



Contribution of science for managing transformed landscape ecosystems

International Seminar Bogor-Indonesia 28 Nov 2013

Ecosystem Restoration in the Tropics: Lessons Learned and Best Practices



Ecological and socioEconomic Functions of tropical
lowland rain**F**orest **T**ransformation **S**ystems
in Jambi, Sumatra



**Göttingen
University
Germany**



**Bogor
Agricultural
University**



**Jambi
University**



**Tadulako
University
Palu**



CRC990 / EFForTS in numbers

- Göttingen: 6 faculties, 36 Professors

IPB? UNJA? UNTAD?

- 28 research and support groups
- 11 PostDocs
- 40 PhD students
- master+bachelor students not counted
- 4 secretary's offices (~20 staff)
- ~90 different research assistants in the last 1.5 yrs
- overall: 150-200 researchers directly involved





TRANSFORMATION

rainforests → arable land

tropical submontaneous rainforest in Kalimantan



TROPICAL RAINFORESTS

~ 5% of Earth's total land surface area

600mio ha, ~20% in SE-Asia and Oceania

~ 50% of plant and animal species

thousands of unknown species

~ 25% of industrialized pharmaceuticals

less than 5% tree species tested

~ 80% of dietary plants

fruits: citrus fruits, avocados, coconuts, figs, bananas, pineapples, mangos

vegetables: tomatoes, corn, potatoes, rice, yams

