Ecosystem services

Comments to Steve Carpenter

By

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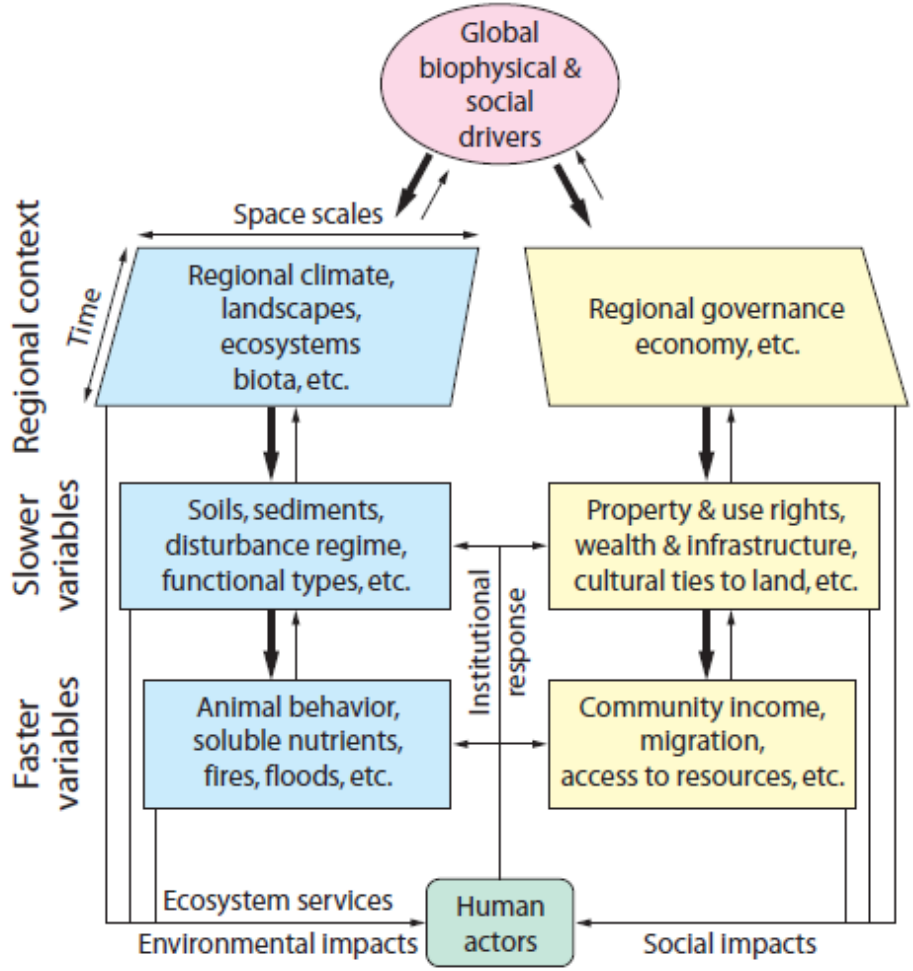
EN ECOSISTEMAS

Ecosystem services need to be analyzed in the context of coupled social-ecological systems frameworks



