

Does biodiversity really matter to benefit from the ecosystem services provided by Central African forests?

« Ecosystem services » meeting

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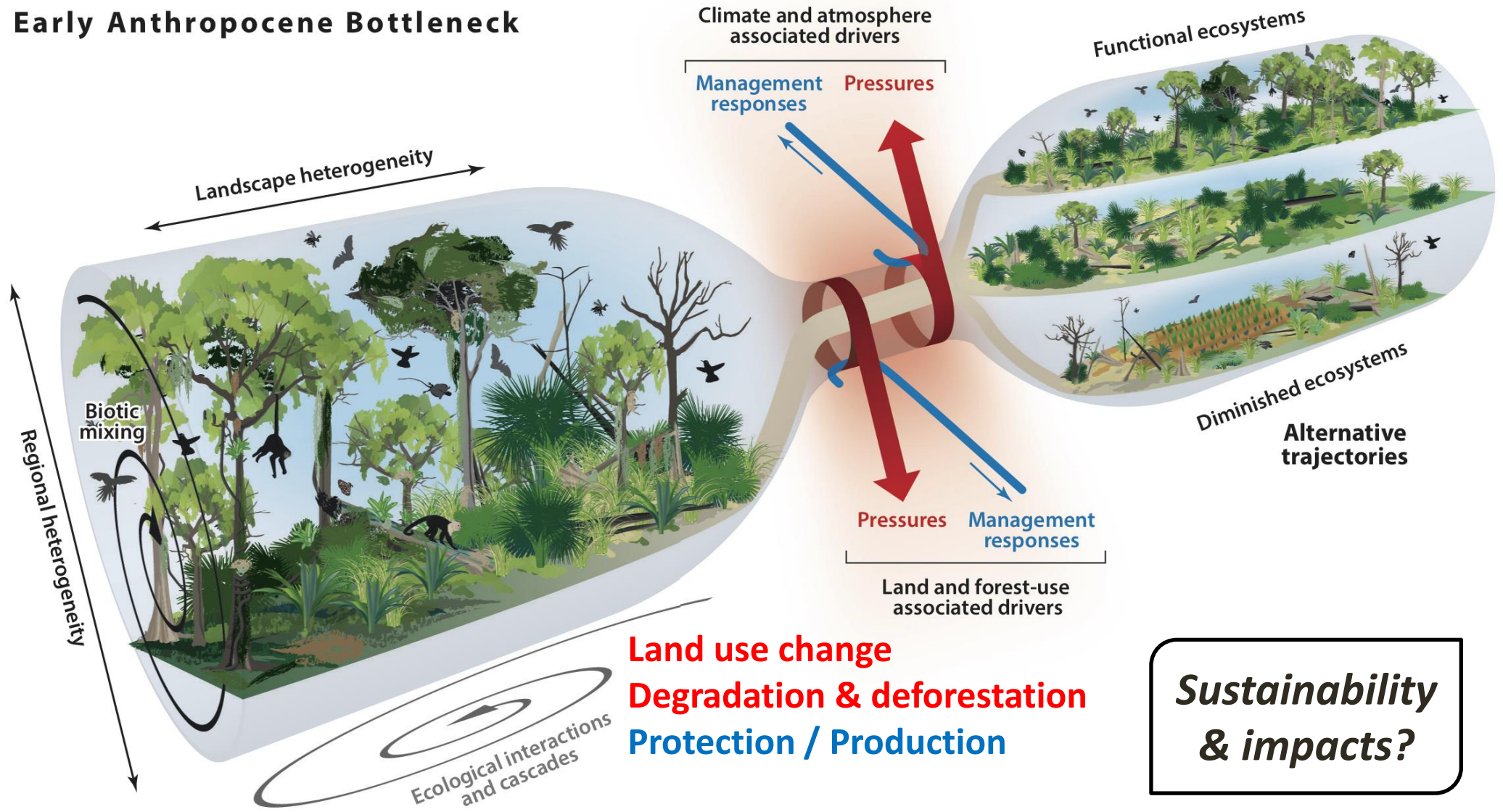


Gembloux Agro-Bio Tech
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Tropical forests

Early Anthropocene Bottleneck



What is the value of ecosystem services (ES) in tropical forests?

6 800 000 000 000 \$/an (Costanza *et al.*, 2014)



What about ecosystem services in Africa?

Review Article

A review of studies on ecosystem services in Africa

Peter Waweru Wangai^{a,b,*}, Benjamin Burkhard^{a,c}, Felix Müller^a

52 studies

Only 2 studies in **Central Africa**!

