

Valuation of Ecosystem Services: Implications for Ecosystem Accounting

Lars Hein, Bram Edens
Wageningen University, CBS



Contents of the presentation

- (very) Brief overview of ecosystem service valuation studies
- Scale: a key issue
- Case study Hoge Veluwe forest, the Netherlands
- Implications for ecosystem accounting

Ecosystem services studies and databases

- Currently over 1600 published studies on ecosystem valuation
- A range of databases including
 - EVRI (1997),
 - ENValue (2004),
 - EcoValue (Wilson et al 2004),
 - Consvalmap (Conservation International 2006), CaseBase (FSD 2007),
 - ESD-ARIES (UVM, 2008),
 - TEEB (2011)

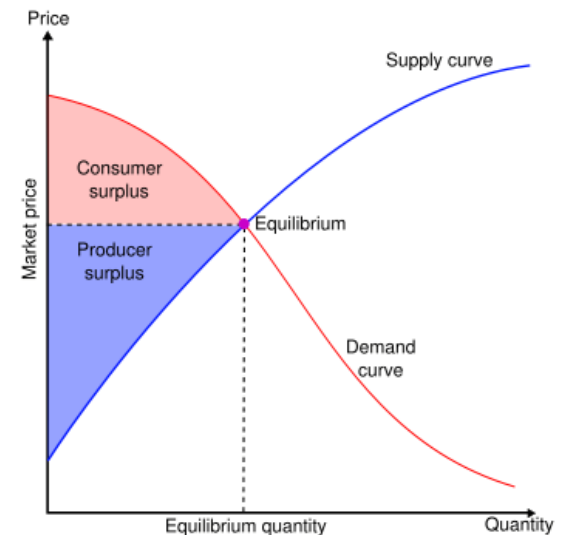
Classification of ecosystem types

TEEB (2010) vs Millennium Assessment (2005)

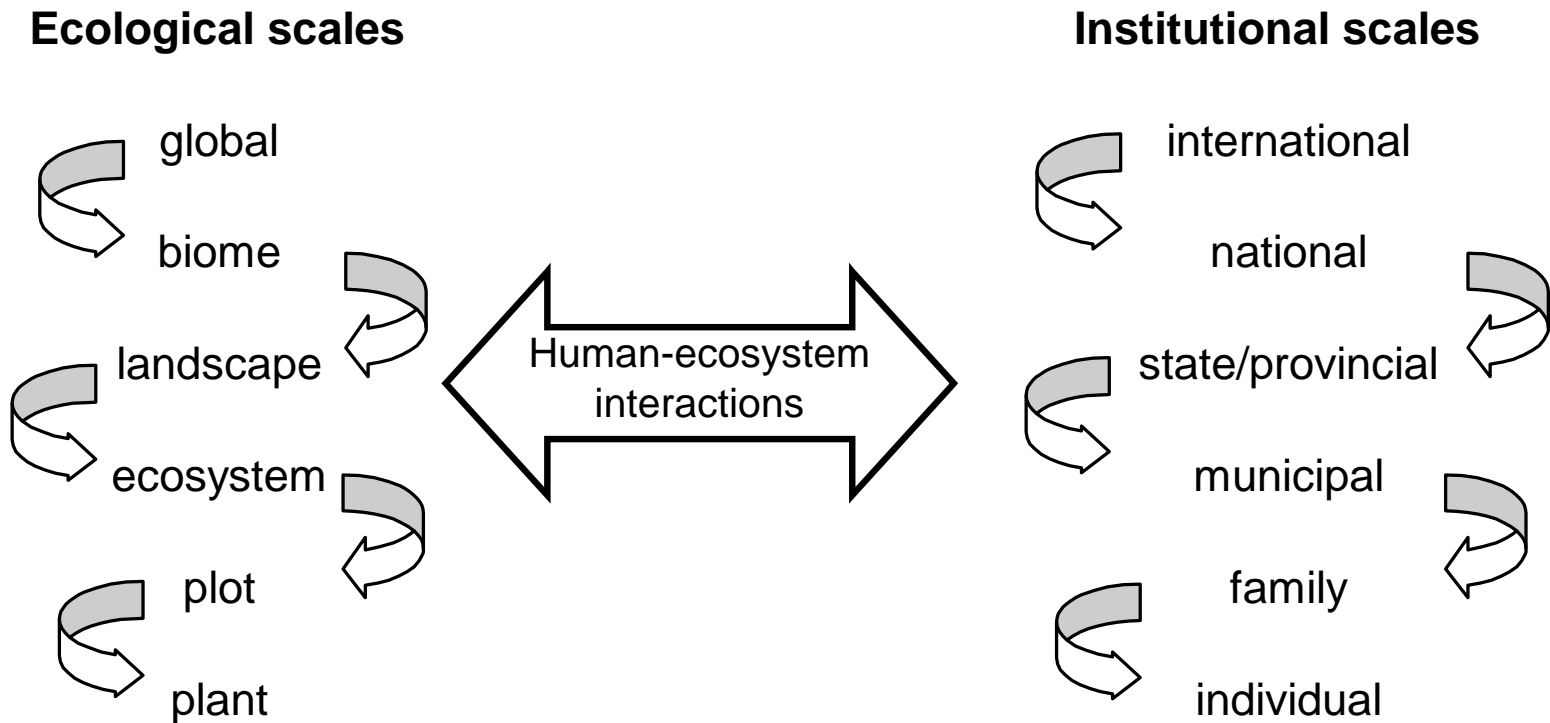
- Both TEEB and MA distinguish
 - Provisioning services
 - Regulating services
 - Cultural services
- MA distinguishes 'Supporting Services' (which includes biodiversity conservation)
- TEEB excludes Supporting services and adds 'Habitat services'
- MA and TEEB define Ecosystem services in slightly different manner