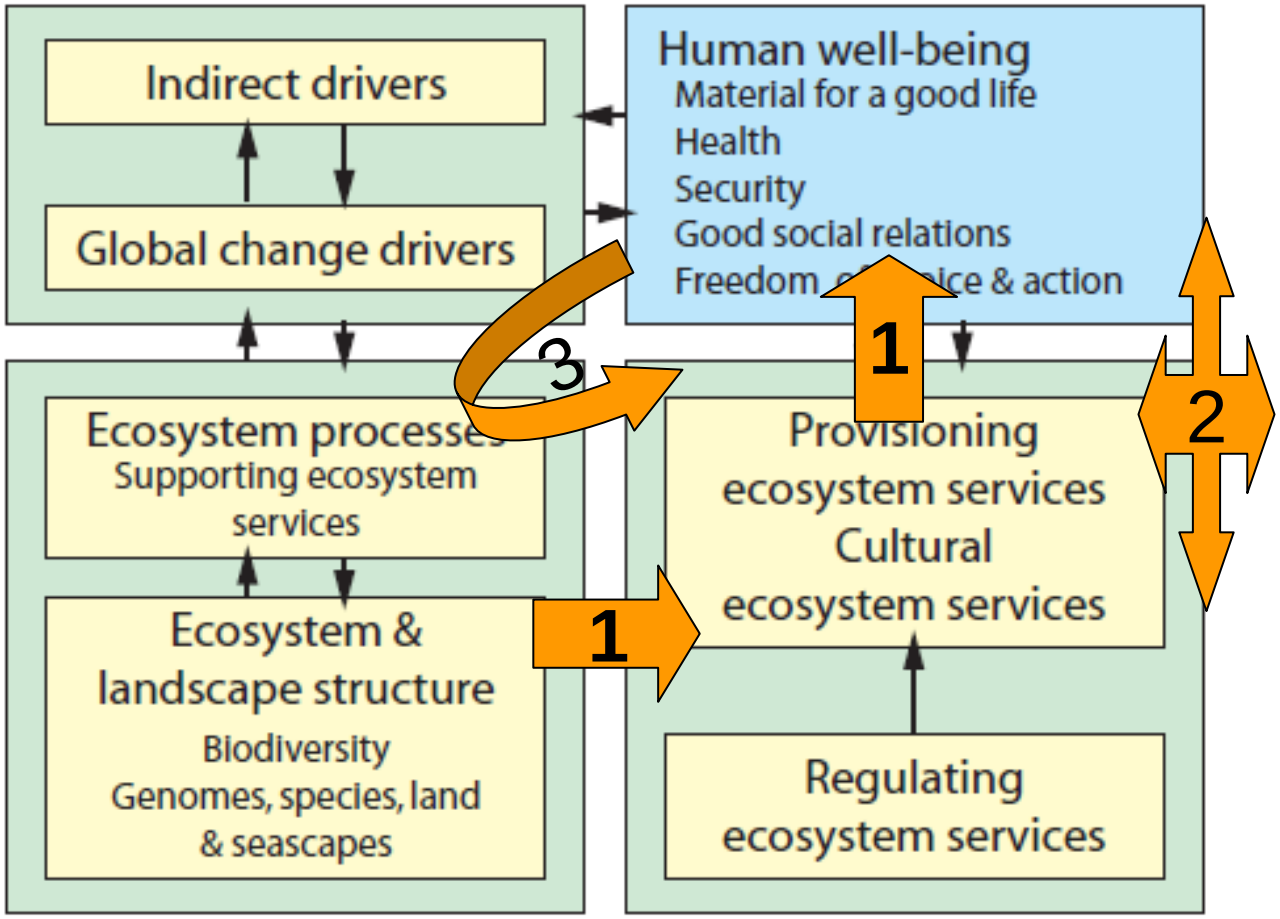
Carpenter et al. 2009 PNAS

Questions for this session

- Topic 1: Flows of Ecosystem Services.
  - Can we characterize/quantify the links from the biophysical world to provision of ecosystem services and can we characterize/quantify how ecosystem services contribute to human wellbeing?
- Topic 2: Tradeoffs.
  - What are the tradeoffs among/between different ecosystem services (provisioning, regulating, etc.)? What are the tradeoffs among different beneficiaries of ecosystem services (across time, space, culture, economic strata, etc.)?
- Topic 3: Interventions.
  - What are the technology, management, policy or institutional interventions that can ensure sustaining natural capital and the flow of ecosystem services?

RESEARCH NEEDS

Overarching feedback loop
MA framework



Carpenter et al. 2010

Topic 1: Flows of Ecosystem Services.

Can we characterize/quantify the links from the biophysical world to provision of ecosystem services and can we characterize/quantify how ecosystem services contribute to human wellbeing?

1-Can we characterize/quantify the links from the biophysical world to provision of ecosystem services?

- A - Measuring ecosystem services
- B - Mapping ecosystem services
- C - Linking biodiversity to ecosystem services
- D - Linking ecosystem functioning to ecosystem services
- E - Sustaining the flow of services under global change