spices: pepper, chocolate, cinnamon, cloves, ginger, sugarcane, coffee, vanilla

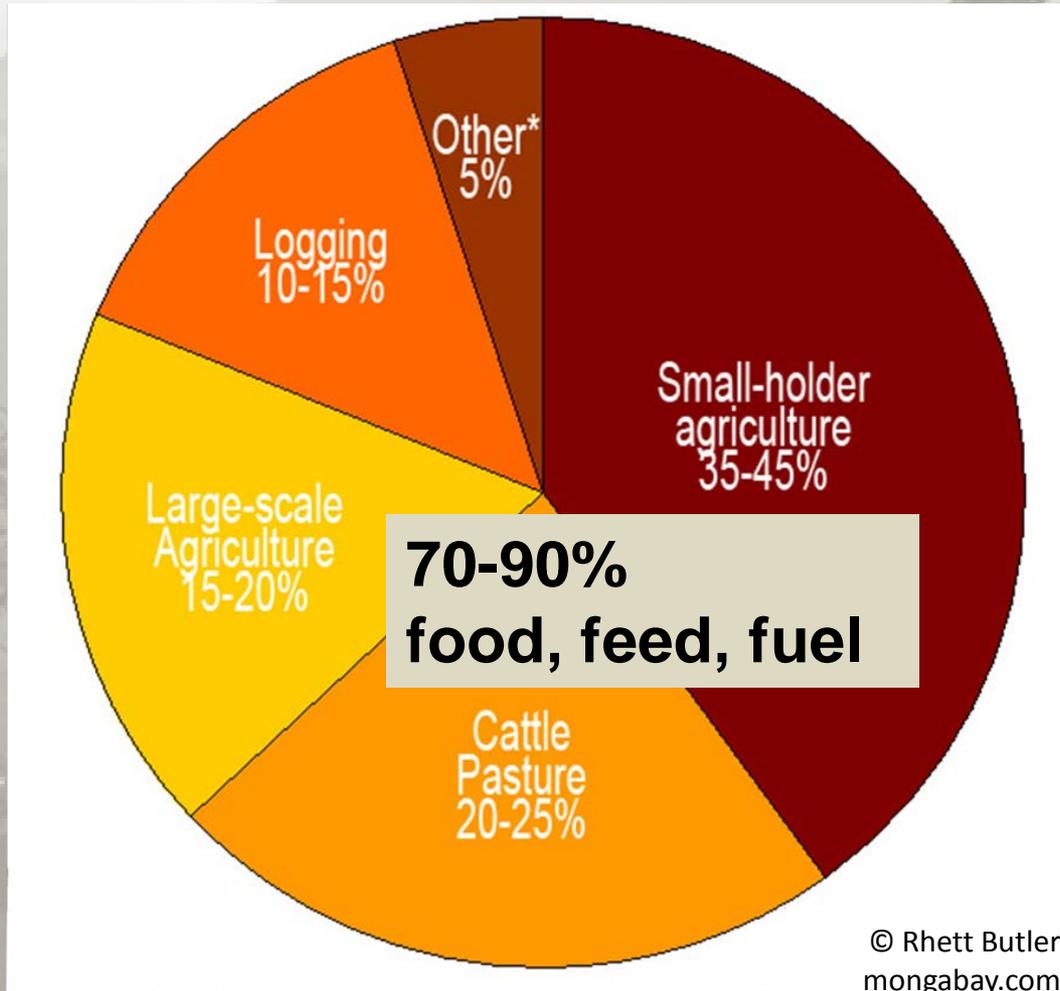
major influence on global climate

Amazon Basin: ~ 20% of worlds oxygen, fresh water



TROPICAL RAINFOREST – TRANSFORMATION

~ 25mio ha lost or degraded per year





TROPICAL RAINFOREST – TRANSFORMATION

~ 25mio ha lost or degraded per year

~ 50.000 species lost per year

- genetic diversity, evolutionary potential
- biomechanical inventions

altered regional and global climate patterns

- precipitation (SE-Asia deforestation impacts rainfall in China/Balkan)
- emission of greenhouse gases
- non-indigenous crops disturb water cycles, lowered groundwater

impacts on human welfare

- increased development for the majority of the human population
- short-term/long-term effects?



TRADITIONAL RESEARCH

**Climate
Stability**

**Ecosystem
Conservation**

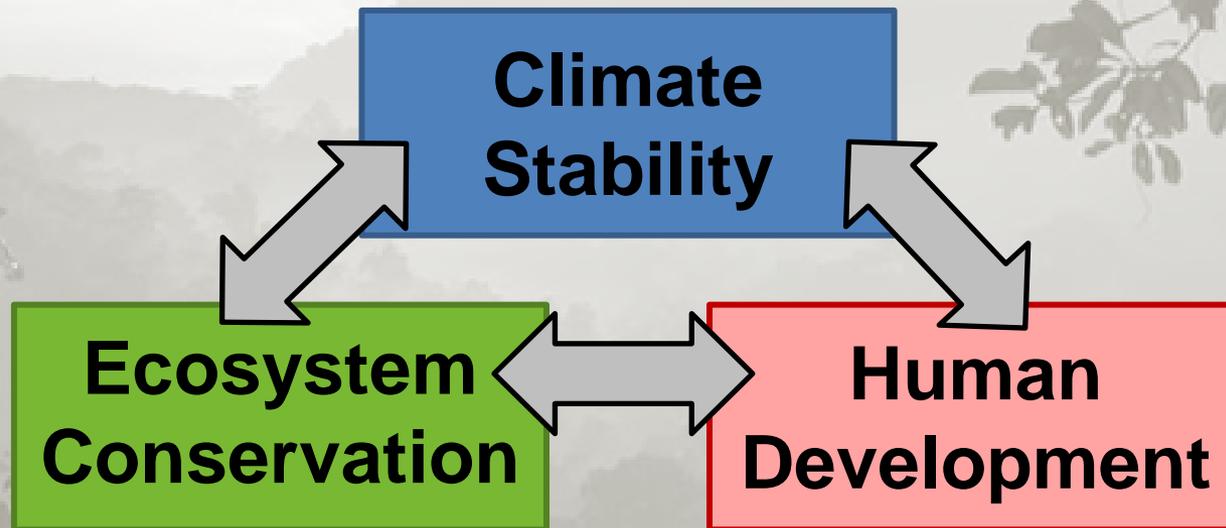


**Human
Development**



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Integrated Research



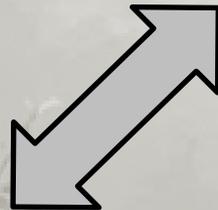
→ coexistence of agriculture and conservation
→ enhancing ecosystem services of forest remnants and agricultural systems while improving human welfare at the same time



