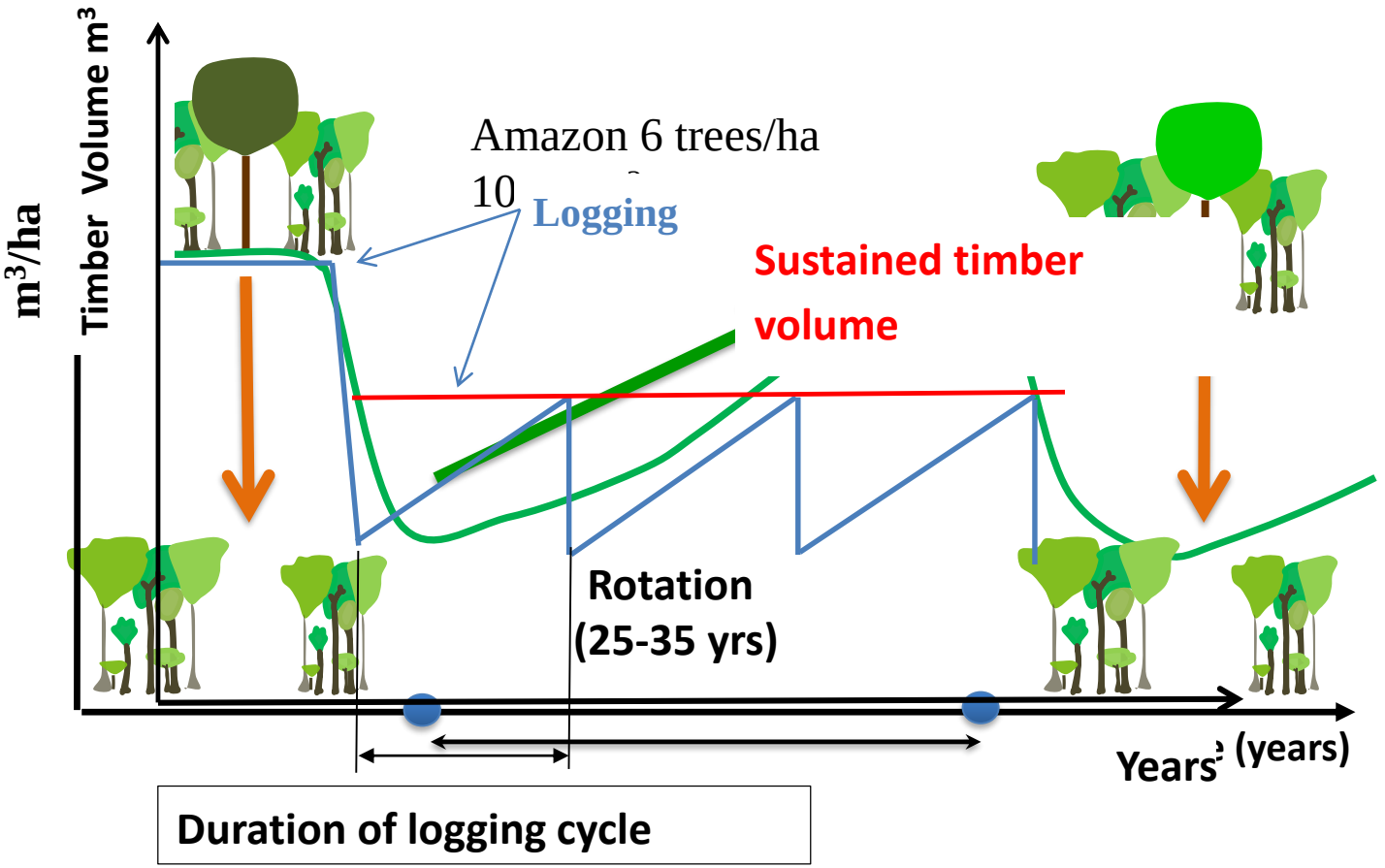
The main challenges of sustainable forest management in the Amazon: Why SFM should be reinforced?

