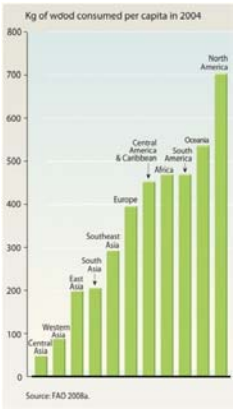
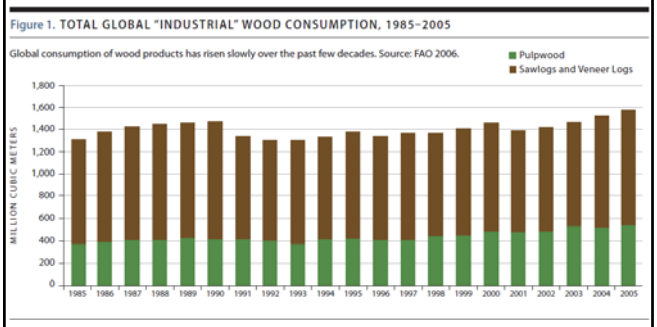
TROPICAL FOREST MANAGEMENT

Worldwide consumption
- ~ 3.5 billion m^3/yr
- 55% fuelwood
- 45% logs, wood products & pulp

Forest Area Effected
- ~1/3 of global forests logged or relogged/yr
- <2% of tropical forest sustainably managed



TROPICAL FOREST MANAGEMENT



TROPICAL FOREST MANAGEMENT

Table 3. ANNUAL PRODUCTION OF THE MOST COMMON WOOD PRODUCTS, 2009

Tropical wood's share of the global market is expected to increase over the next decade. Wood is measured in cubic meters. A cubic meter is about 35 cubic feet-a volume that would make a very comfortable doghouse for a large dog like a Saint Bernard. Paper products, on the other hand, are measured by weight (FAO 2012). Note: FAO data are self-reported by countries, and therefore subject to error and non-compatibility.

PRODUCT	GLOBAL PRODUCTION	TROPICAL PRODUCTION[3]
Newsprint	32.6 Mmt	2.6 Mmt
Printing and writing paper	105 Mmt	15.3 Mmt
Plywood	80.3 Mm^3	13.3 Mm^3
Sawn wood (wood cut into boards, lumber, planks, etc.)	362 Bm^3	72.8 Mm^3

Mmt: million metric tons Mm^3: million cubic meters Bm^3: billion cubic meters

3 Tropical production values compiled from available data for those countries included as tropical production countries in ITTO 2009.

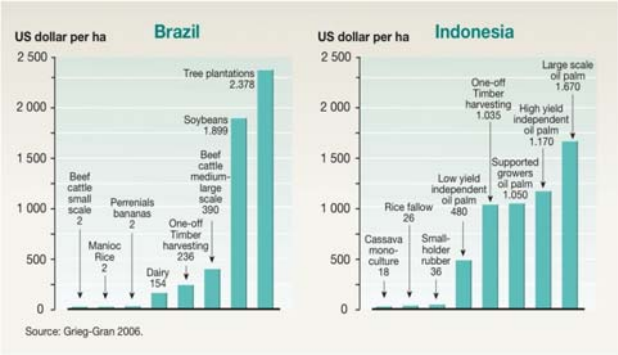
Tropical timber = 8-20% of global production
- $8 billion/yr export market
- 5th ranked non-oil export
- 60% from Asian Dipterocarp forests

LOGGING

Throughout the tropics, giant trees reduced to lumber, furniture, pulpwood, or even shipping pallets (the majestic *Ceiba* above is rather soft wood, and is used for disposable pallets!)

Remember *ultimately* cattle ranching is still #1

Forest Conversion is Profitable



Logging - The Role of Suburbs & Yachts

luxury items: cabinetry and decking on expensive yachts, and showy doors for sprawling US suburbs

Logs are brought into sawmills on trucks, processed into lumber (and byproducts like pulp), and finished as doors ... this sawmill in Costa Rica was shipping thousands like this to developers in North Carolina

CONVENTIONAL LOGGING METHODS

Clear-cutting

- mostly temperate zone (conifers)
- for pulp & fuel in SE Asia
- post "high-grading" in S. America

Selective logging

- the norm in tropical forests
- South America: ~1 – 5 trees/ha
- SE Asia: 14 – 70 trees/ha
  - Why?