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Environmental Processes

- nutrient/water cycles
- 'green house' gases
- climate patterns



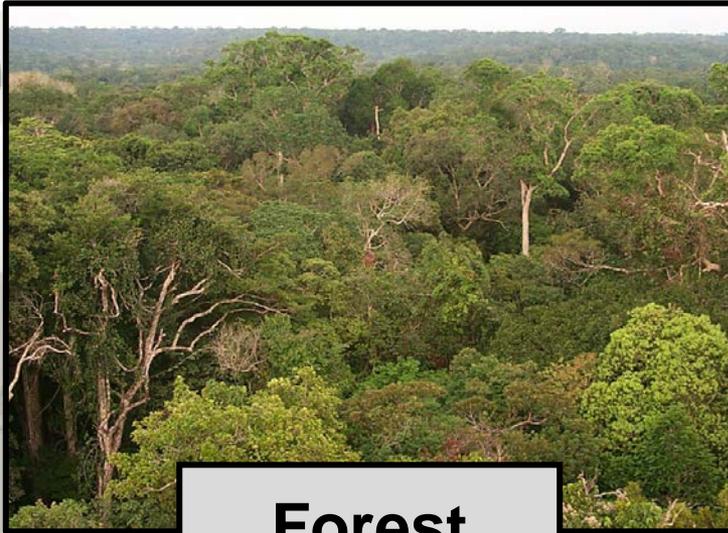
Biota & Ecosystems

- biodiversity patterns
- food web structure
- ecosystem stability

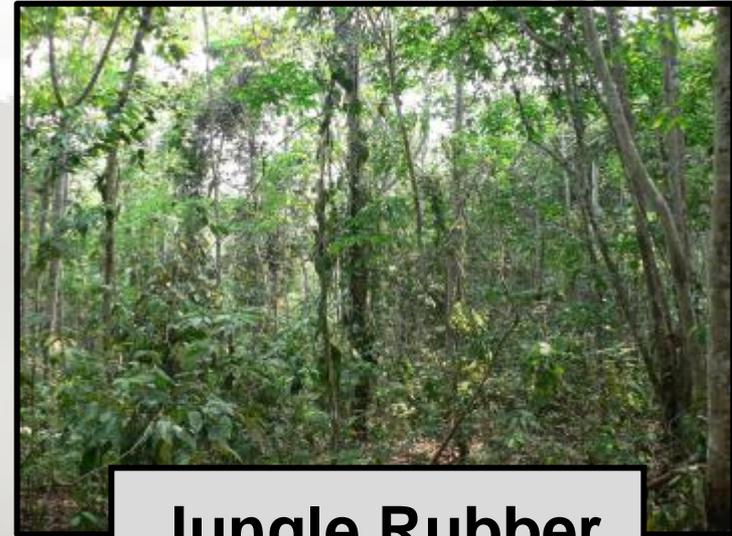


Human Dimensions

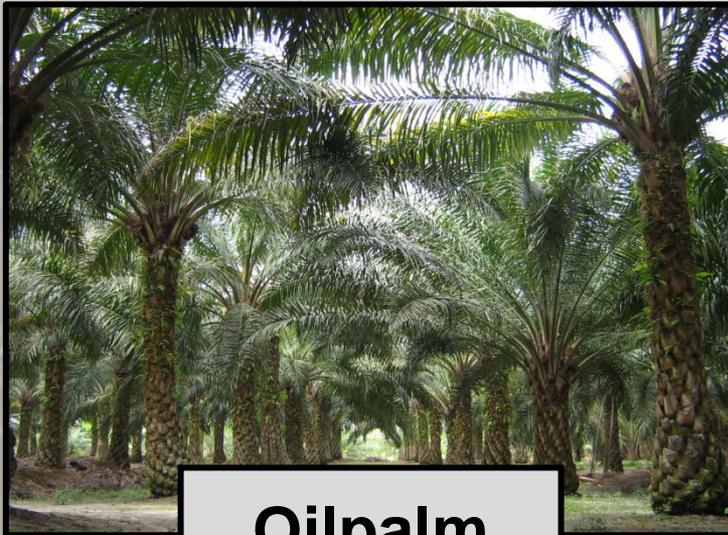
- land-use cause+effect
- local to international
- institutions, markets, culture, demography