Plinio Sist, Lucas Mazzei, Camille Piponiot, Bruno Hérault, Géraldine Derroire, Eurídice Honorio, Milton Kanashiro, Marcus d'Oliviera, Marielos Peña-Claros, Ken Rodney Verginia Wortel, Alexander Shenkin

Production Forests in the Amazon Basin

- 108Mha of forests are designated for wood production (FAO 2011)
- Logging intensity varies 10-30m^3/ha
- Annual market demand 15-30 Mm^3
- According FAO wood demand will double by 2050
- SFM as a tool for forest conservation
- **What is the capacity of natural amazonian forests to meet the demand of the sawn wood market ?**

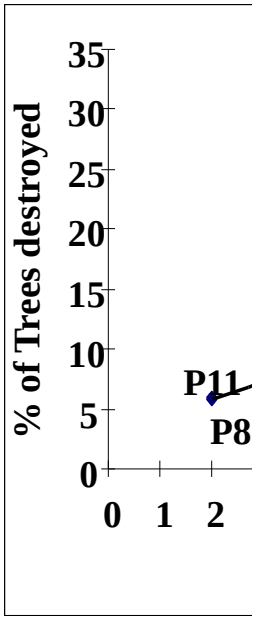
Selective Logging and Sustainability

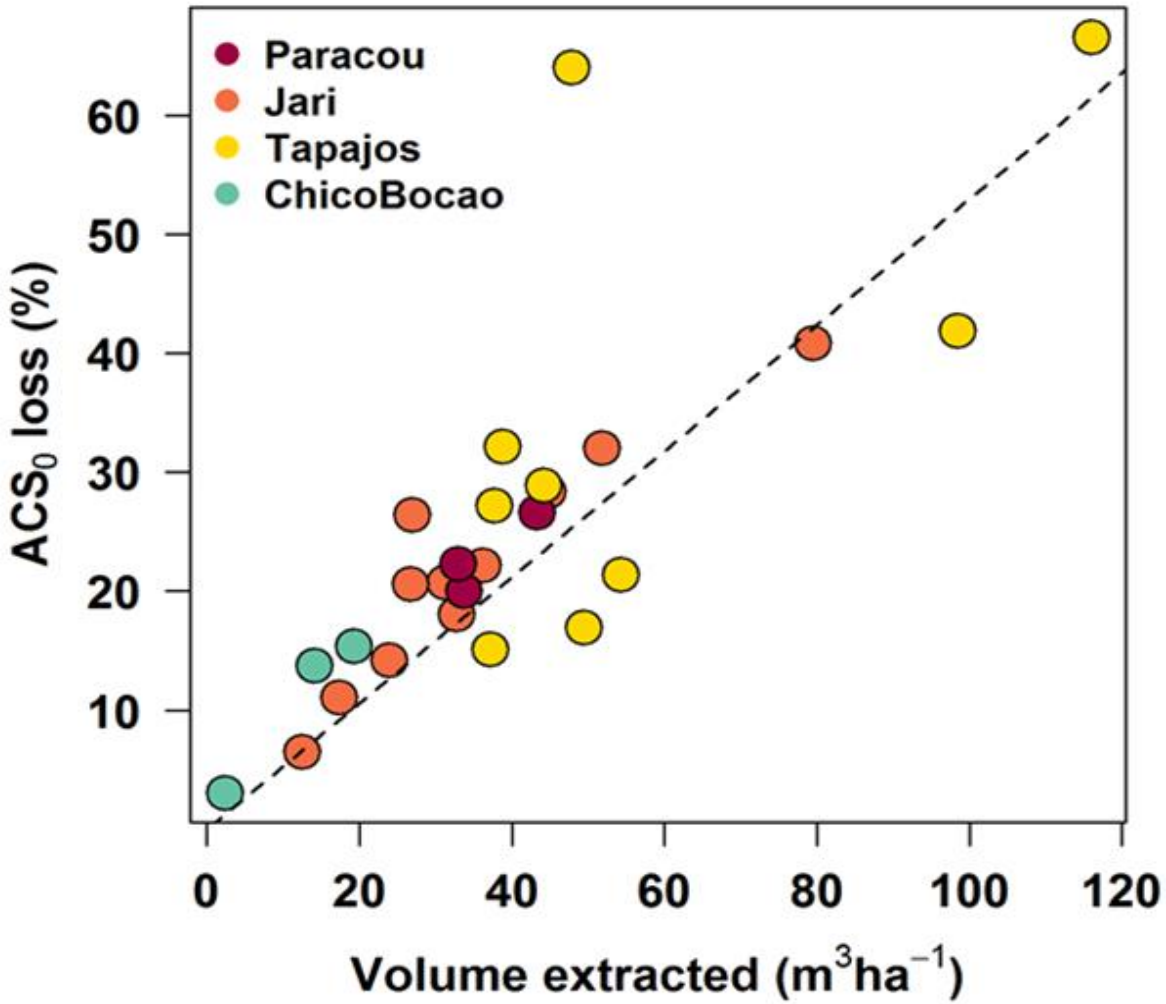


iufro2019
Curitiba · Brazil

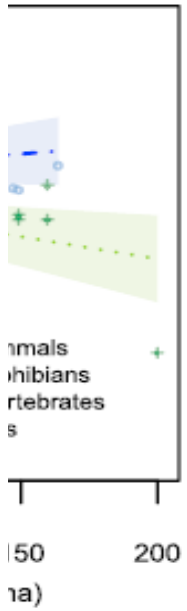
Logging intensity matters

Logg





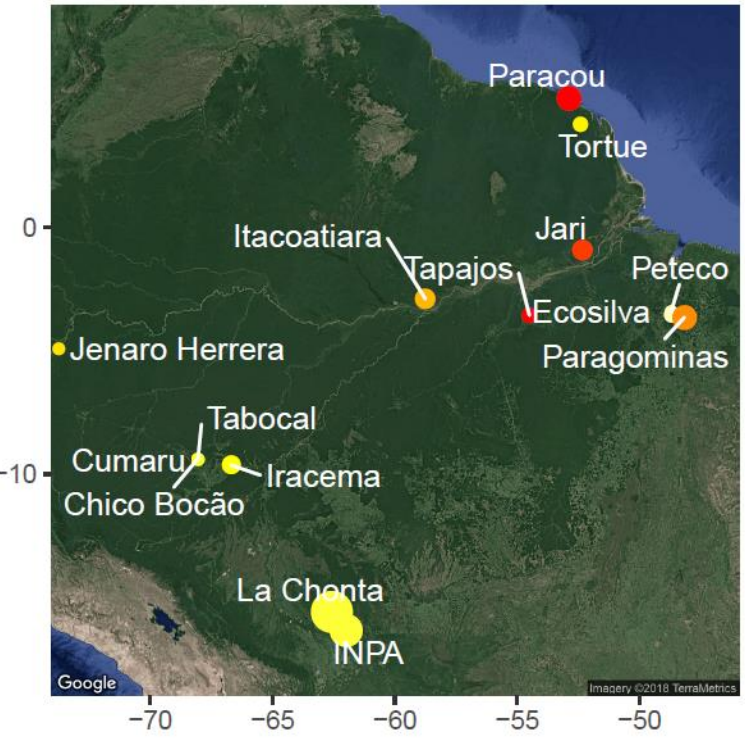
odiversity

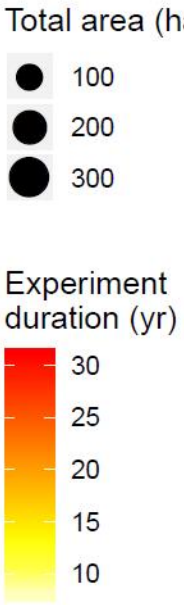


