

London Group on Environmental and Economic Accounting LG/11/21

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Issues related to Chapter 8

The recording of ecosystem services in the SEEA

Jean-Louis Weber

EEA

European Environment Agency



Why accounting for ecosystems is important?

- Problem in state of environment reporting: difficulty of finding benchmarks for environmental indicators
- 2 basic approaches to assessment:
 - (A) by the causes, the pressures: the objectives are reducing pressures; decoupling economy from resource use (performance)
 - (B) by the consequences, the state of the environment and its impacts on the economy, on the human well being in a broader sense and on the sustainability of the ecosystem.



Type A indicators tell precisely:

- who is responsible of the pressure and how much.
- whether the environmental performance is improving or not

They can be easily connected to National Accounts and be used in short term policies.

They refer to targets which are established elsewhere, generally in the policy context. They don't tell in themselves if the degradation is critical; they don't tell if the improvement of environmental performances is sufficient or excessive. Risks of misguidance if used alone.



Type B indicators tell

- what happens to the natural assets in terms of their depletion, degradation and potential of self regeneration
- About the delivery of ecosystem goods and services
- They are relevant to long term assessments but, because of multiple uses and stresses natural assets and goods and services are more complex to connect to the National Accounts.



Accounting for ecosystem services: an emerging issue

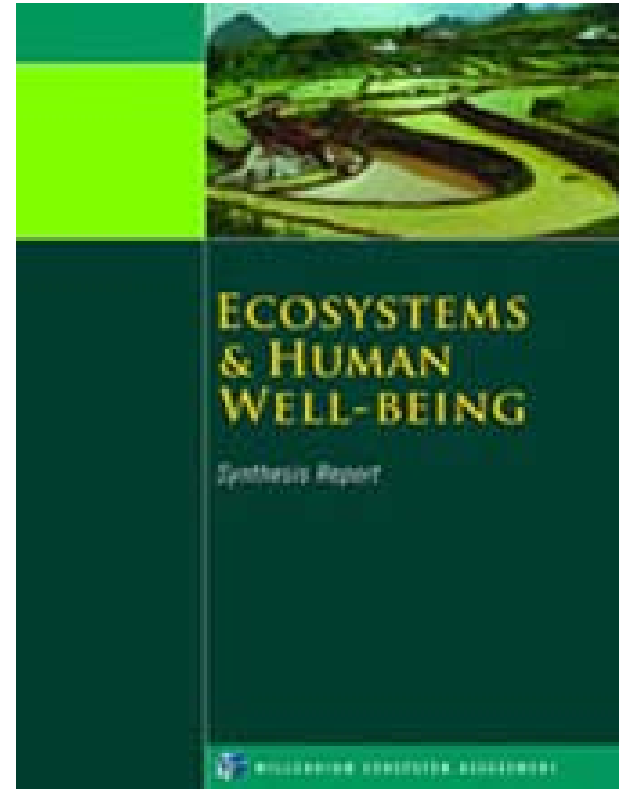
- MA: put ES to the forefront, include scenario, but incomplete
- CBD: ecosystem as biodiversity with humankind in the centre
- Ecosystem Services markets, Pricing ES (UNEP, local level, interest on applications), International trade in medical and aromatic plants (WTO discussions), debt-for-nature swaps ...
- Green Accounting for Indian States Project: focussed on priority issues, based on the SEEA, include monetary valuations
- Research: e.g. accounting of coastal ecosystems of Zanzibar; valuation of ecosystem services (Europe, Beijer Institute); see special issue of the Journal of Ecological Economics on SEEA...
- Europe: Land and ecosystem accounting, part of the Eureka! (European Ecosystem Assessment 2012) project; “Beyond GDP” process...
- 31 Nov. 1st Dec 2006, Copenhagen: International workshop EEA-UNSD; recommendation of focussing ecosystem assessments on main ecosystem services



Ecosystem services

Ref to Millennium Ecosystem Assessment:

	Provisioning <ul style="list-style-type: none">■ FOOD■ FRESH WATER■ WOOD AND FIBER■ FUEL■ ...
	Regulating <ul style="list-style-type: none">■ CLIMATE REGULATION■ FLOOD REGULATION■ DISEASE REGULATION■ WATER PURIFICATION■ ...
	Cultural <ul style="list-style-type: none">■ AESTHETIC■ SPIRITUAL■ EDUCATIONAL■ RECREATIONAL■ ...
Supporting <ul style="list-style-type: none">■ NUTRIENT CYCLING■ SOIL FORMATION■ PRIMARY PRODUCTION■ ...	