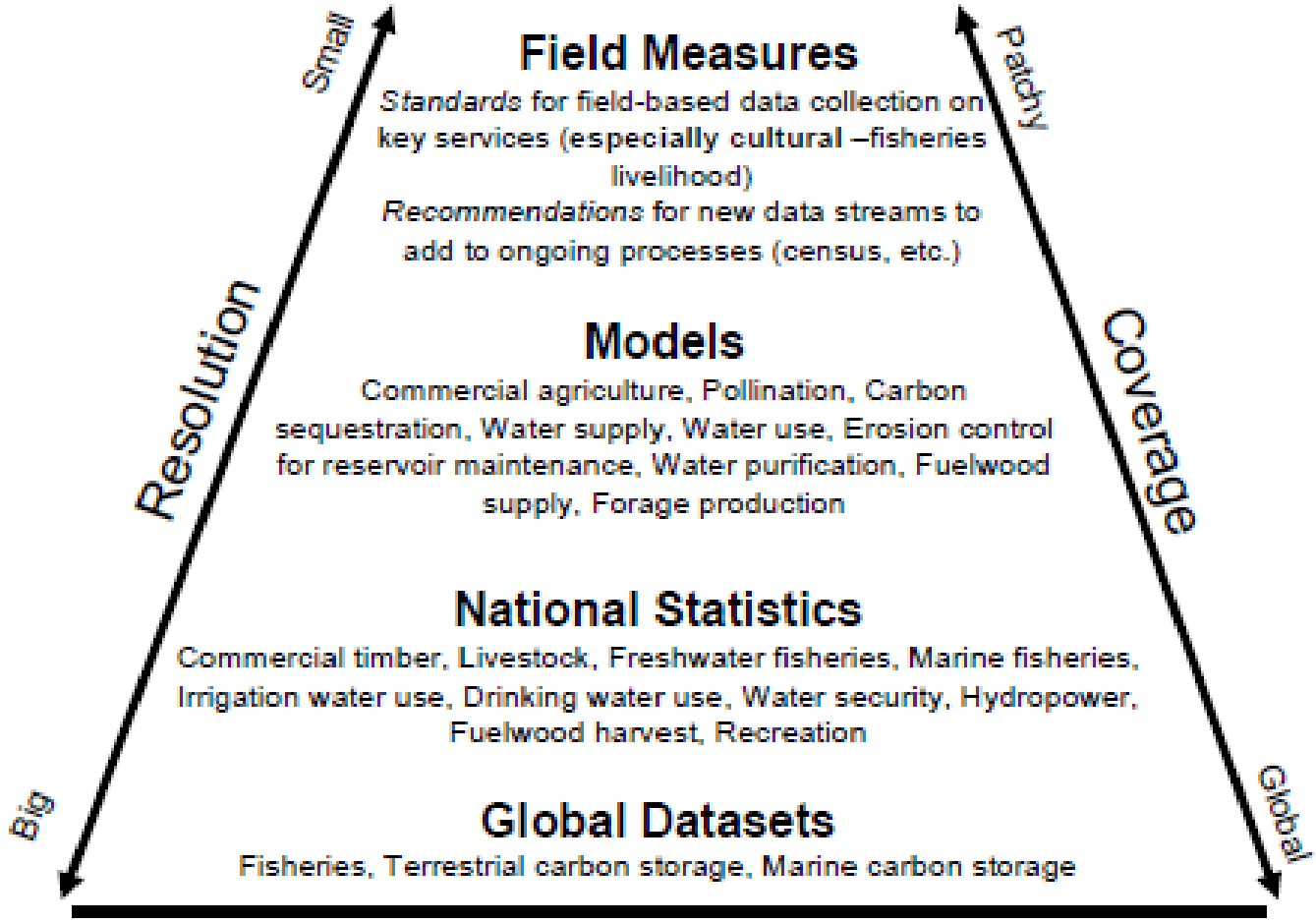
A- Measuring ecosystem services

- Many indicators have been developped to monitor service provision under different information availability conditions

MA publication- Ash 2010 A Manual for assessment practitioners

B- Mapping ecosystem services

- B- Mapping ecosystem services
  - Many developments made to date at multiple spatial scales under different scale, resolution and data availability conditions



Mooney et al. 2009. GEOBON implementation plan

C - Linking biodiversity to ecosystem services

- As biodiversity is declining, what will the consequences be for the flow of ecosystem services?

Biodiversity and ecosystem services

- What happens when biodiversity is lost?
  - Data available from small scale experiments (e.g. Worm et al. 2006). Assements at larger spatial and temporal scale needed
- Which components of biodiversity provide the services and thus need to be sustained
  - (e.g. Luck et al. 2009)?
- How to assess the role of physical conditions, species's attributes and management
  - (e.g. Diaz et al. 2006)?