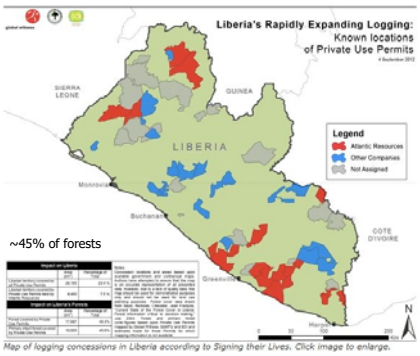
CONVENTIONAL LOGGING METHODS

- Non-mechanized
  - small-scale
  - local consumption
  - uses human labor, draft animals
  - low impact, low yield

  vs.
- Mechanized (Industrial)
  - large-scale **concessions**
  - for export
  - heavy machinery
  - high impact, high yield

THE LOGGING CONCESSION

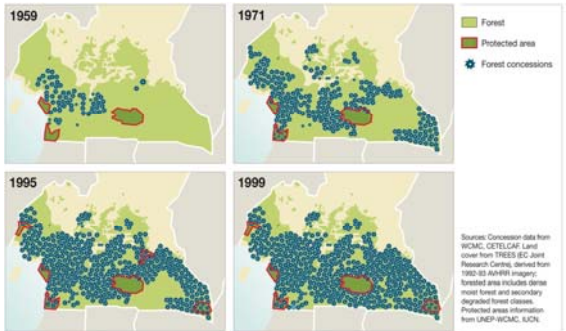
- granted by governments
- as low as $1/ha
- short-term
- foreign investment, tax revenue

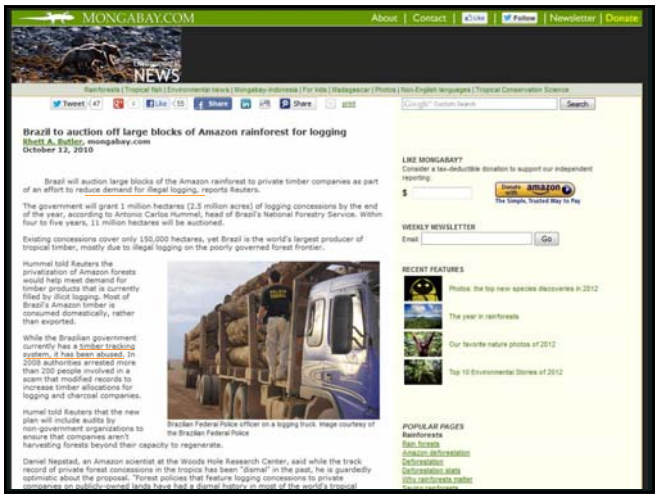


~45% of forests

Map of logging concessions in Liberia according to Signing their Lives. Click image to enlarge.

Example: Logging Concessions in Cameroon





Conventional Logging Methods

Selective Logging of High Value Timber

Purpose: To maximize short-term yield

- No pre-harvest inventory
- No planning of skid-trails & roads
- Use of tracked vehicles = soil damage
- All areas logged, all large trees removed

BIOLOGICAL IMPACTS of Conventional Logging

- 40% of trees damaged or killed
- habitat loss/degradation
- decr. species diversity
- incr. pioneer species
- erosion
- hunting
- deforestation

SUSTAINABLE FOREST MANAGEMENT

Sustainable forest management:

"To harvest forest in such a way that provides a regular yield of forest produce without destroying or radically altering the composition and structure of the forest as a whole…" (Whitmore 1990)

REDUCED-IMPACT LOGGING (RIL)
Purpose = Maximize sustained yield

- reduce damage
- enhance regeneration
- diversify and add value
- sensitive "exclusion zones"
- set aside habitat
- ban certain species

Conventional vs. Reduced Impact Logging

Reduced-Impact Logging

1. Pre-harvest Preparation

- Inventory and mapping of trees
- Planning of roads and skid trails
- Vine cutting
- Optimum road width
- Core habitat areas set aside

Conventional vs. Reduced Impact Logging

Reduced-Impact Logging

2. Felling Operation

- Directional felling
- Reduce waste
- Winching
- Rubber-tired skidders or skylines
- Leave seed trees behind

3. Post-harvest

- Replanting
- Silvicultural treatments

Benefits of R.I.L.

Environmental Benefits

Data from 266 studies
- 50% less soil disturbance
- 41% less residual stand damage
- 30% less canopy opening
- Less habitat loss

Economic Benefits

- Up to 15% lower total cost
- Higher wood recovery
- 13-35% greater profits
- Faster recovery = shorter cutting cycle
- Higher future returns

Barriers to Adoption of R.I.L.

- **Higher pre-harvest cost (*risk*)**
- **Politics of logging concessions**
- **Lack of awareness / training**
- **Lack of control and *skilled* law enforcement (wood ID)**
- **Corruption**

ILLEGAL LOGGING IS RIFE!!

