



Tropical forests and sustainability

do we need new management paradigms?

Robert Nasi

The role of forest biodiversity in the sustainable use of ecosystem goods and services in agro-forestry, fisheries, and forestry

26-28/04/2010, Waseda University, Tokyo

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Outline



- The international forest “agenda”
- Biodiversity and tropical forests
- New societal demands
- Natural forest management paradigms
- New conceptual frameworks
- Some implications for forestry research



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The international forest agenda

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It is... **REDD**

- Climate change is driving but
- Fundamental issues remain the same:
 - Unsustainable use
 - Corruption, weak law enforcement
 - Rights and tenure issues
 - Loss of biodiversity and forest areas
- Compounded by new issues:
 - Carbon-based management?
 - SFM = degradation?
 - Biofuels?

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Biodiversity and tropical forests



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Tropical forests

“For most Northerners, tropical rain forest remains little more than a media construct, or a film set, a riotous ‘jungle’ of climbers and creepers, with Tarzan swinging from tree to tree.” Philip Stott (1999) p.10



Forests: more than timber



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Diversity

- More than half of the world's estimated 10 million species of plants, animals and insects live in the tropical rainforests.
- One-fifth of the world's fresh water is in the Amazon Basin
- One hectare may contain over 750 species of trees and 1500 species of higher plants
- They represent about 30% of the World's forests and 8% of the emerged lands



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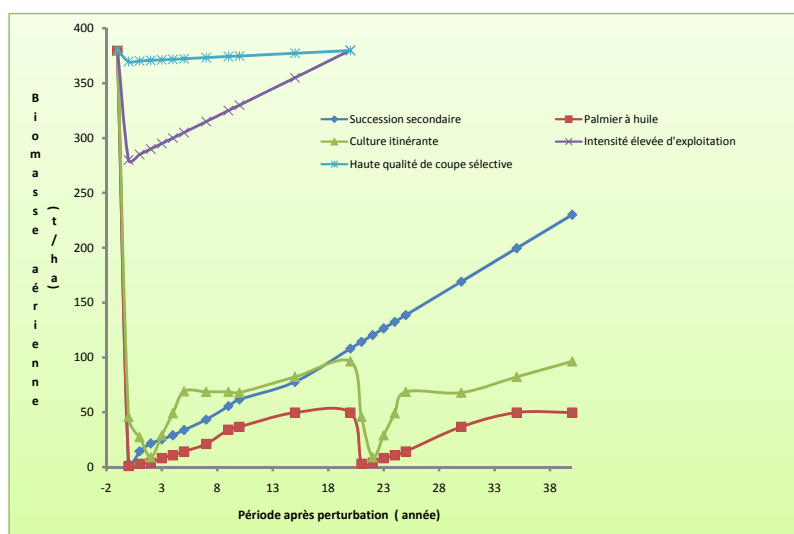


Bushmeat hunting in Congo Basin

- Estimates of the value of the bushmeat trade range from US\$42 to US\$205 million per year in West-Central Africa.
- Current harvest in Central Africa alone may well be in excess of 2 million tons annually, equivalent of over 1.3 billion chickens or 2.5 million cows!
- 30 to 80% of the protein intake of many rural populations

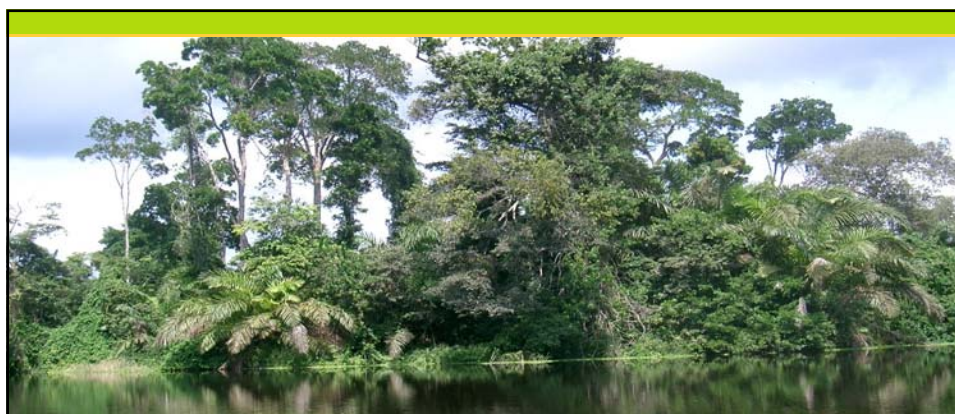
Land cover(LC)	Total Carbon (millions tonnes)	% C Total
1. Closed evergreen lowland forests	27 299	59.3
2. Swamp forests	1 761	3.8
3. Sub-mountain forests (900-1500m)	770	1.7
4. Mountain forests (>1500m)	119	0.3
Humid dense Forest (1-4)	29 949	65.1
Closed deciduous forests	2 791	6.1
Mosaic forest/croplands	3 955	8.6
Mosaic forest/savannas	3 403	7.4
Deciduous woodland	4 149	9.0
Grassland, shrub land, sparse trees	1 770	3.8
Congo basin sub-region (TSR)	46 016	100.0