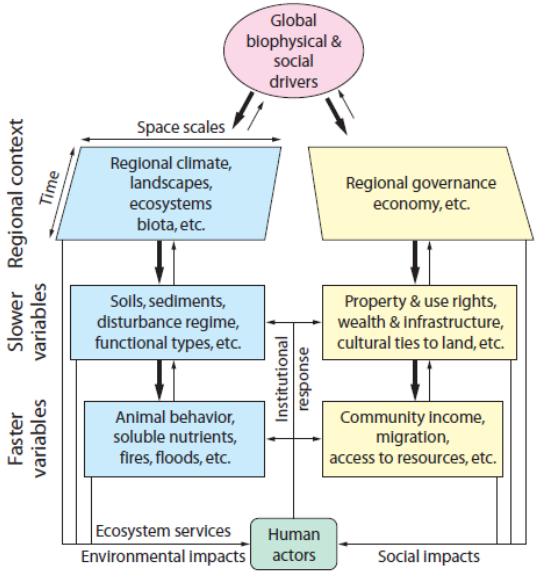
D- Linking ecosystem functioning to ecosystem services

- Which functions contribute to which services?
- Is this a 1 to 1 link or many functions contribute to many services?
- How do changes in rate, direction, magnitude of such functions contribute to changes in ecosystem service flow?

PENDING

E - Sustaining the flow of services under global change

- What roles do thresholds, feedbacks, irreversibility, and resilience play in ecosystem service flow?



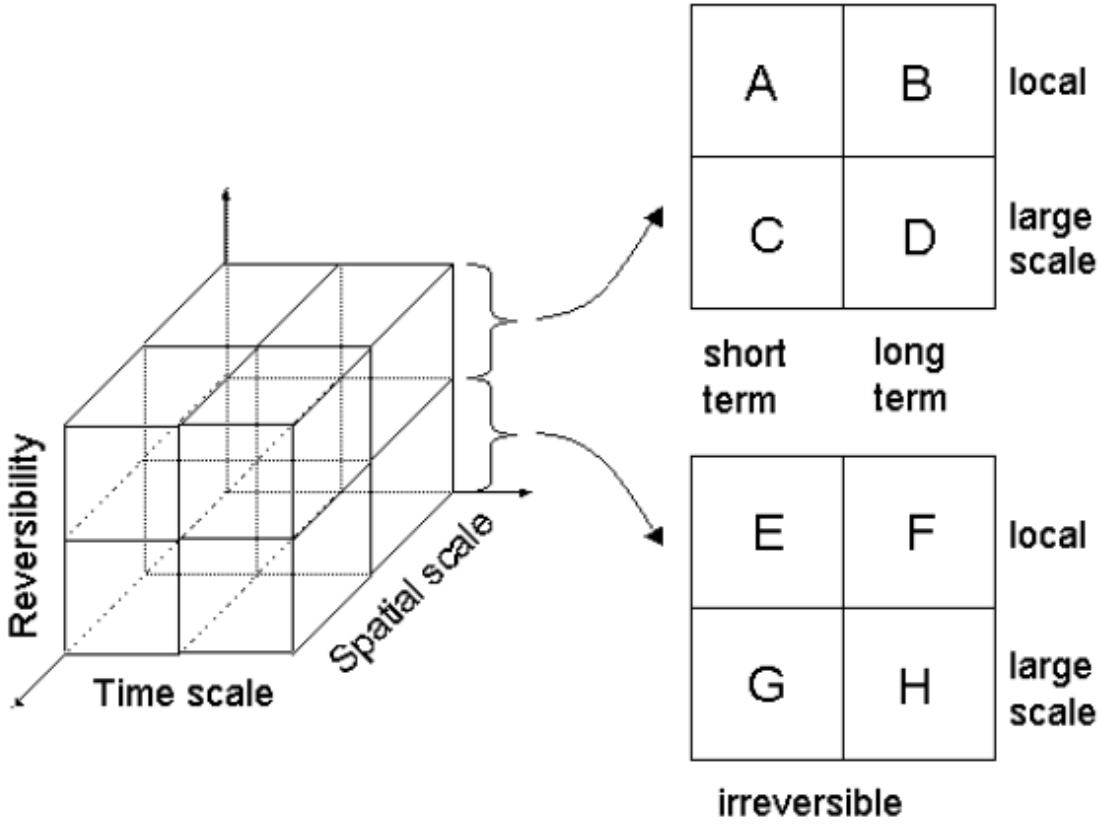
Topic 2: Tradeoffs.

What are the tradeoffs among/between different ecosystem services (provisioning, regulating, etc.)? What are the tradeoffs among different beneficiaries of ecosystem services (across time, space, culture, economic strata, etc.)?