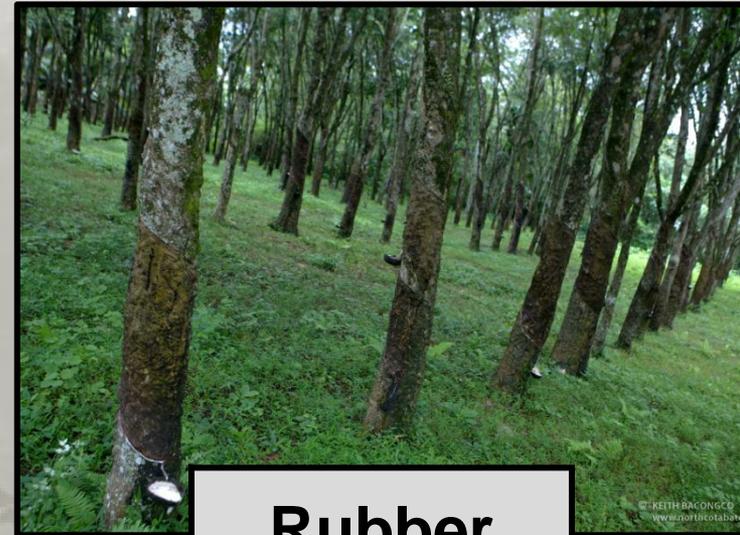
Forest



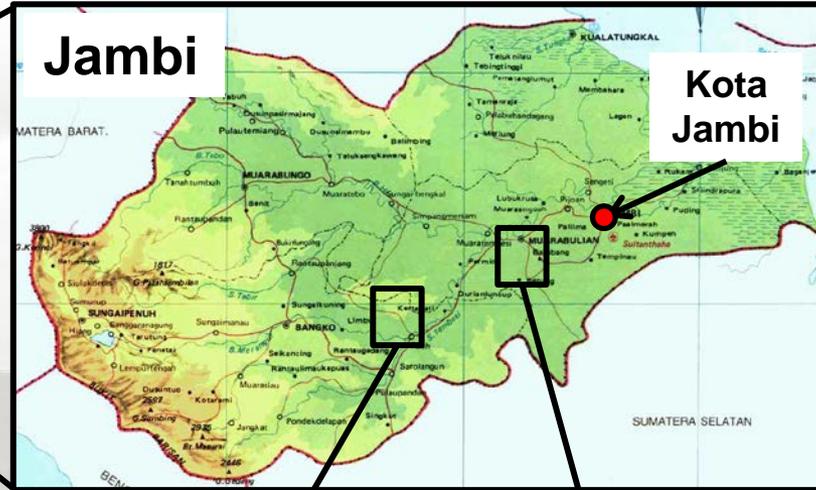
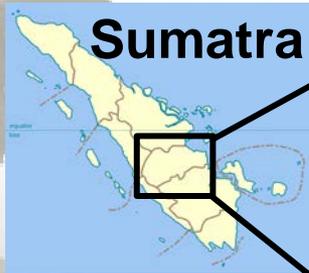
Jungle Rubber



Oilpalm



Rubber



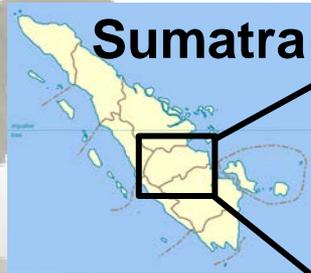
**32
research
plots**

**Bukit Duabelas
landscape**

- 4x old- growth forest
- 4x Jungle Rubber
- 4x Rubber Plantation
- 4x Oilpalm Plantation
- + associated households

**Harapan
landscape**

- 4x old- growth forest
- 4x Jungle Rubber
- 4x Rubber Plantation
- 4x Oilpalm Plantation
- + associated households