Source....



Nasi et al., 2009

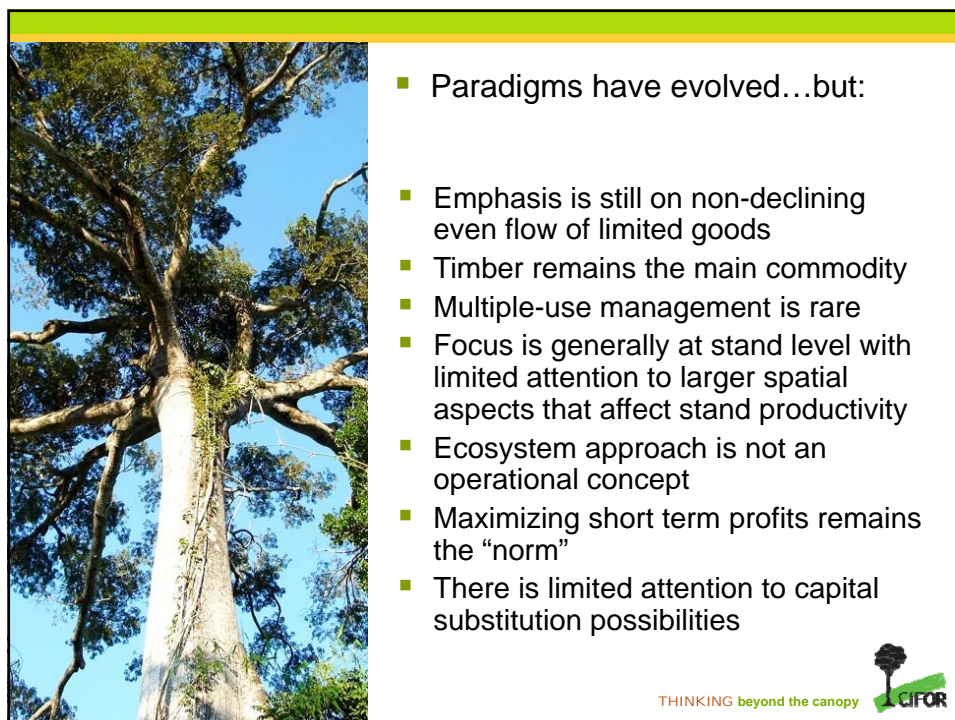
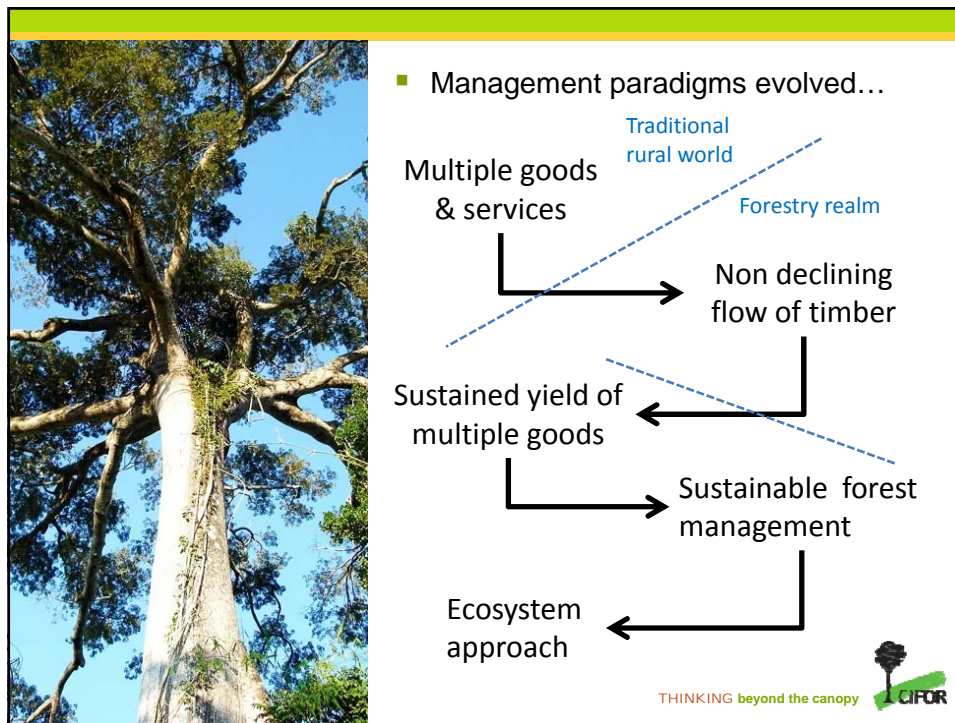
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New societal demands on forests: timber and beyond...