2- Tradeoffs

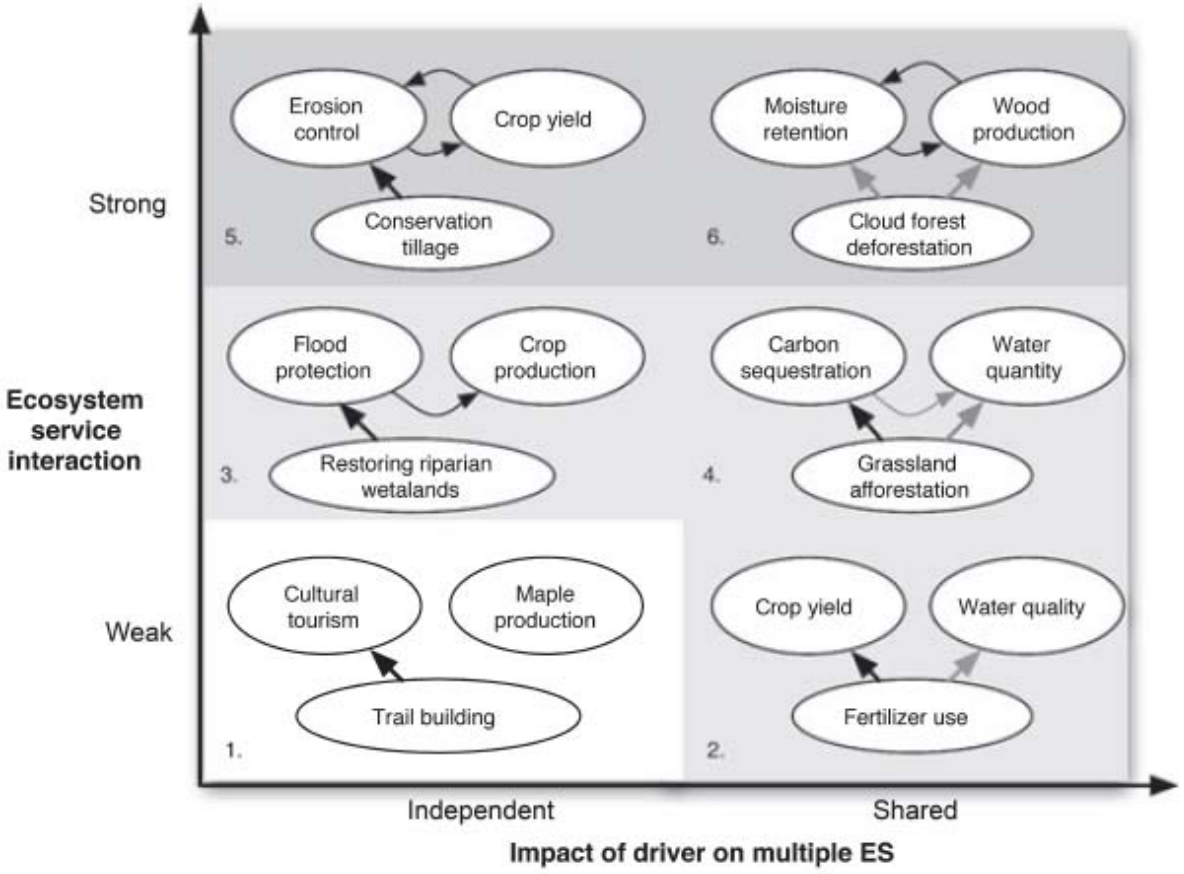
- A – Types of tradeoffs
- B – Types of interactions among services
- C - Measuring and assessing tradeoffs
- D- Other relevant tradeoffs