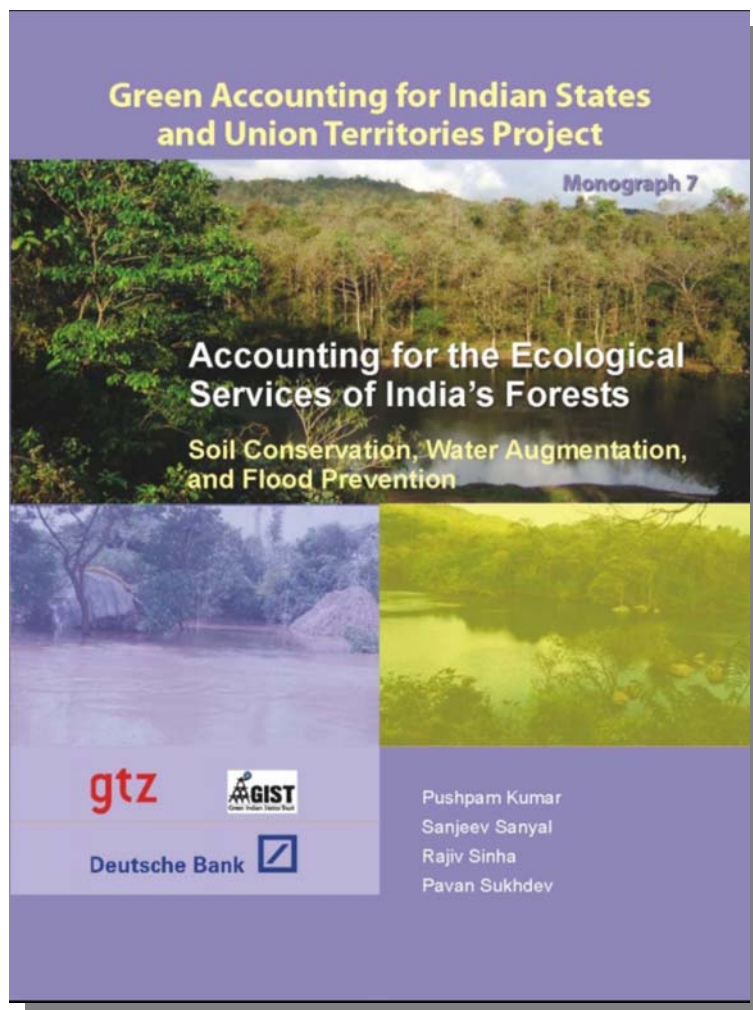


<http://www.maweb.org/en/index.aspx>

<http://www.greenfacts.org/ecosystems/index.htm>



GAISP



The first phase of GAISP comprises the publication of the following eight Monographs:

- 1 The Value of Timber, Carbon, Fuelwood, and Non-Timber Forest Produce in India's Forests
- 2 Estimating the Value of Agricultural Cropland and Pasture Land in India
- 3 The Value of India's Sub-Soil Assets
- 4 Eco-tourism and Biodiversity Values in India
- 5 Estimating the Value of Educational Capital Formation in India
- 6 Investments in Health and Pollution Control and their Value to India
- 7 Accounting for the Ecological Services of Indian Forests: Soil Conservation, Water Augmentation, and Flood Prevention
- 8 Estimating the Value of Freshwater Resources in India

In this monograph, three ecological services of forest ecosystems, namely, prevention of soil erosion, augmentation of groundwater, and reduction of flood damage have been considered.



International trade in medical and aromatic plants – a price issue

Table: The 12 leading countries of import and export of medicinal and aromatic plant material classified as *pharmaceutical plants* (SITC.3: 292.4 = commodity group HS 1211). The countries are listed according to descending order of average trade volumes, 1991-1998. The European countries are underplayed in grey. - Source: UNCTAD COMTRADE database, United Nation Statistic Division, New York.

Country of import	Volume [t]	Value [USD '000]	Country of export	Volume [t]	Value [USD '000]
Hong Kong	73,650	314,000	China	139,750	298,650
Japan	56,750	146,650	India	36,750	57,400
USA	56,000	133,350	Germany	15,050	72,400
Germany	45,850	113,900	USA	11,950	114,450
Rep. Korea	31,400	52,550	Chile	11,850	29,100
France	20,800	50,400	Egypt	11,350	13,700
China	12,400	41,750	Singapore	11,250	59,850
Italy	11,450	42,250	Mexico	10,600	10,050
Pakistan	11,350	11,850	Bulgaria	10,150	14,850
Spain	8,600	27,450	Pakistan	8,100	5,300
UK	7,600	25,550	Albania	7,350	14,050
Singapore	6,550	55,500	Morocco	7,250	13,200
Total	342,550	1,015,200	Total	281,550	643,200

Source: *Dagmar Lange*. Trade in Medicinal and Aromatic Plants: A Financial Instrument for Nature Conservation in Eastern and Southeast Europe? www.bfn.de/09/090203.htm
From Renat Perelet 2003