Burivalova et al. 2015

iufro2019
Curitiba · Brazil

Our main Approach

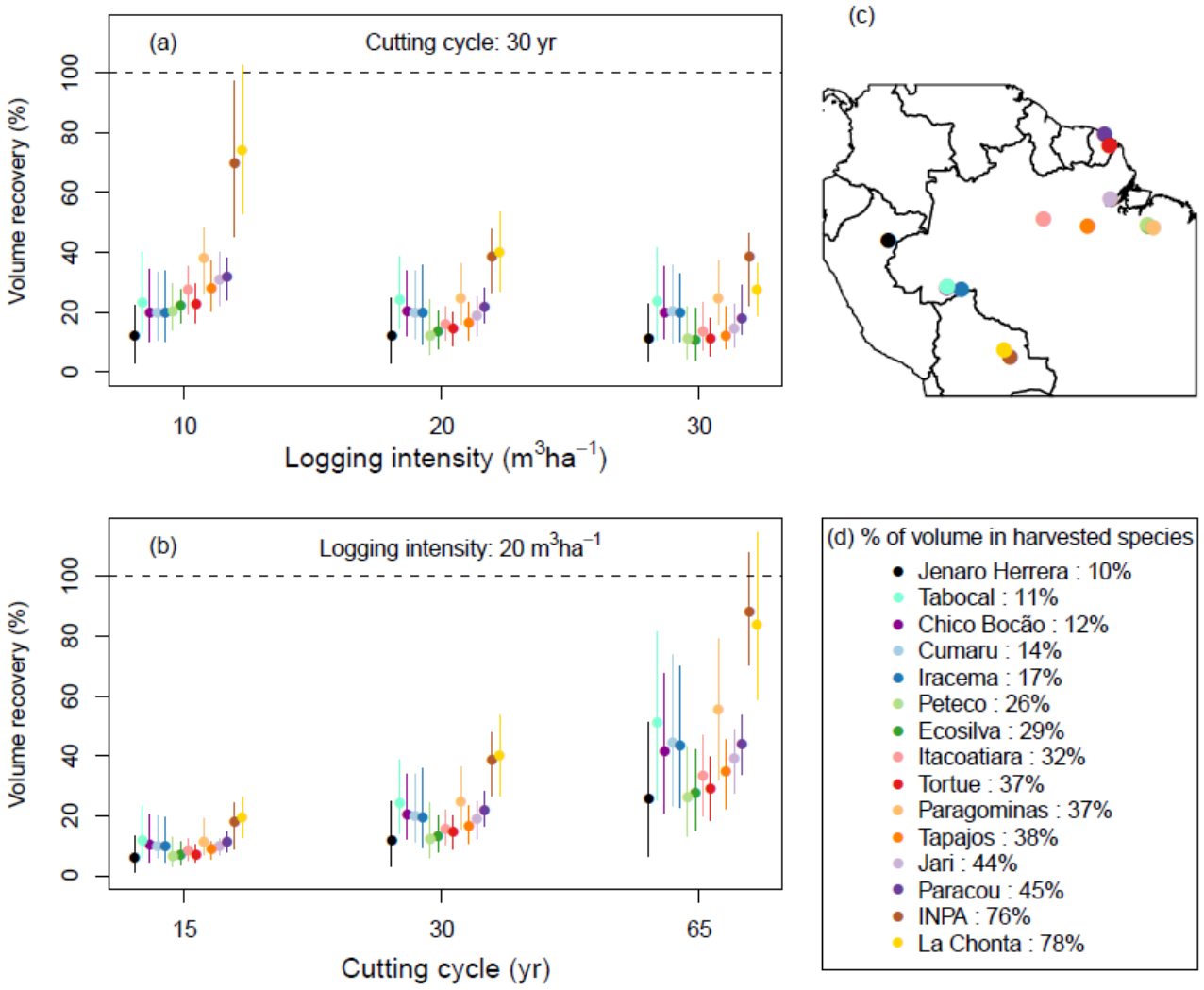




- **TmFO Network (Sist et al. 2015)**
- **15 long-term experimental sites (8-30 yrs)**
- **845 ha, 8% CNV logging, 33% RIL, 37% post logging liberation thinning, 22% Control**
- **Simulation of different logging regimes with a Bayesian hierarchical model of Volume Dynamics with Differential Equations (Piponiot et al. 2018)**