ILLEGAL LOGGING

A "tragedy of the commons" situation

Astronomical profits
- no license fees
- no royalties
- no taxes
- no management / operations requirements

Depresses timber prices
- lower sale price

Undermines profitability of legal logging

Control difficult; Hard to ID wood!

RIL and sustainable timber management thus depends on better monitoring and enforcement of forestry laws.

SOLUTIONS?

Can sustainable management ever be adopted?

Regulate extraction methods
Long-term concessions
Enforce laws
Educate public & law enforcement
Provide incentives
- Tax-incentives
- Certification
- Carbon-offsets

Conservation concessions & REDD+?

PROGRESS

International Timber Trade Agreement 2006

"to promote the expansion and diversification of international trade in tropical timber from sustainably managed and legally harvested forests…"

Since 1990:
112 countries have National Forest Inventories (77% of forests since 2010!)
99% of forests covered by policies or laws that favor SFM
52% of all forests have management plan (2010)

PROGRESS

The U.S. Lacey Act of 1900

Amended in 2009 to include plants

"anyone who imported, exported, transported, sold, received, acquired or purchased wood products made from illegal timber, who knew or should have known that the wood was illegal, may be prosecuted for violation of the Lacey Act." - ITTO

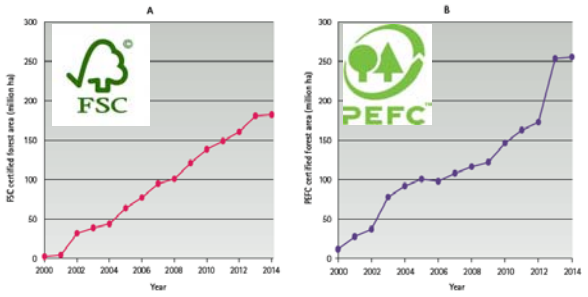
EU FLEGT (Forest Law Enforcement, Governance and Trade)

COMPLIANCE IS CHALLENGING!

Rules don't require sustainability…

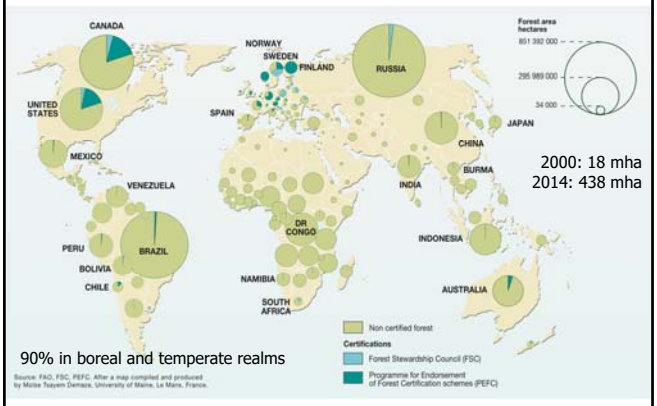
Forest Management Certification

FIGURE 16 A AND B **Area of international forest management certification (2000–2014): (A) Forest Stewardship Council (FSC); (B) Programme for Endorsement of Forest Certification (PEFC)**



2000: 18 million ha 2014: 438 million ha

Very little is certified…



2000: 18 mha
2014: 438 mha

90% in boreal and temperate realms

Solutions?

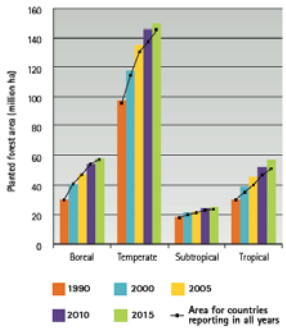
TREE PLANTATIONS

Benefits:
- higher yield
- more efficient
- can rehabilitate degraded lands
- take pressure of natural forest (?)
- carbon sinks

Challenges:
- may replace natural forest (!)
- problematic in seasonal climates
- expensive
- risky
- low biodiversity

Plantations

FIGURE 8 **Planted forest area by climatic domain**



fuelwood (*Acacia mangium)*
pulp (*Eucalyptus* spp., *Pinus* spp.)
timber (*Tectona grandis* – teak)
biofuel (*Populus* spp.)

Community-based Forestry

The Role of YOU

A few things you can do:

- reduce wood & paper use
- reuse/repurpose whenever possible
- recycle and buy recycled
- buy only certified timber
- avoid tropical hardwoods
- support forest conservation
- spread the word!

REUSE
REDUCE
RECYCLE


E-readers may make environmental sense for avid readers of books and magazines.