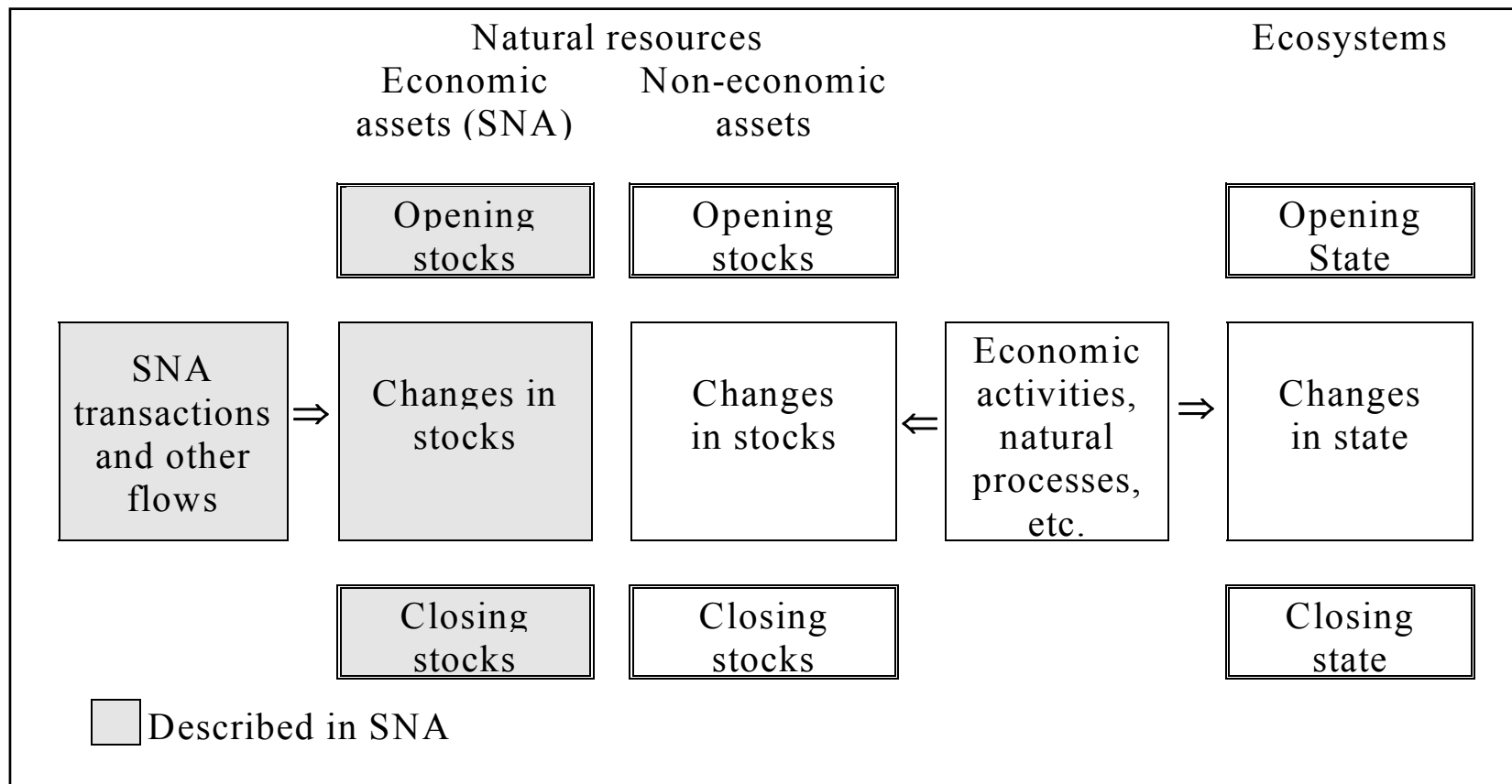


Land and ecosystem accounts

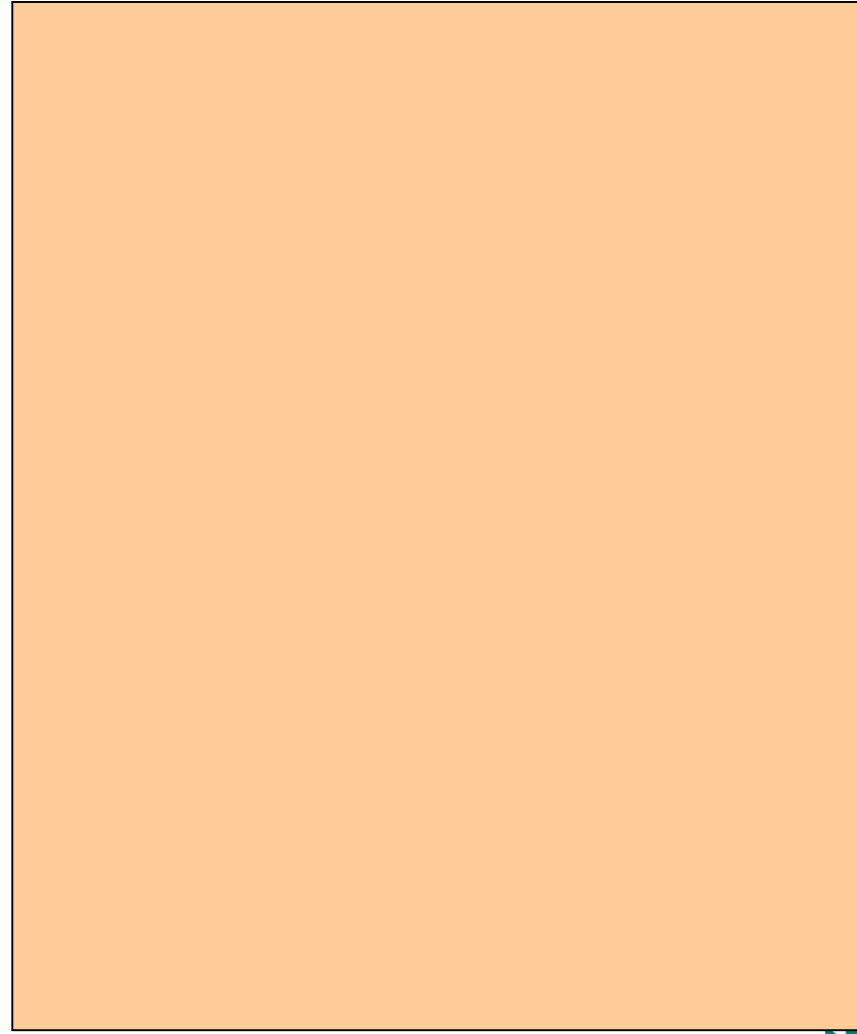
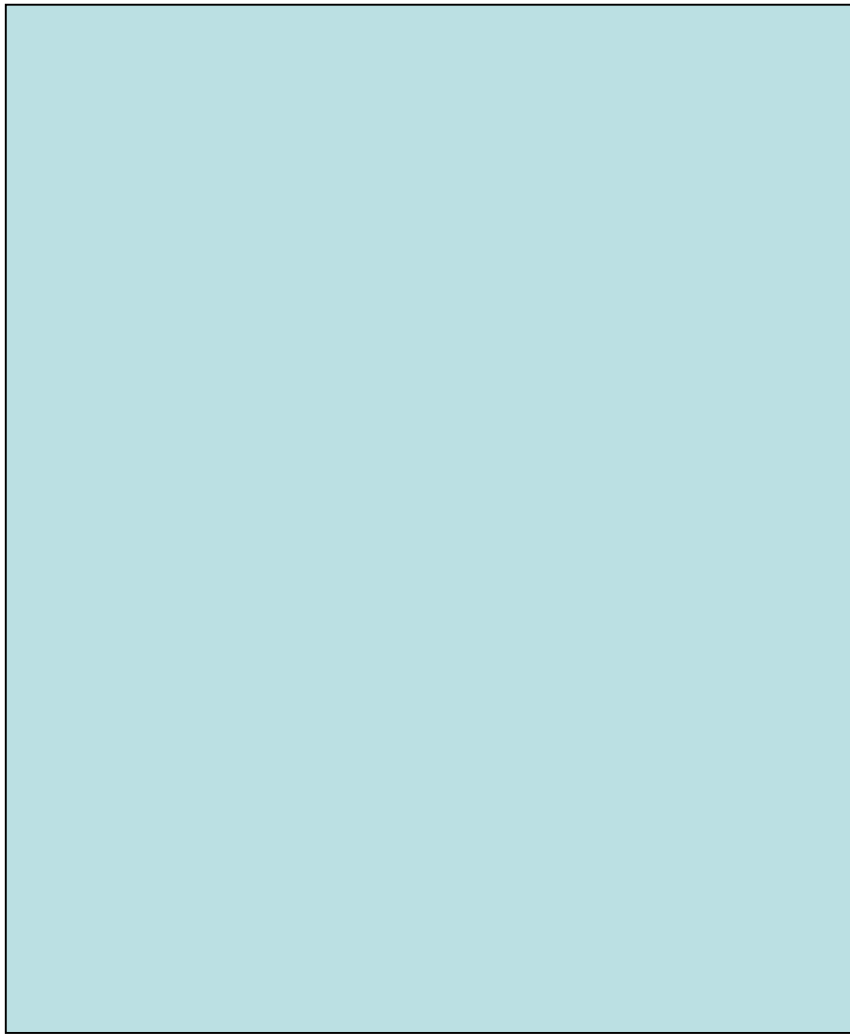
- In SEEA2003, Ch. 8
- In UNCEEA's research agenda
- A sub-group in LG, June 2006
- An International workshop end of 2006, CPH, co-chaired by EEA and UNSD
- A European programme, database and publication of land cover accounts, update for 2006 ongoing. European ecosystem assessment 2012