A- Types of tradeoffs



Rodriguez et al. 2006 Ecology and Society

B- Types of interactions among services

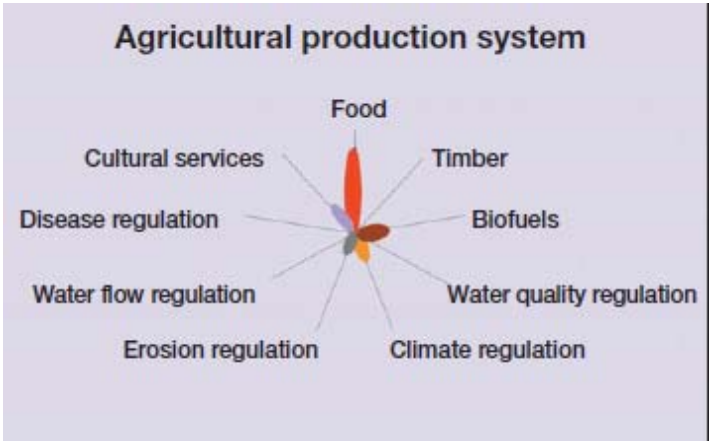


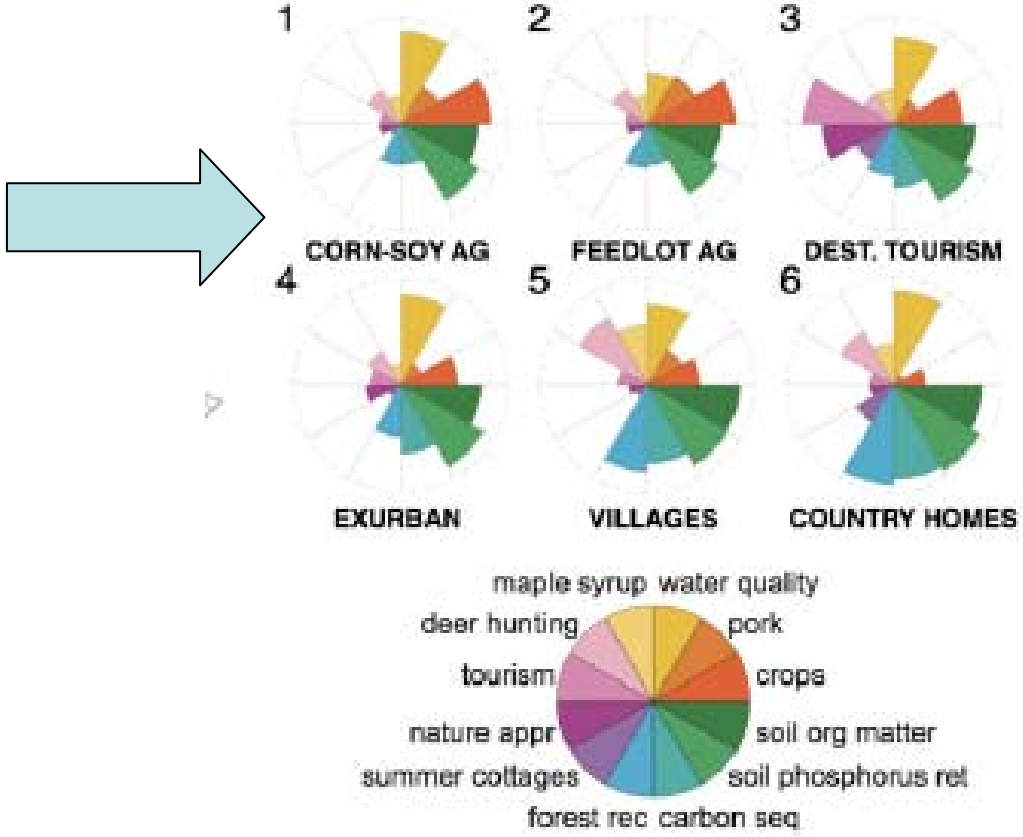
Bennett et al. 2009 Ecology Letters

C - Measuring and assessing tradeoffs

1- Mapping tradeoffs in space
2- Assessing equitativity in service provision
3- Identifying ecosystem service bundles

Flower diagram





Bennet & Balvanera 2007 Frontiers

Raudsepp-Hearne et al. 2009 PNAS

D- Other relevant tradeoffs

- Short term vs. long/term benefits
- Maximum yield vs. increased security (reduced variance)
-

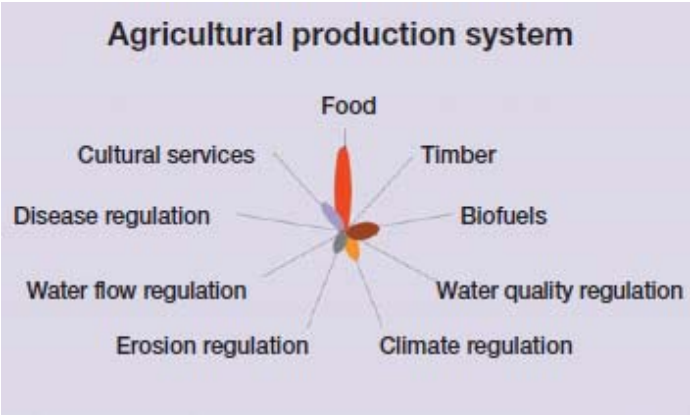
Topic 3: Interventions.