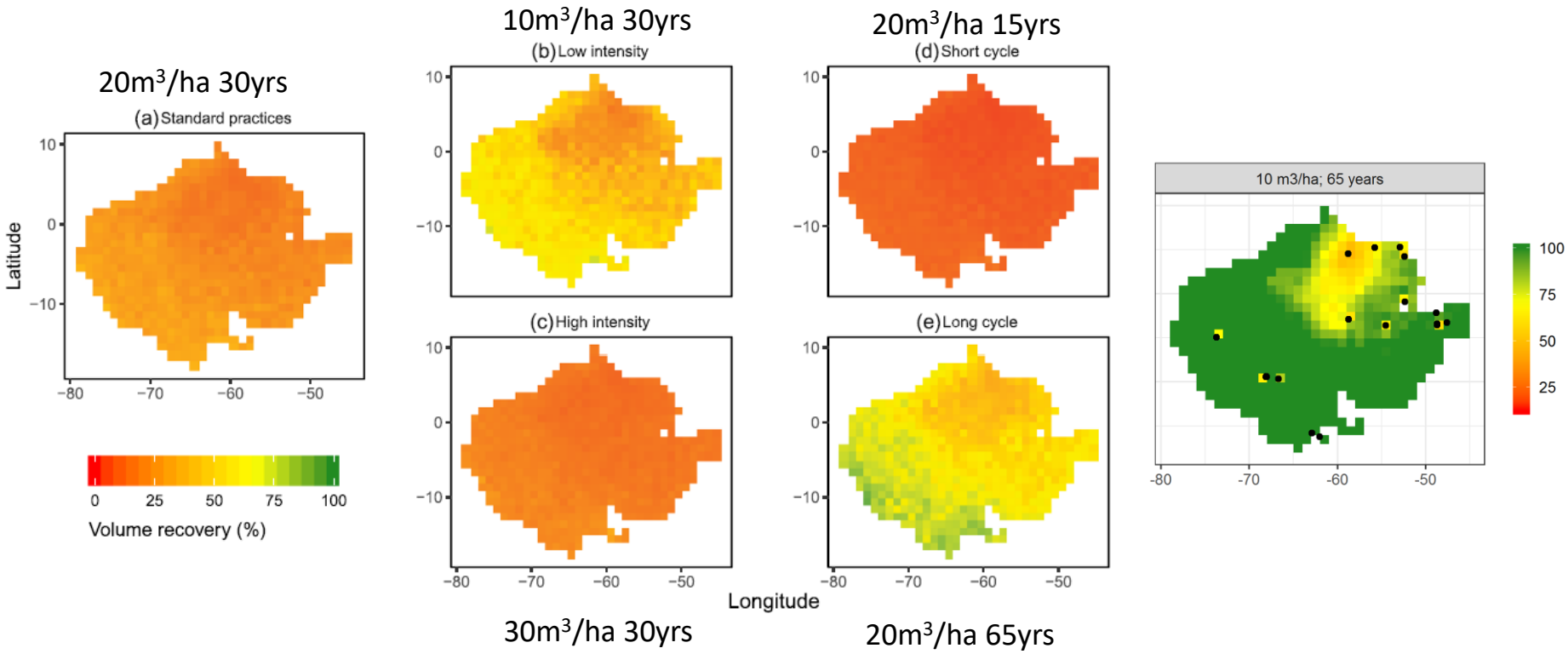
iufro2019
Curitiba · Brazil

Timber volume recovery in each site



iufro2019
Curitiba · Brazil

Volume Recovery at Regional Level



Piponiot et al. 2019

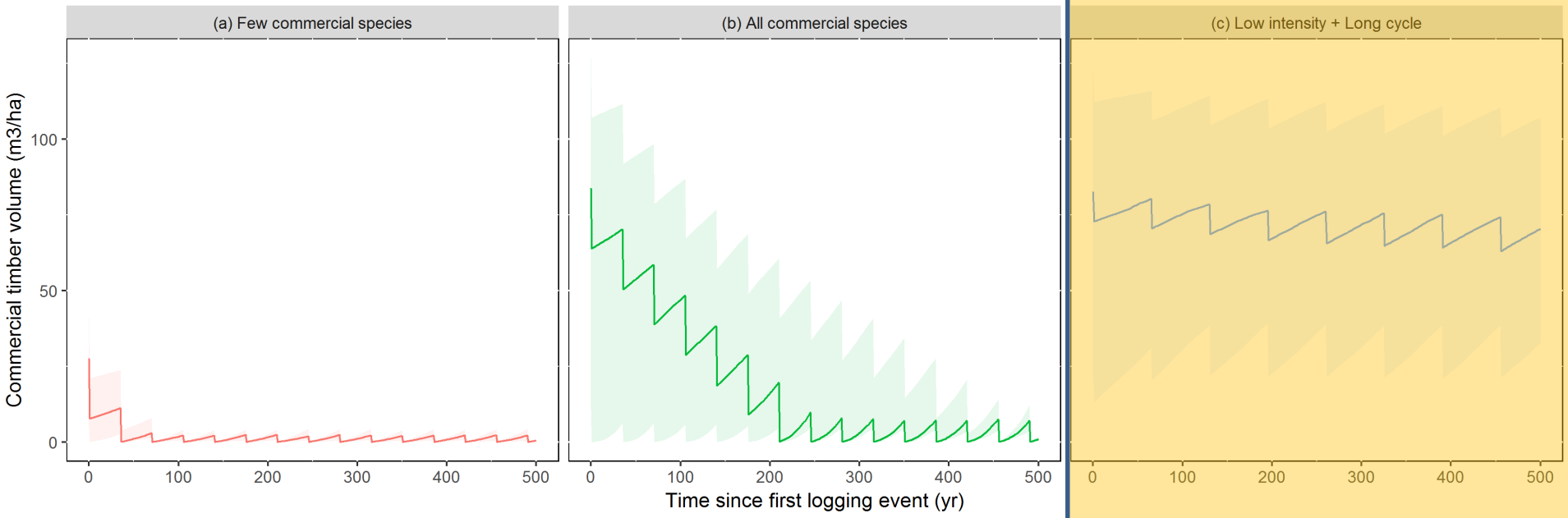
iufro2019
Curitiba · Brazil

Long Term Simulation of three scenarios

20 m^3/ha every 35 yrs, 30% of timber volumes

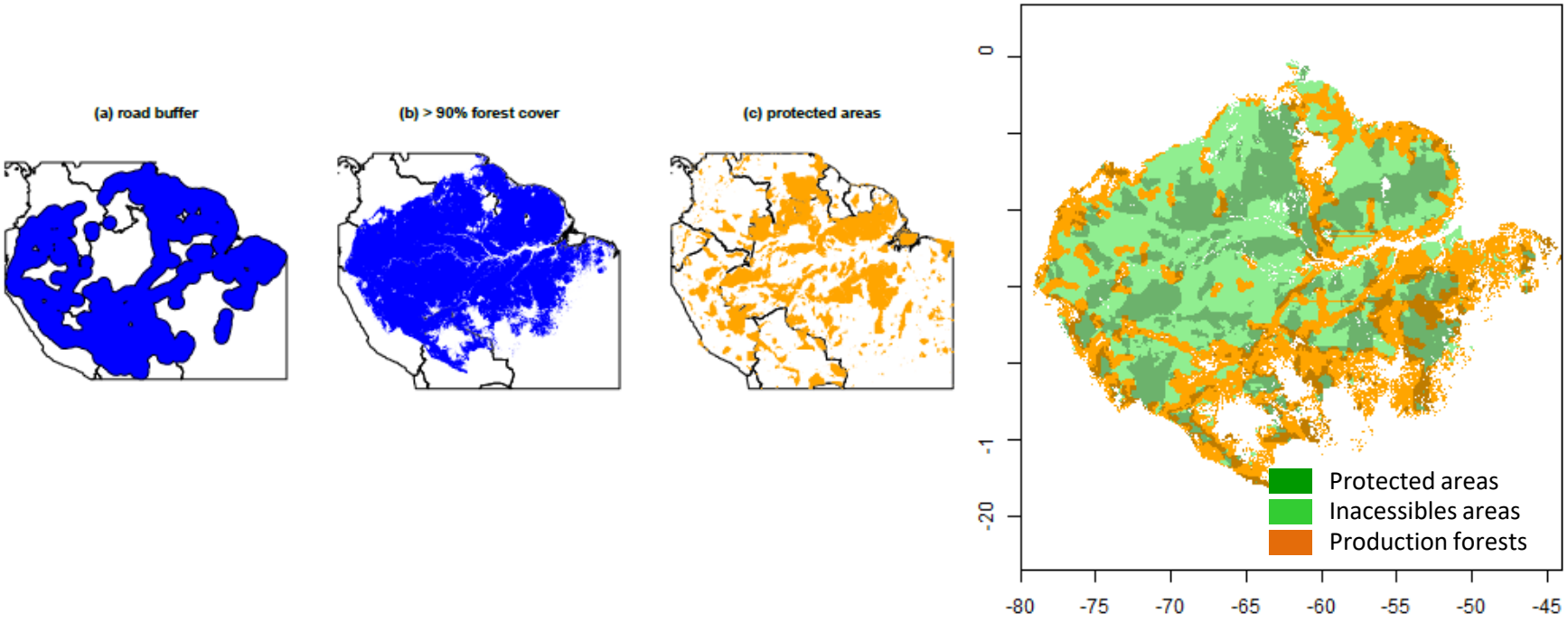