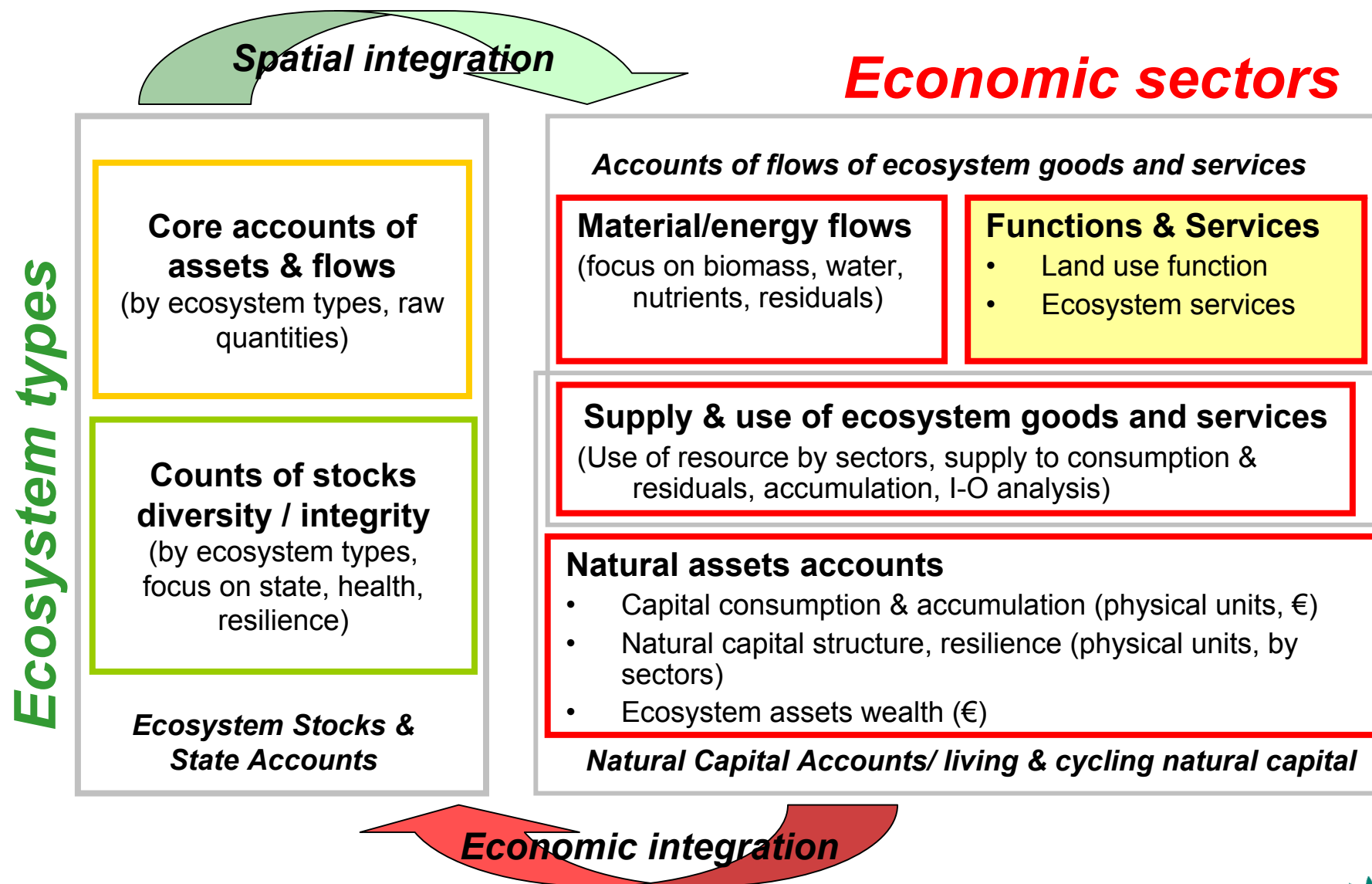
SEEA: expansion of the System of National Accounts (UN1993) in order to include more environmental aspects



Accounting for Land & Ecosystems in the SEEA



An Ecosystem Approach of Accounting



Points for clarification

- Which accounting units?
- Ecosystem goods v.s. services
- Ecological functions v.s. ecosystem services
- Intermediate consumption v.s. final use
- Final use v.s. capital consumption
- Spatial and social dimensions of the generation and use of services
- Values, valuation, “Beyond GDP”



Which accounting units for ecosystem services?

What Are Ecosystem Services?

The Need for Standardized Environmental Accounting Units

James Boyd and Spencer Banzhaf

1616 P St. NW
Washington, DC 20036
202-328-5000 www.rff.org



“Because most ecosystem services are public goods, markets are not available to provide clear units of account.” This point can be made most forcibly if we consider the challenge of creating markets for ecosystem services. In practice, such markets tend to stumble over the issue of trading units. When regulators attempt to compensate for ecological losses, they inevitably rely on coarse units for trade, such as “acres of wetland,” “pounds of nitrogen,” or “equivalent habitats.” These units are coarse because they are compound bundles of multiple goods and services. In other words, a wetland provides numerous distinct public and private benefits, not just one. The imprecision of these measures is understandable but problematic from a policy perspective.”

...

“An important point—and a motivation for this paper—is that welfare accounting requires **consistent separation of quantity and price measurements.**”



Ecosystem goods vs services

“that one should separate ecosystem goods (that are movable and may participate in the world trade) from ecosystem services (that are usually immovable and can hardly be separated from the place ecosystems are located)”

(Renat Perelet)

Ecological functions v.s. ecosystem services

Box 1. Daily's List of Ecosystem Services

- purification of air and water
- mitigation of droughts and floods
- generation and preservation of soils and renewal of their fertility
- detoxification and decomposition of wastes
- pollination of crops and natural vegetation
- dispersal of seeds
- cycling and movement of nutrients
- control of the vast majority of potential agricultural pests

Nature's Service, Gretchen Daily, 1997

Example of list to be scrutinized for avoiding double accounting

Many, if not most, components and functions of an ecosystem are **intermediate products** in that they are necessary to the production of services but are not services themselves. Their value will be captured in the measurement of services.

Boyd and Banzhaf 2005



Intermediate consumption v.s. final use

- Ecosystem services to be measured from end use? Eliminate intermediate consumption, keep final use by households and government
- Particular difficulty with joint consumption:

“services are not ... necessarily the final product consumed. For example, recreation often is called an ecosystem service. It is more appropriately considered a benefit produced using both ecological services and conventional goods and services. Recreational benefits arise from the joint use of ecosystem services and conventional goods and services. Consider, for example, the benefits of recreational angling. Angling requires ecosystem services, including surface waters and fish populations, and other goods and services including tackle, boats, time allocation, and access. For this reason, angling itself—or “fish landed”—is not a valid measure of ecosystem services.” Boyd and Banzhaf 2005



An illustration...