Valuation studies: what is valued ?

- Economic value = Sum of the Consumer and Producer surplus (e.g. Freeman, 1993)
- Different valuation approaches tend to be used for specific ecosystem services, that may or may not measure CS and/or PS
 - Compare Travel cost method (recreation) and Replacement cost method (water purification).
- Valuation approach (and quality) varies



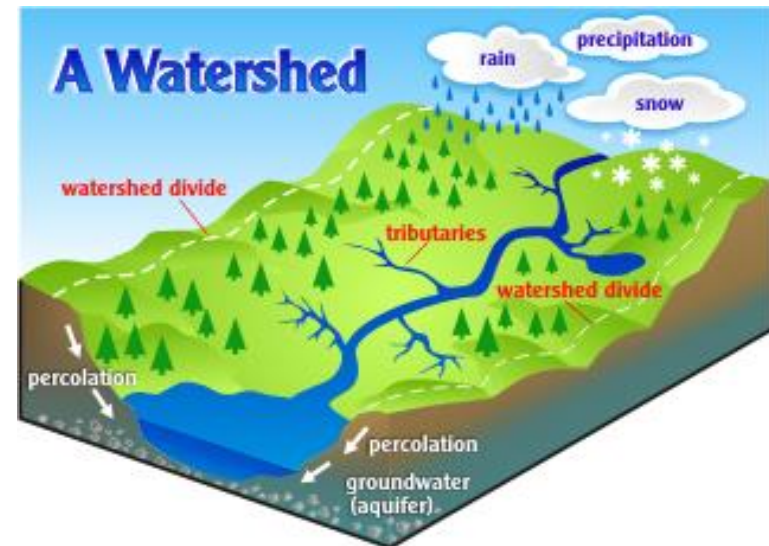
Spatial scale



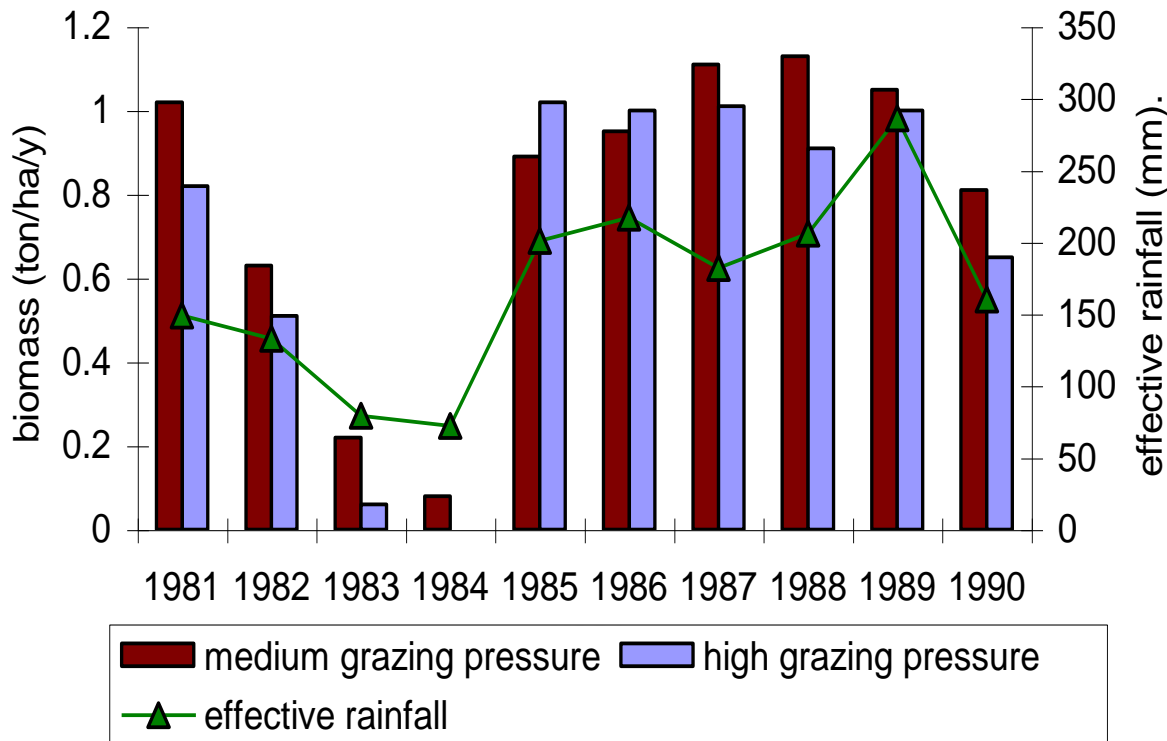
- Ecosystem services generated at different scales

Scale matters for physical accounting

- For some regulating services, benefits not location specific (carbon capture)
- For others (hydrological service): benefits depend on
 - Location in the landscape
 - Configuration and economic activities in the landscape
- For the 2nd type, analysing ecosystem services at national scale therefore requires dealing with this spatial variability



Temporal Scales: Ecosystem services production may vary strongly between years



- Grass biomass production in semi-arid rangeland, Northern Senegal

Hoge Veluwe valuation study: findings

- Very high availability of data (fenced, monitored, operated as ‘business’)
- Key point of uncertainty: air filtration service
 - How much PM10 captured ?
 - In what range is air quality improved ?
 - What is the value of PM10 capture
- Relatively low value of carbon capture (using 10 €/ton CO₂)
- Not feasible: valuation of biodiversity
- Snap-shot of services generated under current management, limited applicability to support decision making.

Implications

- Ecosystem services databases are not comprehensive (e.g. many studies on wetlands, few on arctic, mountain ecosystems). Even 40 studies on temperate forest seems a small number
- A range of valuation methods were used, outcomes depend strongly on assumptions and on quality of the work. Therefore difficult to compare the values of the various studies.
- Studies may be prone to a bias because studies may take place preferentially in high value ecosystems

Prices of ecosystem services

- Market prices of (some) ecosystem services are strongly dependent on market conditions defined by regulator – and may therefore be highly variable.
 - Compare price of CO₂:
 - ECTS: 16 euro/ton
 - Marginal damage costs: 10 – 80 euro/ton
 - Capture and storage of CO₂ in industry 20 -100 euro/ton
 - REDD carbon capture 2 – 10 euro/ton
 - Price of Victoria bushland ('Bushbroker'); very high prices of land with native vegetation up to US\$ 200,000 /ha because of legal requirements to protect *similar* land used for property development.
- *Implication*: care needs to be taken in applying market prices for ecosystem services in particular where these markets are immature.