Mainly **provisioning** services
Much less **cultural** services

- ES **tradeoffs** and **synergies** are barely addressed
- **Economic valuation** & ES **mapping** = more than $\frac{3}{4}$ of the studies
- **Research needs:**
 - Extend ES studies to other African countries (capture spatial and socio-economic uniqueness!)
 - Focus more on local-scale assessments of multiple ES (address ES tradeoffs and synergies!)

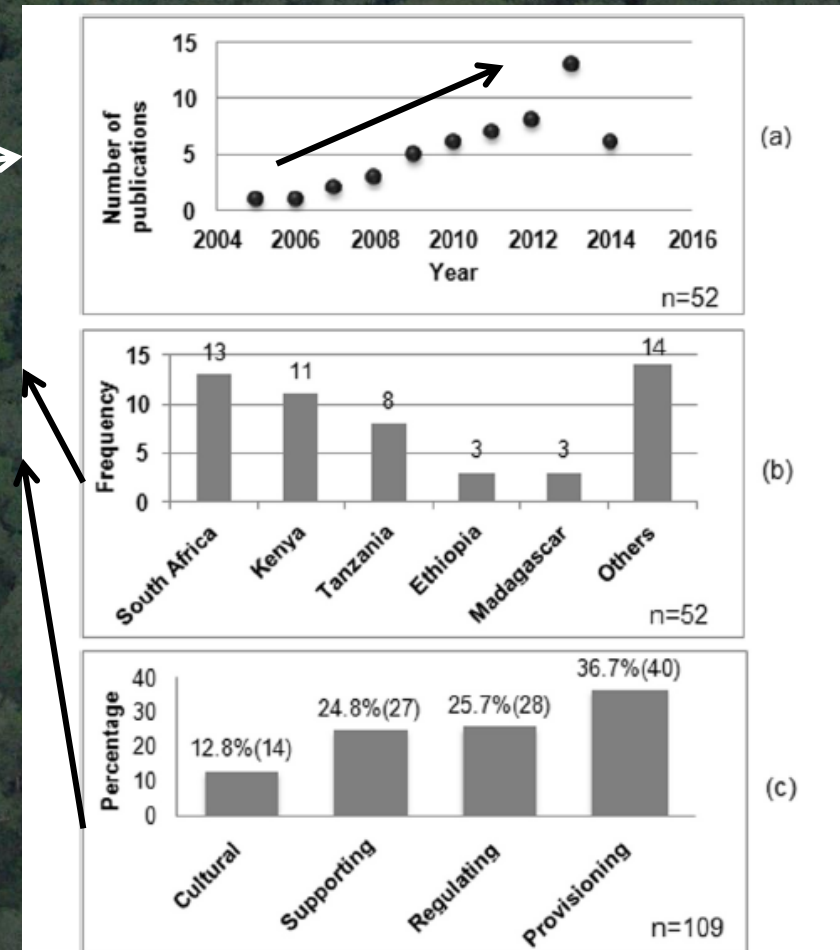
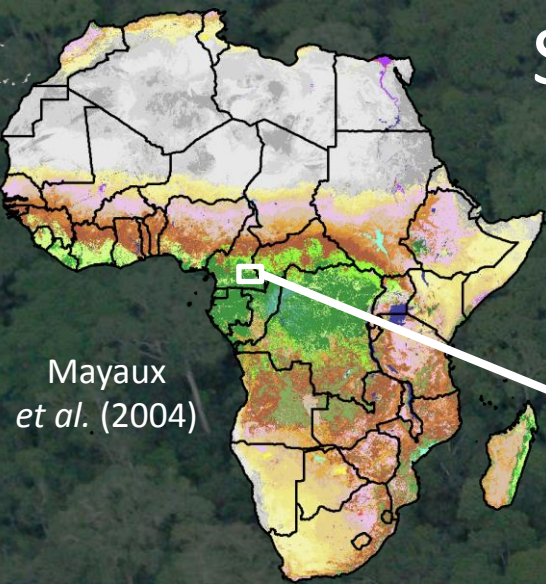


Figure 2. (a) The development of ES studies in Africa between 2005 and July 2014, (b) the distribution of ES studies in African countries, and (c) the percentage and number of ES represented in each category.