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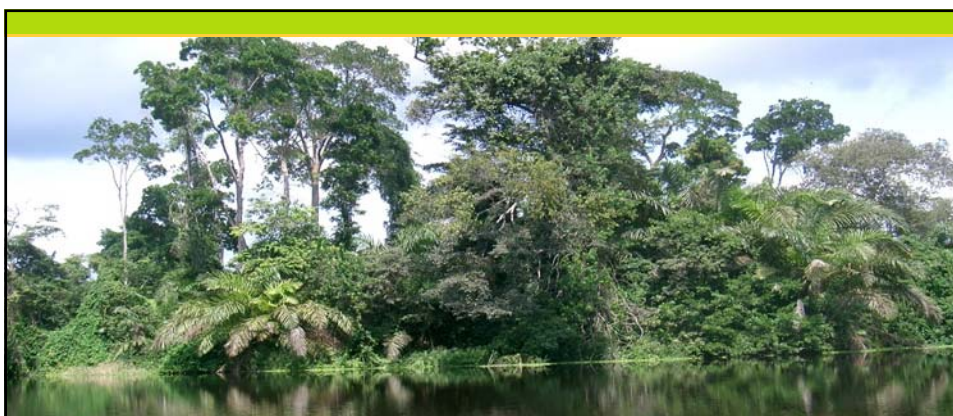


Sustainability issues

- Intergenerational fairness and moral responsibility of the current generation to its dependants
 - How much of an obligation do we assume?
 - What are we willing to give up today for tomorrow?
- Role of assets provided by Nature in satisfying current needs and our obligations for the future
 - To what extent they are crucial in intergenerational interests?
 - To what extent can other forms of wealth be substituted to these natural assets?

→ ecological assets need to be singled out

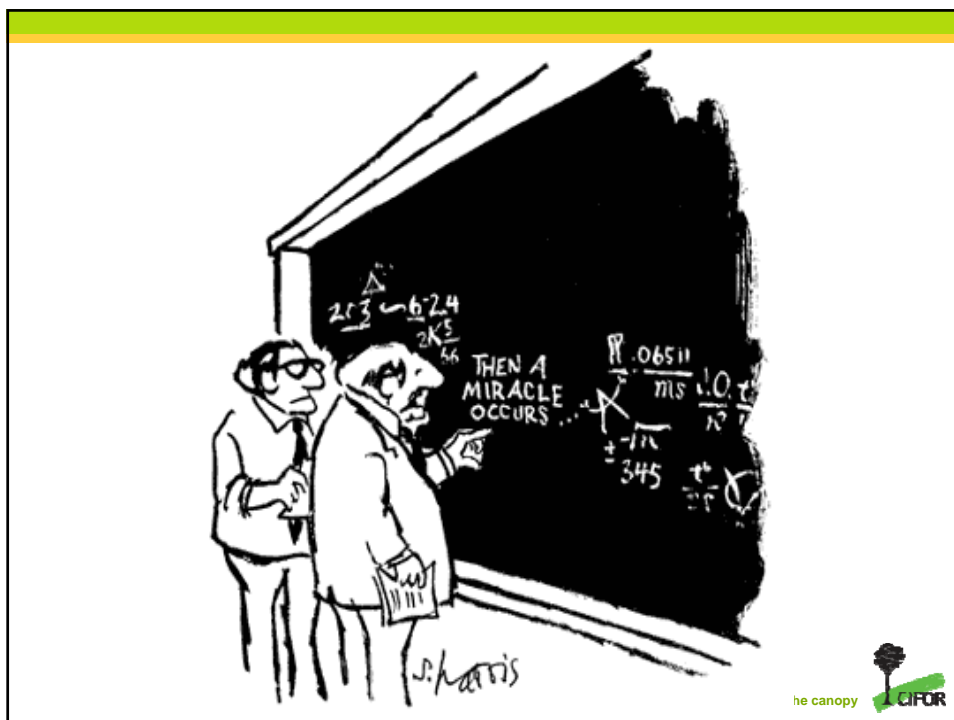
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New conceptual frameworks for tropical forest management