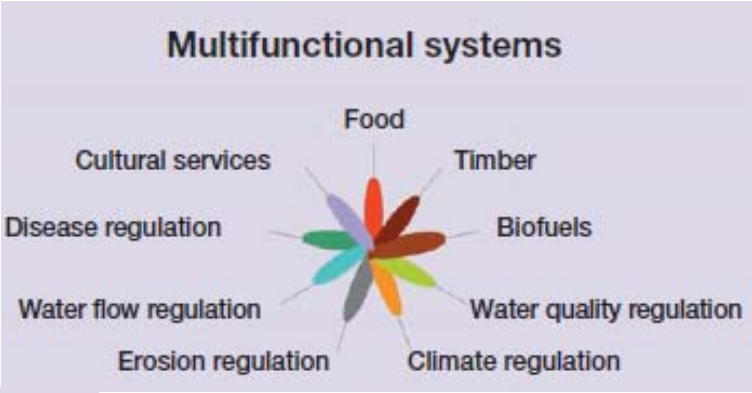
What are the technology, management, policy or institutional interventions that can ensure sustaining natural capital and the flow of ecosystem services?

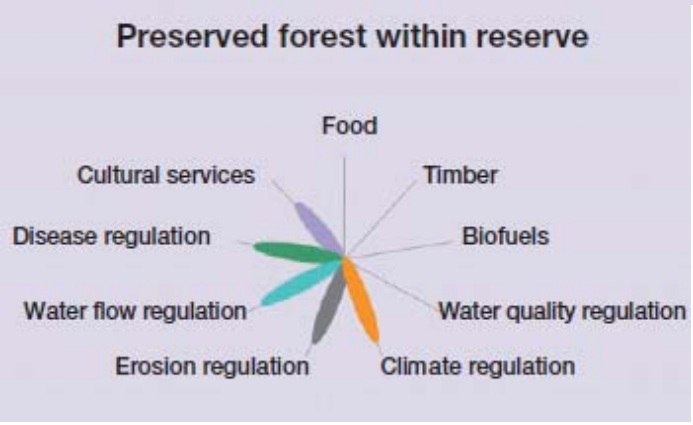
3- What are the technology, management, interventions that can ensure sustaining the flow of ecosystem services?

- A- The design of multifunctional systems
- B – Restoring ecosystem service provision