Study area: South-East Cameroon



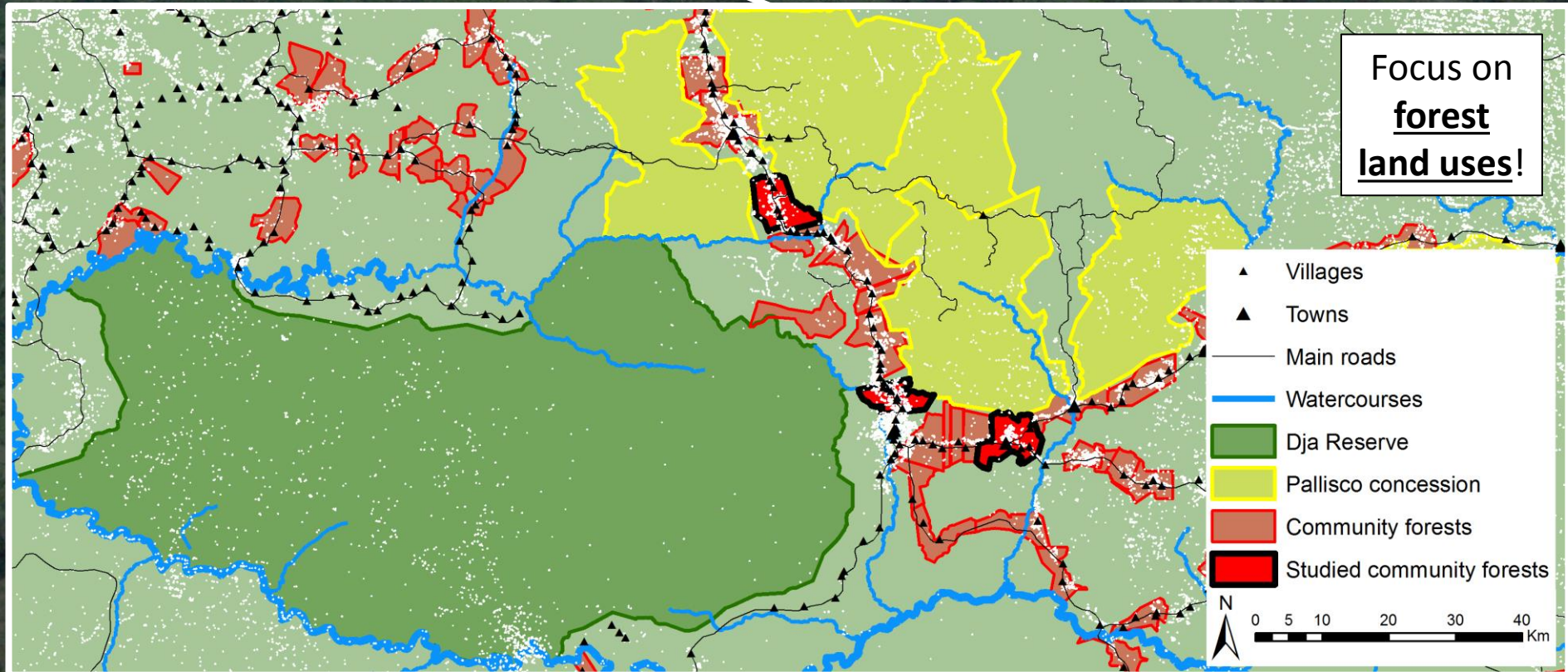
Mayaux
et al. (2004)

Local populations:

