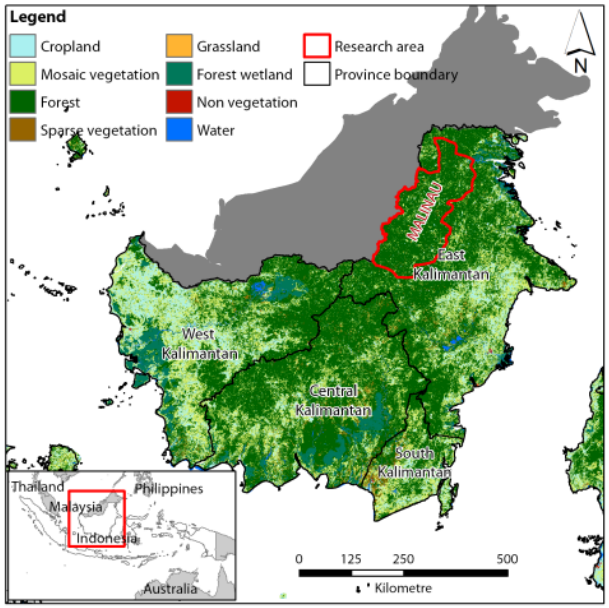
- Raw data remain with site leaders and institutions
- Common protocol of data analysis
- Metadata are shared among site leaders within the same region
- Participatory Research favouring discussion and knowledge sharing among scientists
- Preserve data source and ownership

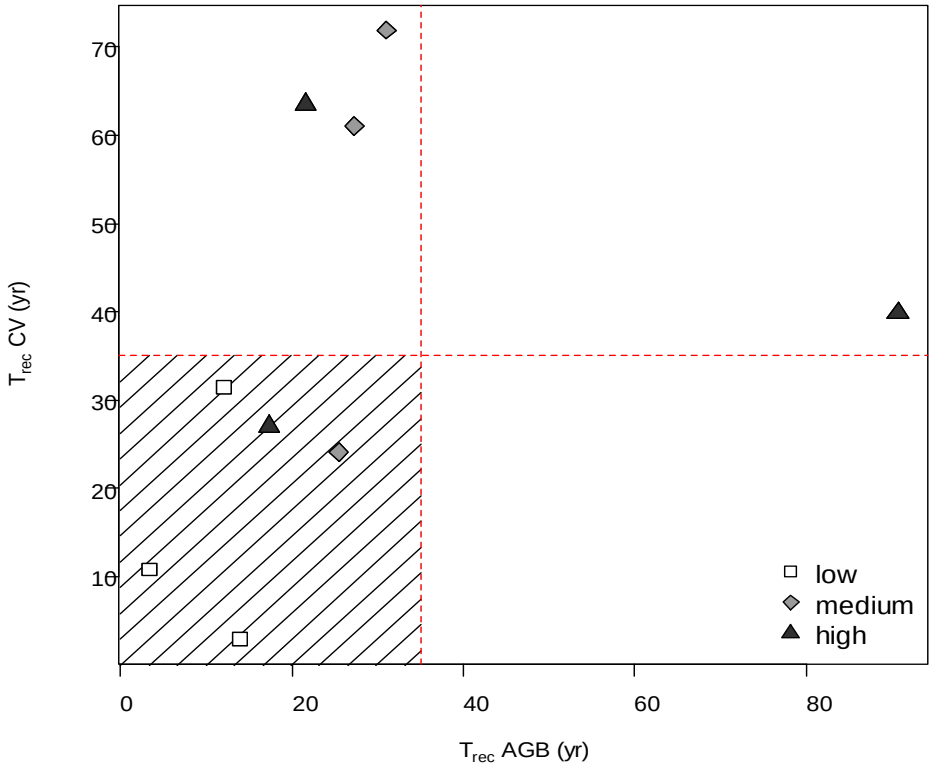
Recovery Time of AGB after Logging: The Amazon Example





AGB and Commercial Volume Recovery after Logging: The Malinau Example





- On average, T_{rec} was faster for biomass (27 ± 25 yr) than for timber volume (65 ± 44 yr).
- Most plots would recover their initial biomass within 35 years (TPTI cutting cycle), but only half would recover their initial CV

The Main Sucesses

2012

Meetings Belém &Bogor

Launching TmFO

- **What is SL Program**
- **Main objectives of TmFO**
- **Principle on data analysis and sharing**
- **Paper on Biomass and timber volume recovery in Malinau**

2013

Meeting in Manaus

Data Protocol & Analysis on Biomass recovery
Paper on TmFO presentation (Submitted to JVS)
Paper on big trees (published in FORECO)

Meeting in Bogor

Decision for a workshop in June 2014
Biomass and Timber recovery in SE Asia

2014

Meeting in Macapa

Logging impact on Biodiversity
Finalization of the Biomass recovery paper

Meeting in Bogor

Strengthen Forda Participation

Meeting in KL

Biomass and Timber volume Recovery

Field Surveys

Ivory Coast and STREK

Meeting in Congo

Launching TmFO in Africa

Why TmFO is important

- TmFO is unique
- TmFO consolidates long-term historical partnership
- TmFO is a platform of capacity building for
  - Researchers
  - Students (Fonaso Fellowship)
- TmFO gives an international dimension to each experimental site
- TmFO contributes to the diversified forest management thematic of FTA flagship 2
- TmFO addresses key questions on forest functioning and degradation
- TmFO aims to develop new evidence-based policy approaches and guidance

Expectations and Questions

Expectations

- More publications and international recognition of the TmFO contribution
- More students to be involved
- More sites included
- Change of scale : Plot → regional maps of Biomass
- Building bridges with others sentinel landscape (Discussion with Borneo SL engaged)
- Impact on forest management regulation

Questions

- How do we ensure a longer term basis of TmFO (3-5 yrs basis) ?
- What are the possible source of fundings?
- How do we ensure a stronger involvement of our partners?

Tropical managed Forest Observatory

TmFO is a pan-tropical network aiming at understanding the long term effects of logging on tropical forest ecosystems. TmFO encompasses permanent forest plots spread across the Amazon and Congo basins and South East Asia. The network will notably investigate the response of those forests to logging, in terms of biomass dynamic and changes in species composition over time. Thanks to the large number of plots (489 so far), TmFO represents a unique opportunity to gain understanding and compare forest responses at both regional and continental scales.

The ultimate goal of TmFO is to find out evidence-based logging practices that sustain forest functions, provision of environmental services and economic viability. Those results will provide Politics and forest practitioners with clear guidance to efficiently manage and preserve tropical forests in the future.

TmFO in brief:

- 489 permanent plots across South America, Africa and South East Asia
- 1114 ha and 6+ million trees measured
- long-term data (avg. survey duration: 12 years)
- 40+ researchers involved from 15 institutions

TmFO's partners:

Join us on www.tmfo.org or contact plinio.sist@cirad.fr

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journal homepage: www.elsevier.com/locate/foreco

Large trees as key elements of carbon storage and dynamics after selective logging in the Eastern Amazon

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