20 m^3/ha 35 yrs with 90% of species considered as commercial

$10m^3$/ha every 65 years, 90% of species considered as commercial



iufro2019
Curitiba · Brazil

Potential Areas of Production Forests in the Amazon



- Potential areas of production forests = 190 Mha
- 60% suitable for logging (slope, riparian areas) = 114 ha
- Under sustainable regime = 17Mm^3/ha/yr

Conclusions & Recommendations

- **Under sustainable regime**, Amazonian natural forests **are unable to feed the market demand** (17 Mm^3/year vs 30Mm^3)
- **Natural forest** will remain the **main sources of timber for decades**
- Transition phase:

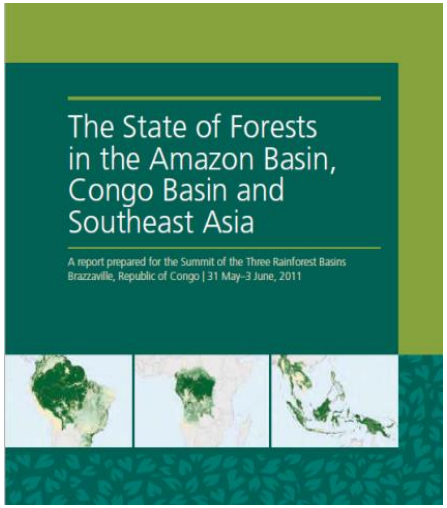
  - RIL techniques + lower intensity must be a basic requirement

  - Silvicultural treatments to boost tree growth ?