Bantu and Baka Pygmies

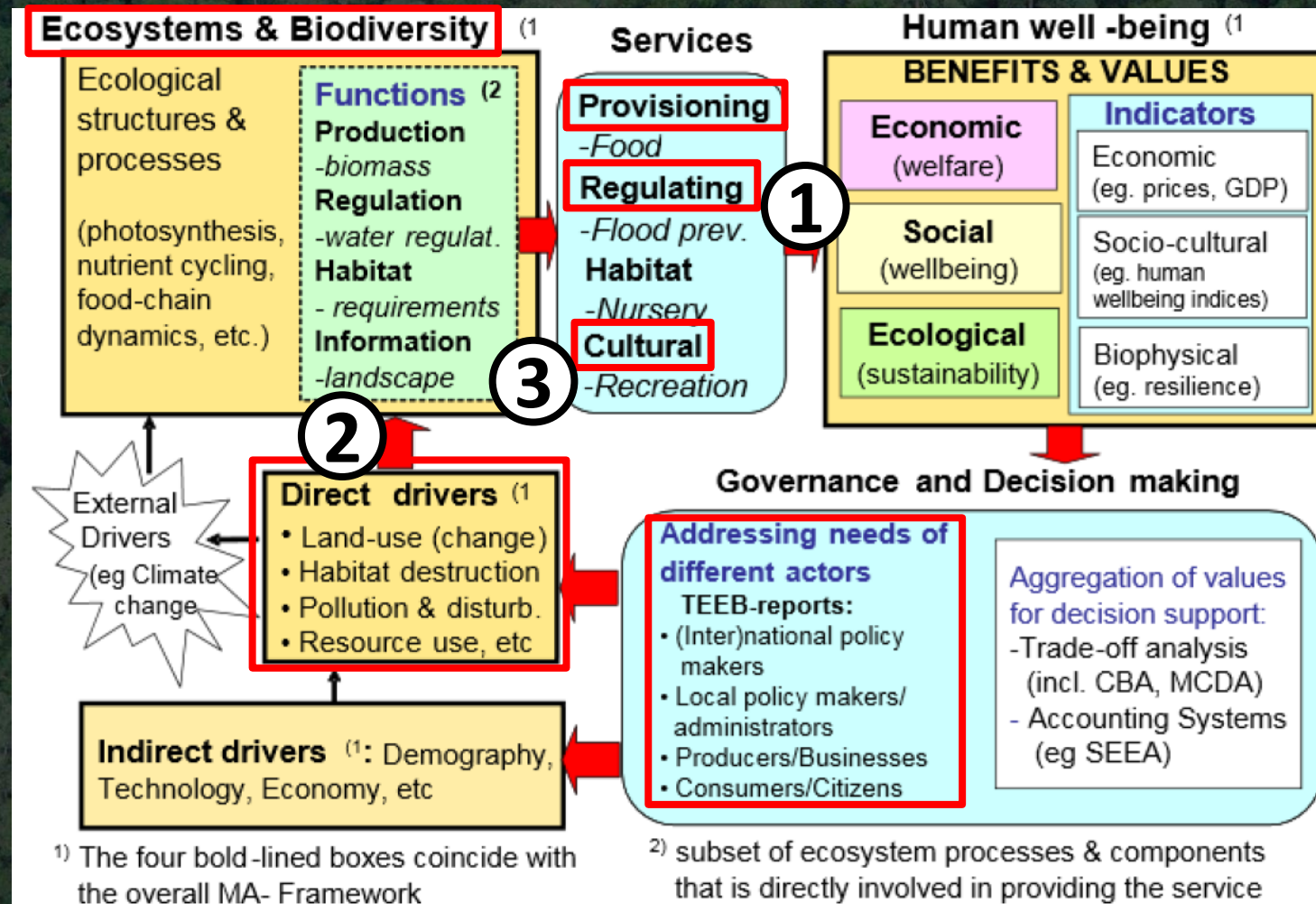
Widely dependent on the forest for their daily activities
(hunting, fishing, gathering of forest products, extensive agriculture)

Different management types with different
customary rights for rural populations



Trees, Mammals, Dung beetles, Soil, Seed bank

Provisioning: Food (meat, fish, fruits), wood, raw materials
Regulating: Climate, water-air-soil quality, natural protection
Cultural: Heritage, traditions, recreation, education, tourism



De Groot *et al.* (2010)

Paper 1: Perceptions of ecosystem services

Paper 2: Impacts of the management regimes on biodiversity

Paper 3: Integrative analysis of the impacts of the management on ES

Local populations, local administrators, forest managers (protected area, logging concession, community forests)

Paper 1: Perceptions of ES

Questionnaire structure

1. General open question (awareness of ES, “spontaneous perceptions”):
“What are the usefulness and interests of this forest for you?”
-
2. Perceptions of 18 particular ES, with numerical values & short justifications:
 - 0 = *“The service is not provided”*
 - 1 = *“The service is provided in an intermediate way”*
 - 2 = *“The service is clearly provided”*

Interview methodology

- 225 individual interviews of forest stakeholders + 7 experts
- Perceptions of ES provided to local populations
- Stratified sampling approach:
75 interviews in each management types, in a total of 23 locations

Paper 2: Land uses impacts on biodiversity

1 Trees

- 1 ha-plots
- Diameter at breast height: all trees (DBH > 10 cm)
- Height: 50 trees/plot
- Identification of all tree species (DBH > 10 cm)

2 Mammals

- 5 grids x 12 cameras
- Standardized TEAM protocol
- Transition between dry & rainy season
- Objective: 1000 trap.days for each grid (~ 3 months)
- Identification of all animal species/genus

3 Dung beetles

- 72 baited pitfall traps (24/land use)
- Transition between dry & rainy season
- Identification of all animal species

Paper 3: Land uses impacts on ecosystem services

Ecosystem services		Types of indicators		
		Economic	Social	Biophysical
Provisioning	Wood	/	Interviews	Volume used/person/year (villages)
	Food (meat, fish, NTFP)	/	Interviews	% of proteins in the daily diet (villages)
	Medicine	/	Interviews	/
	Raw material	/	Interviews	/
Regulating	Climate	/	Interviews	Above-ground carbon stocks (1-ha plots)
	Water quality	/	Interviews	Physicochemical analysis (watershed outlets)
	Air quality	/	Interviews	/
	Soil quality	/	Interviews	/
	Protection against disturbances	/	Interviews	/
Cultural	Heritage	/	Interviews	/
	Recreation	/	Interviews	/
	Education	/	Interviews	/
	Tourism	/	Interviews	/
	Rituals & traditions	/	Interviews	/



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Thanks for your attention, comments are welcome!