

State of the art in the economic valuation of ecosystem services

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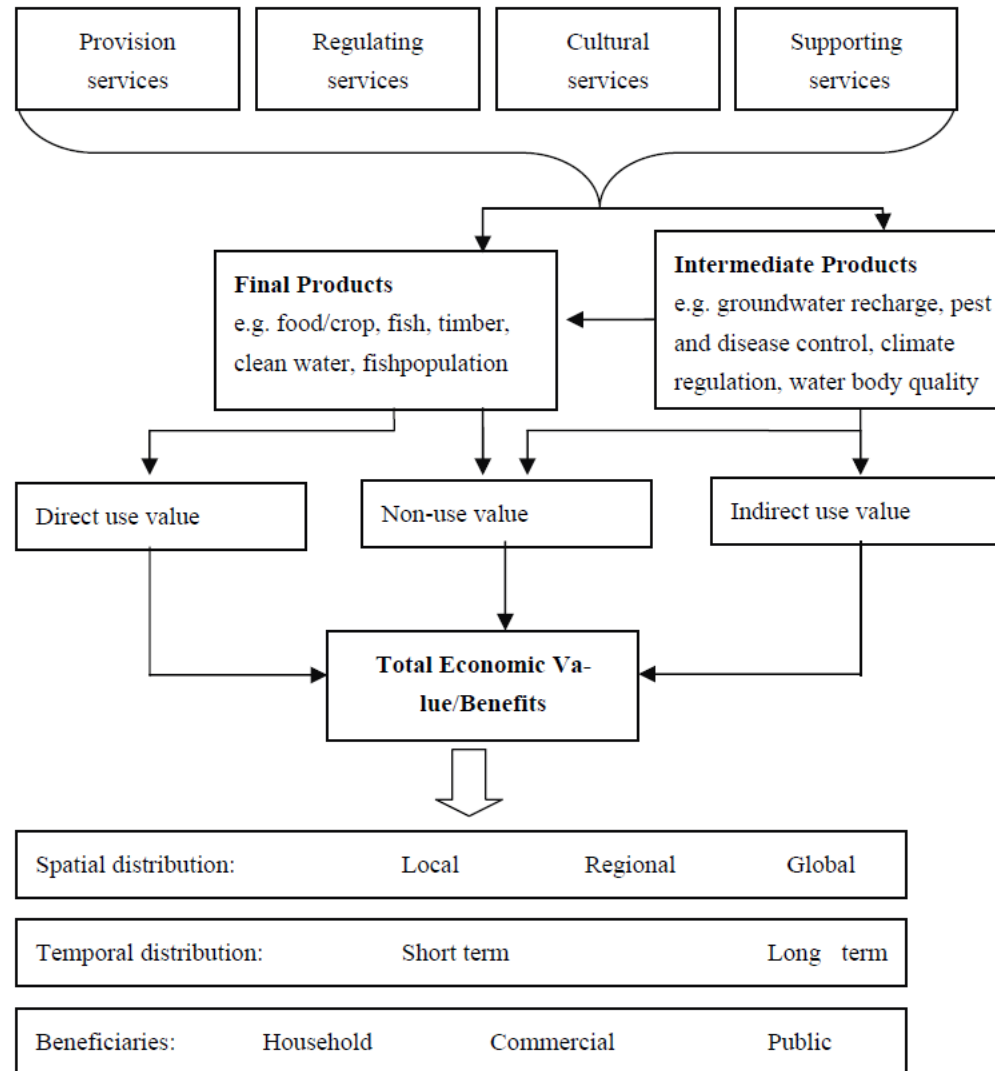
Disposition

- Intro
- Structure of ecosystem services
- A brief literature overview
- Selected results
- Discussion
- Summary

Intro

- Economic evaluation of Ecosystem Services provides a 'new' potential to include economic values of air pollution induced changes to ecosystems
- High profile "activities":
 - The UN Convention on Biological Diversity (1992 -)
 - The Millennium Ecosystem Assessment (2000 – 2003)
 - The Economics of Ecosystems and Biodiversity (TEEB) (2007 -)
 - EU Mapping and Assessment of Ecosystems and their Services
- However, these include many more aspects than air pollution related issues
- Focus in this presentation tries to lie on ecosystem services that can be linked to air pollution and forests

Yet another mental picture of ecosystem services and the economy



Zandersen et al. 2009

An overview of the Biodiversity and Ecosystem Service literature

- Much of the literature concerns basic theoretical challenges and moral foundations for valuing ecosystem services
- Other large groups of literature discuss the taxonomy of ecosystem services and conceptual representations
 - “Our aims in this paper are to offer a framework for considering... ”
- In the literature there is often a disconnect between theory and application
- In general there is a lack of reliable data
- Often conclusions establish that the ecosystem services is a very very complex area and more research is needed

Result – Potential implications of increasing the use of the ecosystem service approach

- The U.S. Department of Agriculture [notes](#) many of goods and services delivered by forests traditionally are viewed as free benefits to society, or "public goods." Yet nearly 60 percent of forest land is privately owned, and plays a critical role in improving our air quality, protecting our watersheds, providing habitat for wildlife and stabilizing the climate.
- My interpretation, Parts of the ecosystem services approach aims at correcting a traditional market failure, that of public and non-exclusive commodities/services
- Are we ignoring other knowledge on how to Govern the Commons?