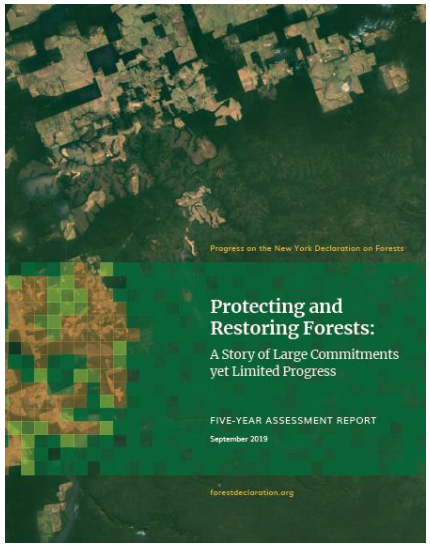
  - Restoration program and incentives for SFM are key elements for the future (natural regeneration, intensive silviculture in plantation, assisted regeneration in degraded forests…)
- **Future role** of natural forests (timber vs environmental services) ?
- **Territorial integrative approach**

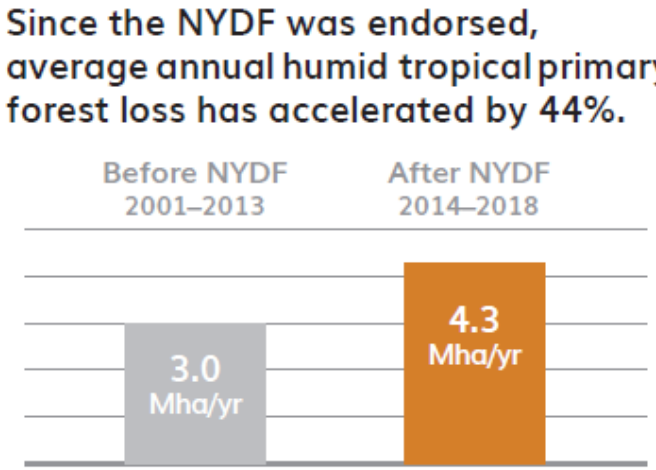
iufro2019
Curitiba · Brazil

Final Remarks about The Real World



- **Only 0.7% of the total amazonian forest area are certified**
- **Only 2 % of the total Amazonian forest area are considered under sustainable management**
- **Illegal logging > 50%**
- **Plantations = 1.2% of the total forest area**
- **Deforestation and forest degradation are still important**





Latin America continues to lose the most primary forests per year.

Acknowledgements

All the TmFO researchers: Marielos Peña-Claros, Alexander Shenkin, Bruno Hérault, Lilian Blanc, Fidèle Baya, Fabrice Benedet, Katia Emidio da Silva , Laurent Descroix, Joice Nunes Ferreira, Sylvie Gourlet-Fleury, Marcelino Carneiro Guedes, Ismail Bin Harun, Riina Jalonen, Milton Kanashiro, Haruni Krisnawati, Mrigesh Kshatriya, Philippa Lincoln, Lucas Mazzei, Vincent Medjibé, Robert Nasi, Marcus Vinicius N. d'Oliveira, Luis C. de Oliveira, Nicolas Picard, Stephan Pietsch, Michelle Pinard , Hari Priyadi, Francis. E. Putz , Ken Rodney, Vivien Rossi, Anand Roopsind, Ademir Roberto Ruschel, Nur Hajar Zamah Shari, Cintia Rodrigues de Souza, Farida Herry Susanty, Eleneide Doff Sotta, Marisol Toledo, Edson Vidal, Thales A.P. West, Verginia Wortel, Toshihiro Yamada

All the partners Institutions :