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Key "lessons"

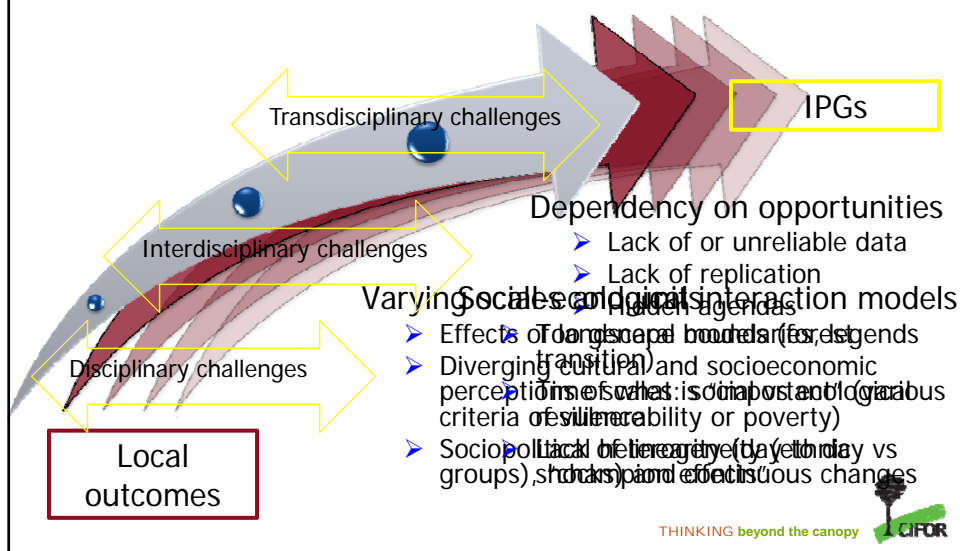
Go beyond the obvious, identify:

1. The different components / facets of forests of relevance to human and environment welfare
2. The relevant spatial scales for management of these components / facets
3. The capacity for substitution or damage remediation over different temporal scales



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Methodological challenges: towards local outcomes and IPGs?



Integration or segregation



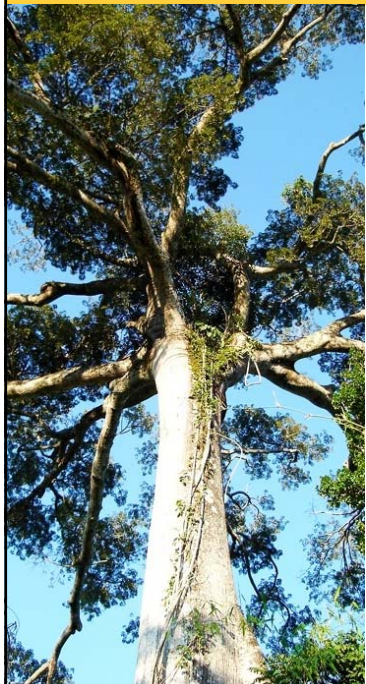
Integration or segregation

System components and processes




Management: beyond timber
and beyond the obvious

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- Timber
 - RIL and beyond...
- + Biodiversity
 - Use ecology, life history, consider wildlife...
- + Non Timber Forest Products
 - Trade-offs but possible
- + Ecosystem services
 - Trade-offs but possible; appears in certification schemes (HCV); serious accountability issues...
- + Carbone
 - Several risks, trade-offs and issues
- ...Against threats?
 - Climate change, invasive species, land conversion....