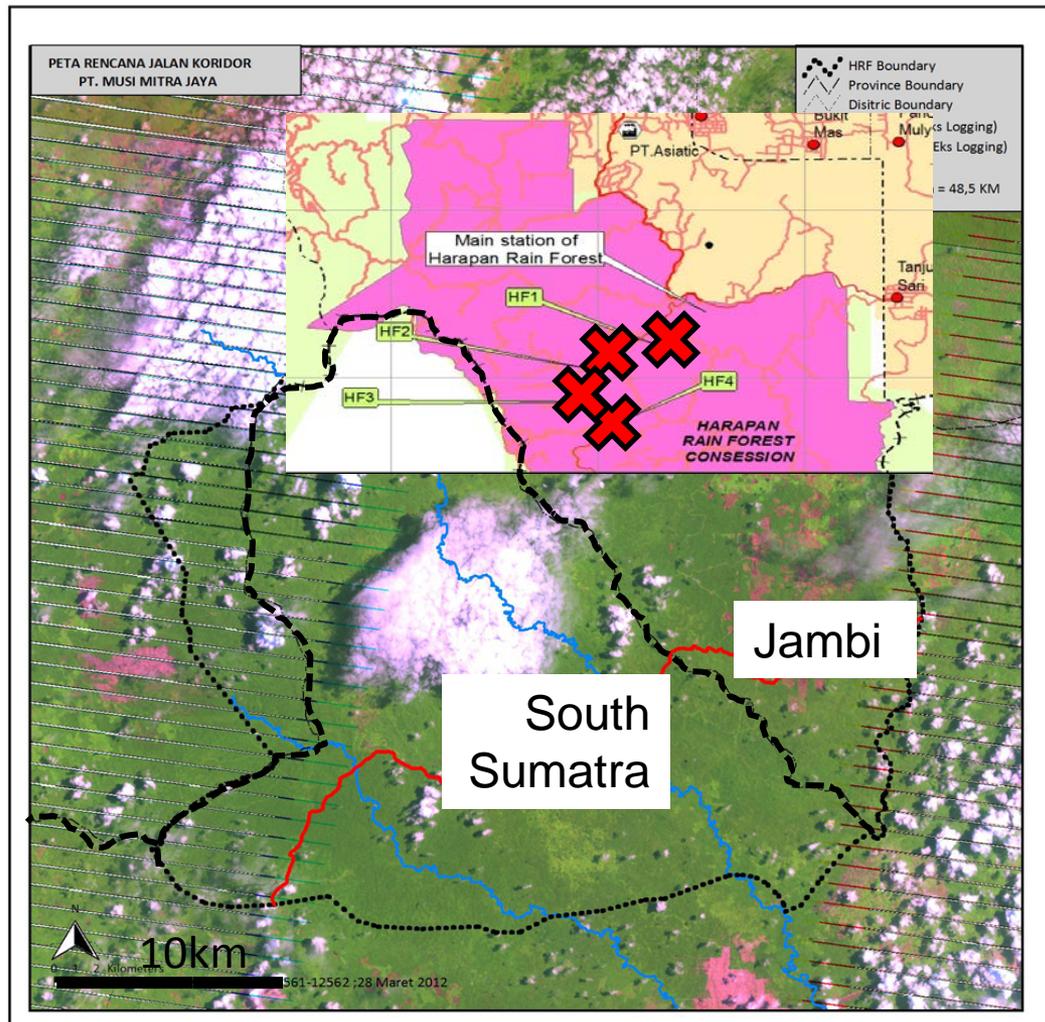


**Transformation systems → small stakeholders
PT Humusindo
(biodiversity enrichment exp)**

**old-growth forest systems → TN Bukit Duabelas
PT REKI / Hutan Harapan
Restorasi Ekosistem Indonesia**



PT REKI (Hutan Harapan) Restorasi Ekosistem Indonesia



currently 4
CRC990/EFForTS
research plots
(old-growth forest /
high secondary
forest)

in planning:
4 additional research
plots in 'low
secondary forest'

→ paired design



CRC990/EFForTS → long term research



PhD thesis: 3-4 years

40 PhD students per phase → ~120 PhD theses until the end of the project
associated master/bachelor theses???

funded by:

DFG

Deutsche
Forschungsgemeinschaft