A- The design of multifunctional systems

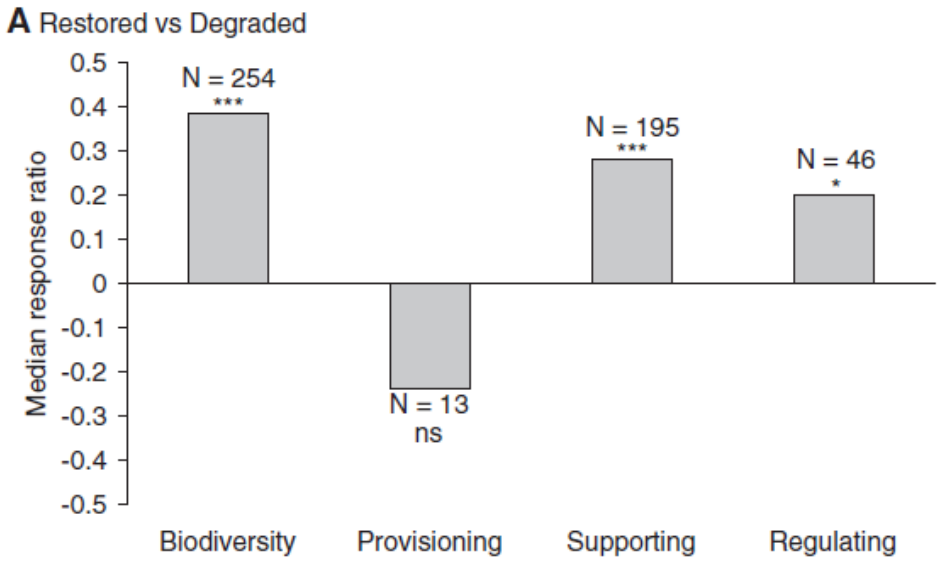


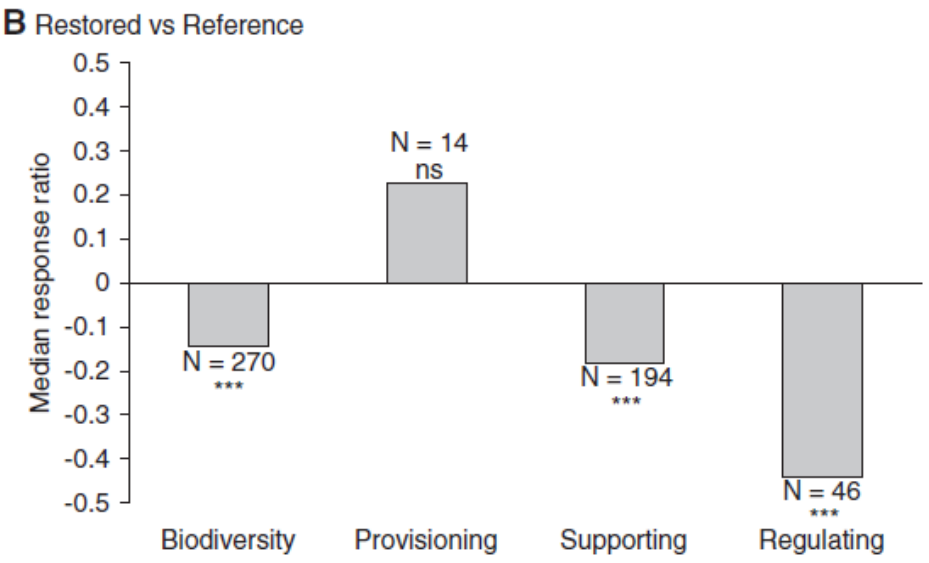




Diverse agroecosystems
Secondary forests
Diverse landscapes

B- Restoring ecosystem services





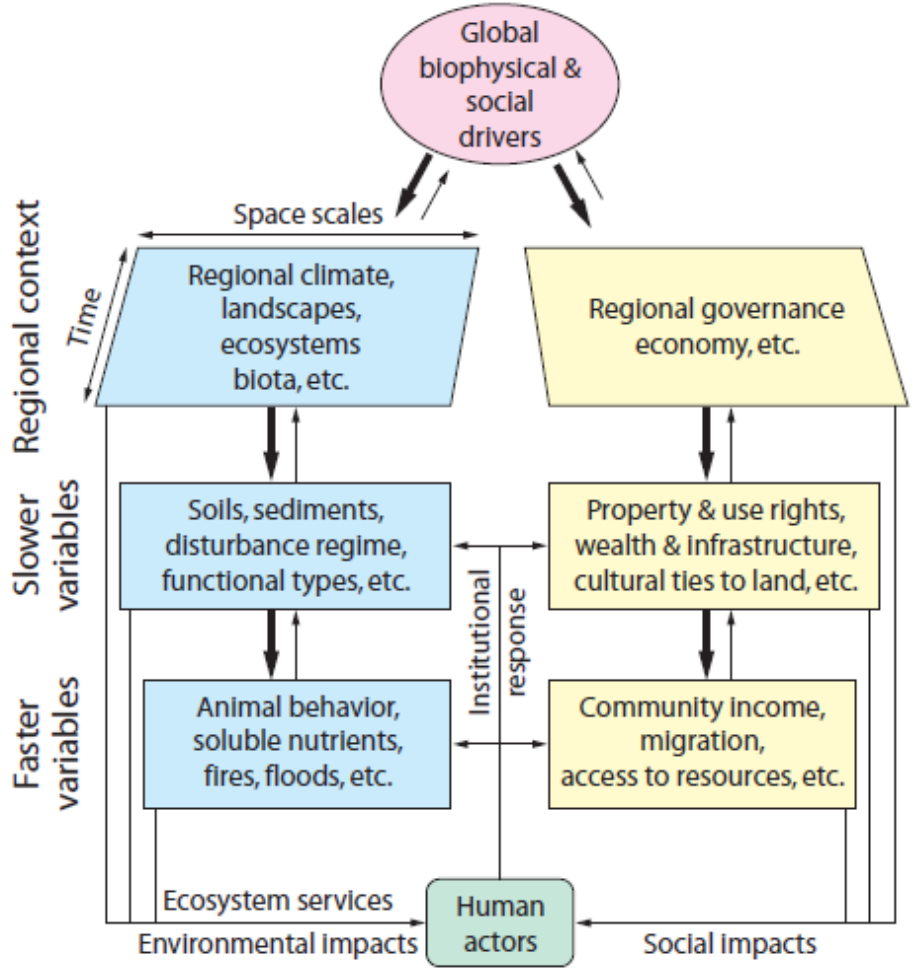
We have successfuly restored
Supporting and regulating services

Yet, restored systems are far from
Original systems

Rey-Benayas et al. 2009 Science

The challenges ahead

Full integration of ecological/social drivers in sustained flow of services & complex feedbacks



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