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Set of key attributes

<ul style="list-style-type: none"> ■ Complexity ■ Authenticity ■ Continuity ■ Heterogeneity 	<ul style="list-style-type: none"> ■ Proximity ■ Redundancy ■ Resilience ■ Uniqueness
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Gustafsson, Laumonier, Nasi 2009
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Management principles

- Maintain landscape heterogeneity
- Maintain large structurally complex patches of natural vegetation
- Create buffers around sensitive areas
- Maintain or create corridors and stepping stones
- Use appropriate disturbance regimes in management
- Maintain functional diversity
- Manage for keystone species
- Consider endemic, rare and threatened species

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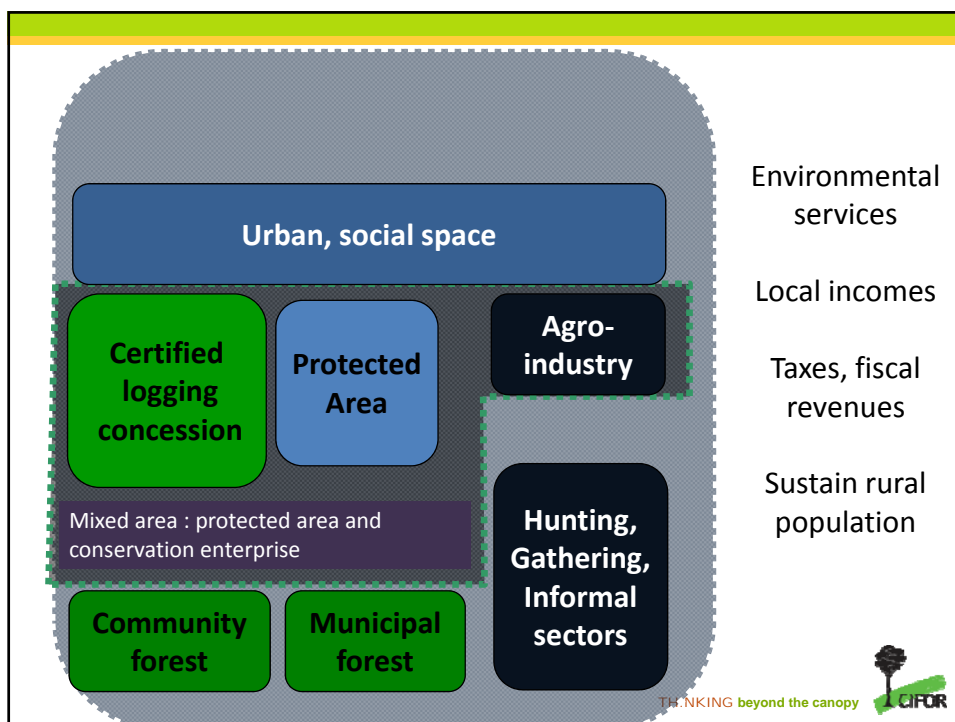


New land-use types

- Combine several land use types (e.g. logging concession, protected area, CBFM...) in one land-use management unit that would become an:
- Integrated production/conservation landscape

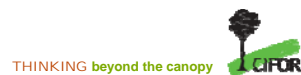
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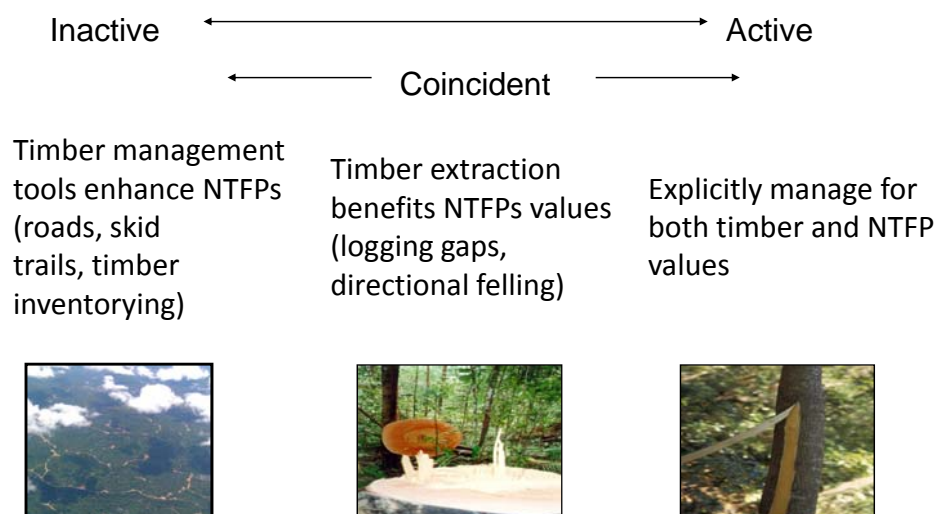