Results – Market for ecosystem services

- Many economic values are still missing, policies suggested includes creation of markets to reveal the economic values of ecosystem services
 - “One of the ways forward is to create markets for ecosystem services, where the actual value of these services is revealed by making the users of the services pay for the supply.”*
 - “Today there are at least 39 active global markets for biodiversity, 57 water quality markets, and an expanding carbon dioxide market.”*
- Market prices do not provide Total Economic Value but rather benefits on the margin
- This might be quite suitable for air pollution? *Cole et al 2012

Results – Example markets for ecosystem services

- Some markets for Ecosystem Services do exist today:
 - Conservation Banking (Land developer meets wet land restaurateur) California (U.S.)*
 - Nutrient uptake in the Baltic Sea (mussel producers meets water cleaning plants) (Sweden)**
 - Clean drinking water (mineral water producer meets agriculture) (France)***
- Much experience is drawn from ecosystem compensation mechanisms (restoration costs)

*Madsen et al., 2010

**Zandersen et al., 2009

***Perrot-Maitre, 2006

Results – Aggregated monetised estimates

- UK
 - Wet land water cleaning ability ~£ 1.5 billion/yr*
 - Pollination ~£430 million/yr*
 - Living close to green areas ~£300 / person and year*
- Value of EU Natura 2000 ~€200 – 300 billion / year**
- Urban trees in the US 'neutralises' 711 000 ton of pollutants, equivalent to \$3.8 billion abatement costs***
- Results are for Total Economic Value (TEV), not values of marginal/incremental changes)

*The UK National Ecosystem Assessment, 2011

** EC, 2013

*** Novak et al., 2006

Results – Selected Air pollution related Ecosystem Services & suitable economic valuation methods

Ecosystem Service group	Specification	Economic valuation method
Provisioning services	Timber & fish etc.	Market prices
Regulating / Provisioning	Air and water cleaning	Avoided damage costs (alternative costs at market prices)
Regulating	Air quality	Surrogate markets (hedonic pricing & travel cost methods)

SOU 2013:68

Results – Economic value of timber in Nordic countries

- “With the exception of assessment of market values of timber, provisioning services, there are very few Norwegian studies of economic (or other) values related to forest ecosystem services. Overall, the knowledge base is quite thin for a thorough TEEB follow-up in Norway. More, good studies, both related to the extent and value of service flows and the change in these, is necessary for progressing in the area of policy design and priority setting. “* ”
- “There are no good estimates on damage costs of CO2 emissions, it is therefore difficult to assess the economic value of CO2 storage and uptake in forests” ** ”

*Lindhjem & Magnussen, 2012

** NOU 2013:10

Results – From theoretical science to applied research

- Visualisation of Biodiversity and Ecosystem Services is required in one way or the other for these to be considered in decisions. This can be considered to require 'Operational ecosystem service assessments'.
- 'Operationalizing' assessments on Ecosystem Services can be considered to include the following steps:
 - Identification
 - Classification
 - Mapping
 - Valuation
- Based on the literature review, our impression is that more knowledge is needed especially for the Classification, Mapping, as well as Valuation of Ecosystem services

Results - When not to monetise? (Swedish perspective)

- Avoid monetisation when ecosystem service is:
 - Complex,
 - linked,
 - affected by cultural, moral, and non-use values
- This especially applies for Supporting & Regulating ecosystem services providing long term capacity for continued human welfare
 - Soil formation
 - Water regulating
 - Pollination (!)
- Value still needs to be explicit
 - Recognition
 - ‘articulation in regulatory frameworks’

SOU 2013:68 and TEEB

Results - Business

- Despite of knowledge needs, governments and corporations, appears to be moving forward:
 - Swedish authority strategy for considering ecosystem services as decision support (more on this tomorrow)
 - Corporations and organisations are considering ecosystem services
 - The NCD Roadmap
 - The Business imperative
 - UNEP Finance Initiative
 - Consultancy reports
- **RISK!** appear to be the key driver for corporate interest

"The 24 companies featured in this report are united in the view that immediate leadership to safeguard well-functioning ecosystems is a business imperative, not a matter of philanthropy."

Corporate Eco forum and Nature Conservancy, 2012

Demystifying Materiality

Hardwiring biodiversity
and ecosystem services
into finance

**Expect the
Unexpected:
Building business value
in a changing world**

The NCD Roadmap

Implementing the four commitments
of the Natural Capital Declaration

The new BUSINESS IMPERATIVE:
VALUING NATURAL CAPITAL

Discussion

- Utility vs. Fairness?
- Preferences of today vs. Preferences of tomorrow?
- How to derive value of marginal changes from Total Economic Values?
- Identifying common parameters for economic benefit assessments and ecosystem modelling is necessary (discussions ongoing in ECLAIRE)
- A personal reflection, the concept of 'ecosystem services' appears to have brought scientists and economists closer together, working with the same functional units as basis.
- "In the present state of the art this is all that can be done."

Summary

- Economic Valuation of Biodiversity and Ecosystem Services is a field that gains increased attention
- Most of the knowledge and research is performed in relation to other environmental problems than air pollution
 - Most results require data conversion processes
- Methodological and data issues still needs serious consideration, and most of the publications are on methodological issues
- Nevertheless some numbers are being produced
 - Mostly Total Economic Values
 - Main applications are land management changes
- Adaptation will be needed prior to use in valuation of air pollution related ecosystem services
- But governments and organisations appear to be moving forward in their consideration of Ecosystem Services

Thank you