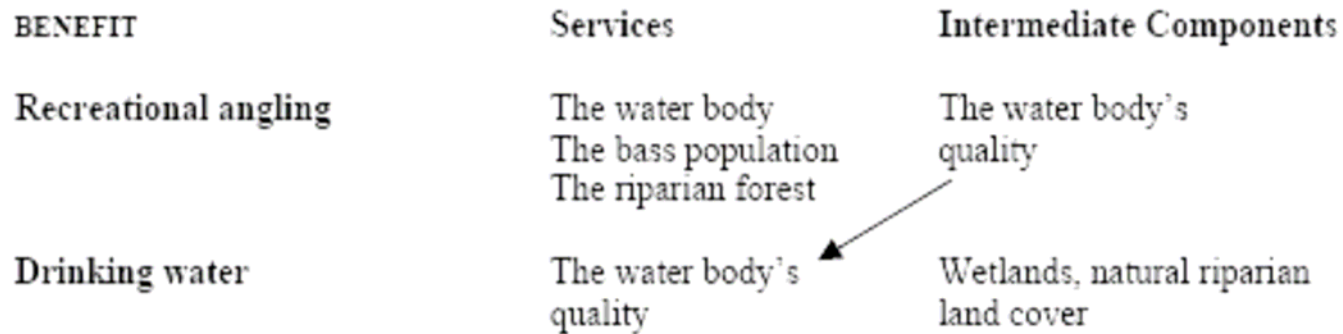


Figure 2. Ecosystem Services for Recreational Angling vs. Drinking Water

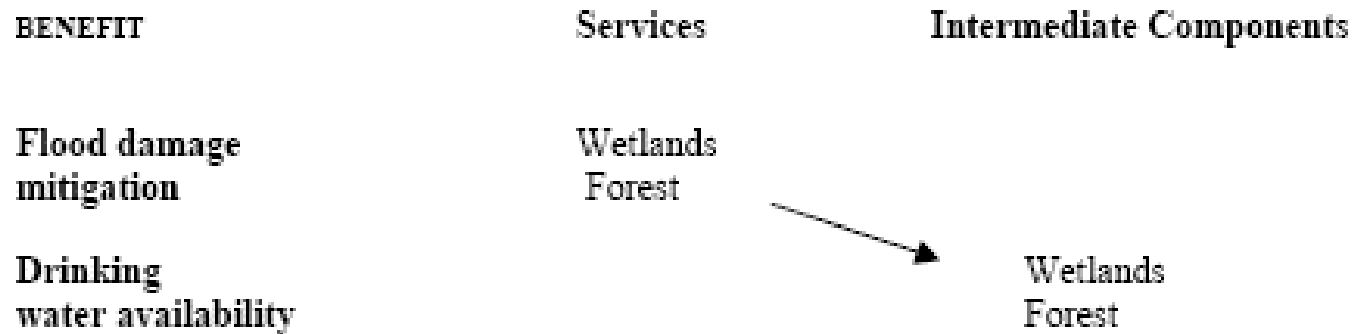


Figure 3. Ecosystem Services for Wetlands

Ecosystem services and households final consumption

In the history of the National Accounts, the concept of household's consumption has been step by step broadened:

- material goods (the first accounts in the Soviets time)
- material goods and purchased services
- the same plus financial services even when they are not formally sold
- some of the government services when they are assignable to households (education, health care...); other collective services could be incorporated as well.

This evolution should be continued for incorporating non-marketed ecosystem services in the measurement of human well-being.