Integrated approaches

- At the landscape scale: segregation for particular goods and services
- At the stand level—probably more difficult and research intensive and with more tradeoffs to solve
- Selecting use with the highest NPV (timber or high-value NTFPs) and adding other uses



The “Compatibility Continuum”



Modes of Interaction

- Independent (spatially segregated, or when there is no conflict of use for tree species with NTFP value)
- Competitive—e.g., extraction of tree species with both NTFP value for different stakeholders or exclusion of a given group of stakeholders
- Complementary—e.g., logging enhances growth/regeneration of NTFP (all else being equal)

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Community forestry concessions in Petén, Guatemala

- Improved management of timber and at least one NTFP for the export market (FSC-certified)
- MFM inserted from the outset when the government created the community concession system in 1993
- Government recognized early the right of the communities to manage and live from their forest but also demanded good management practices
- Strong social cohesion and tradition of deriving a large proportion of their income from the forest

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Community concessions in Petén, Guatemala

- No access/resource rights conflict
- Current logging intensities (3-4 m³/ha) do not directly affect understory *xate* populations
- Logging cycles ~ 25 yr; *Xate* fronds ~ 4 mo
- Palms are widely distributed and logging in annual compartments
- Certification scheme for timber and *xate* follow FSC standards—integrated audits, lower transaction costs
- *Xate* is not edible nor used as a cosmetic



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Main Issues

- Many tropical tree species have both timber and non-timber values that accrue to different stakeholders
- Current certification schemes diverge for timber and NTFPs
- Forestry education and training biased towards timber
- Legal and regulatory frameworks dictated separately for timber and NTFPs
- Best harvesting practices/management protocols for NTFPs have little validation

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Some implications for tropical forestry research



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Research /Science

- Search for universally agreed definitions is pointless (forests or sustainability)
- Strive for continuous improvement to better outcomes when the “best” is unachievable
- Scale research appropriately to the research question
- Classical forest science has peaked!
- Grainger (2009) calls for a “*new global forest science*”
- Burley (2004) believes that forest science can be “*restored*” with “*new interdisciplinary approaches that integrate the work of biophysical scientists and socio-economic researchers*”



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"Our major disciplines have long ago ceased to be effective as separate, have in fact searched for ways of coming together...but are restrained by institutional resistance and lack of vision" (Ron Burnett 2005)

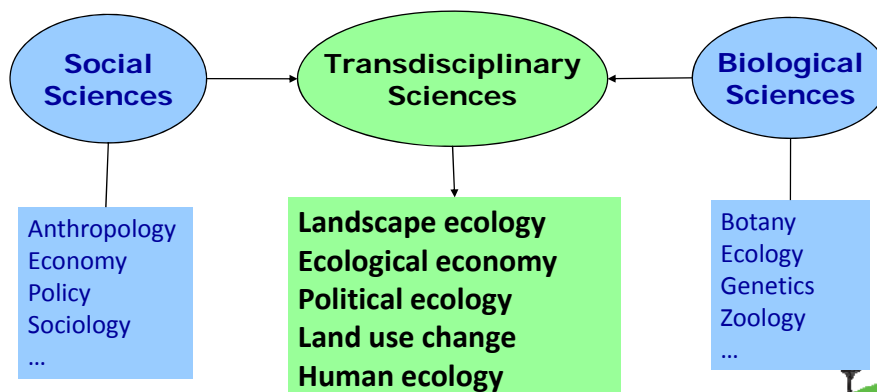


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New disciplines

"CONSILIENCE: the methods and assumptions of any field of study should be consistent with the known and accepted facts in other disciplines" E.J. Wilson.



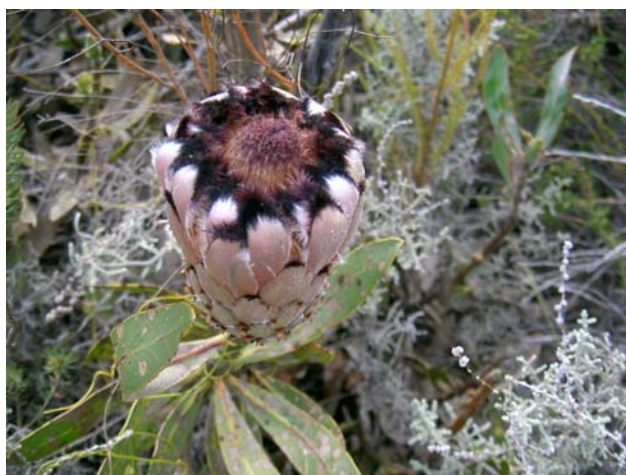
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Some final comments

- Search for a globally accepted definition of sustainable forest management is pointless
- Management should be defined by societal demands
- Outcomes and results should be monitored based on agreed objectives for management; unrealistic, unachievable or vague targets are of little use
- Good management can never be attained through bureaucratic procedures alone.
- Best practices require able and motivated managers are available on site to address concerns on a day-to-day basis: capacity building and training are keys!
- Sound judgment remains the foundation of good management. Data can inform this judgment, but is not an end in itself

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Slides 19-20 adapted from Frost (2004), 28-32 from Guariguata (2009)

Pictures: CIFOR, R. Nasi, IRD Iwokrama International Center, J. Okouyi Okouyi, D. Sheil, C. Doumenge, D. Wilkie, P. Frost. M. Guariguata

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Forest Good or Service (discounted US\$/ha or /yr)	Global (Pearce & Pearce 2001)	Cameroon (Lescuyer 2007)	Gabon (National Park) (Lescuyer 2006)	Cameroon (Community Forest) (Akoa Akoa, 2007)
Timber	200 - 4,400	560	98	25-78
Fuelwood	40	61	NA	165
NTFPs	0 - 100	41 - 70	3	172
Genetic resources	0 - 3,000	7	1<	Na
Recreation	2 - 470	19	4	34
Watershed benefits	15 - 850	54 - 270	0	998
Climate benefits	360 - 2,200	842 - 2,265	211	632

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Some basic rules

- Realize the economic potential of the conservation side
- Manage informal sectors like hunting, fishing or NTFP extraction outside of the conservation area for local livelihoods;
- Use part of the income generated by the industrial production side for the conservation area for reciprocal benefits

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Some basic conditions

- Starting funds are needed to cover initial transaction costs
- The willingness for the production sector to engage into certification
- A political support proactive (creating specific land-use units, accepting a redistribution or a waiver on royalties) or, at least, neutral (no undue interference from the State).

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Tradeoffs at the biophysical level

Extent of habitat specificity	- Spatial segregation of timber and NTFPs due to edaphic/disturbance factors
Growth habit and product type	- Lianas, shrubs, epiphytes, palms; or fruits, foliage, resin, bark - Relative timber/NTFP values for a given tree species ("conflict of use")
Silviculture	- Extent of thinning, liana removal, logging practices applied, enrichment planting, site preparation
Length of timber rotation cycles	- Spatial distribution of NTFPs and time to recover to pre-harvest levels
Pre-harvest timber inventories and marking of future crop trees	- NTFP growth habit (easier for arborescent palms, trees)

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Institutional/social/legal

Gender	- Who is involved in collecting NTFPs
Seasonality	- How it influences labor availability for harvesting timber and NTFPs
Property rights	- Modes of access (legal vs. customary, cooperative members vs. open access)
Local governance	- Degree of organization among producers - Extent of differences between established mechanisms to distribute revenues from timber and NTFPs
Training and education	- Degree to which NTFPs are incorporated into forestry curricula, and loggers and forest managers are aware of NTFP values
Legal frameworks	- Extent to which government-designed management plans for timber harmonize NTFP issues or vice versa
Income diversification	- Extent to which timber and NTFP diversify income sources

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