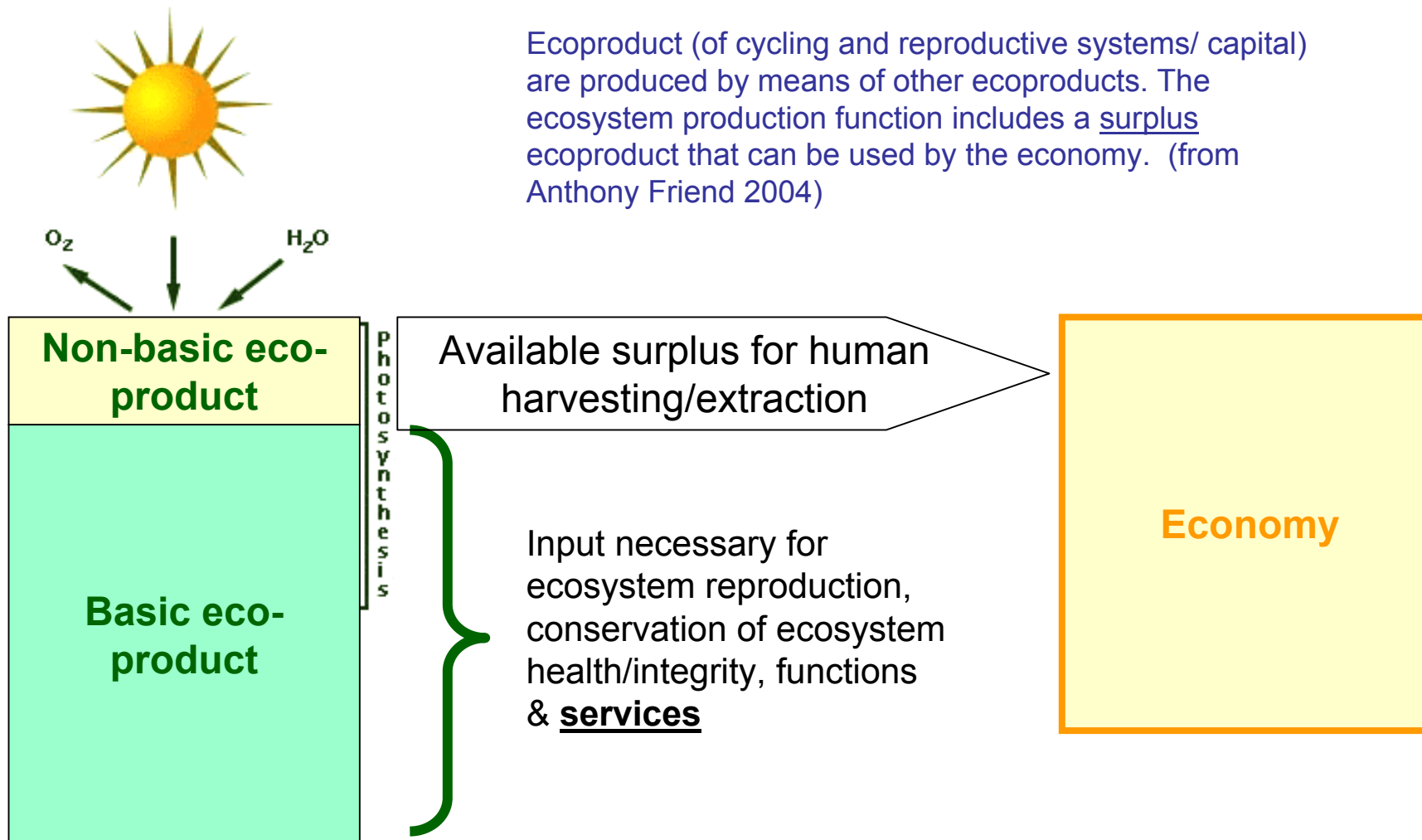


Final use v.s. capital consumption (1)

- Natural capital consumption takes place when harvesting/extraction from ecosystem goes beyond resilience thresholds



Renewable resource from ecosystems



Ecoproduct (of cycling and reproductive systems/ capital) are produced by means of other ecoproducts. The ecosystem production function includes a surplus ecoproduct that can be used by the economy. (from Anthony Friend 2004)

Sources:

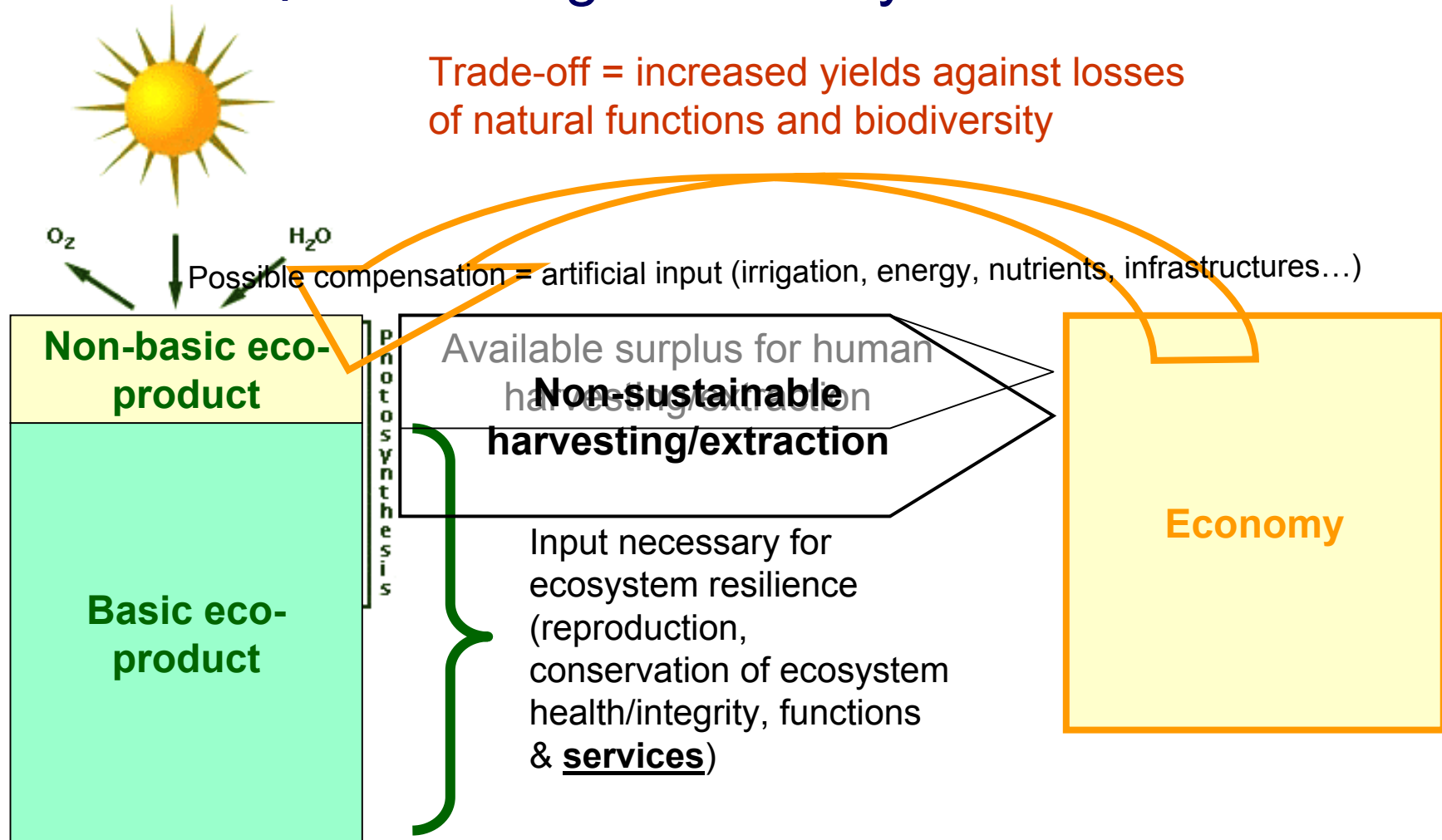
Kling/U Michigan_2005

& Friend/ISEE_2004

European Environment Agency



Renewable resource from ecosystems: depletion/ degradation by over-use



Sources:

Kling/U Michigan_2005

& Friend/ISEE_2004

European Environment Agency



Final use v.s. capital consumption (2)

- Natural capital consumption takes place when harvesting/extraction from ecosystem goes beyond resilience thresholds
- For one given service, over harvesting/extraction will result in the decrease of future generation of the service
- And of other services of the ecosystem as well – not accounted; additional account needed
- Particular case with the so-called regulating and supporting services – need some kind of accounting (capital consumption only?)



Spatial and social dimensions of the generation and use of services

“Typically, ecological components are not spatially fungible—that is, a lake, a fish population, or an attractive forest buffer cannot be transported to another location. Many ecological services are best thought of as differentiated goods with important place-based quality differences. Ecosystem services’ scarcity, substitutes, and complements likewise are spatially differentiated.”

“...all of the services listed should be measured in the most spatially explicit manner that is practicable. This is because the social value of a particular service depends on its location in the physical and social landscape.”



Values, valuation, “Beyond GDP” ... Just an illustration...

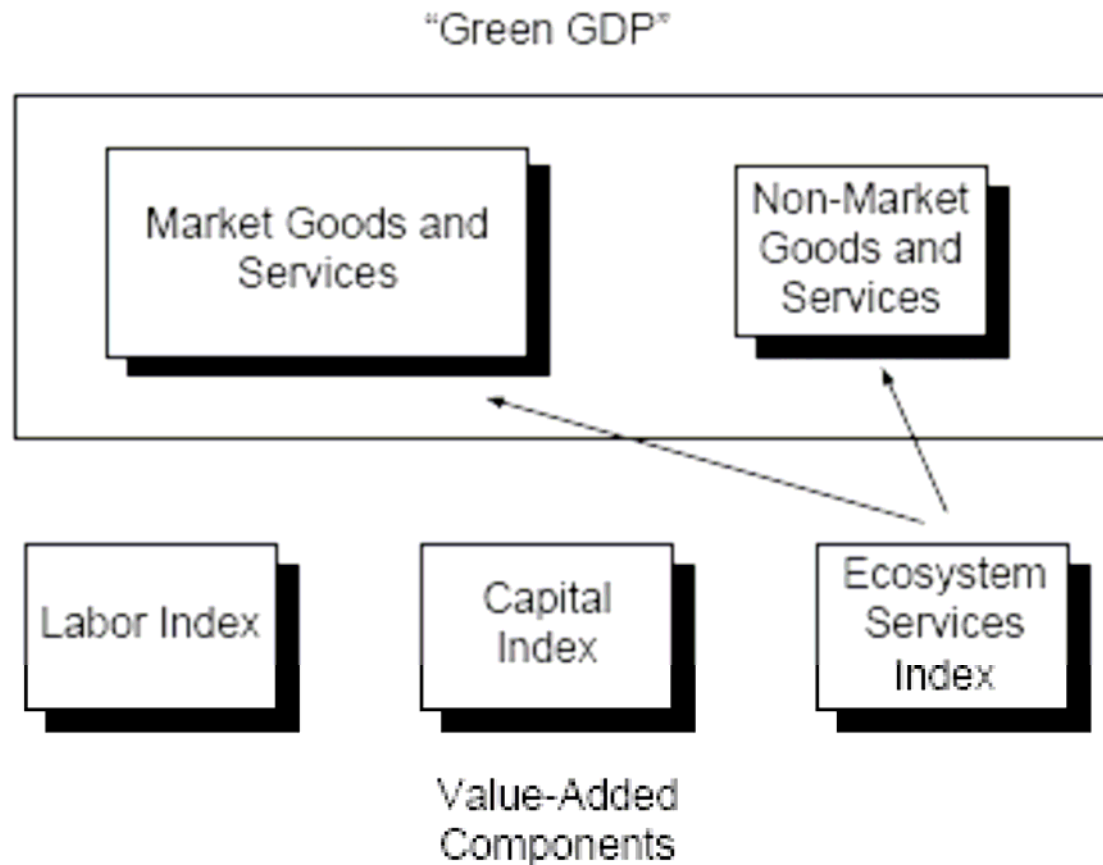


Figure 1. Green GDP vs. an Ecosystem Services Index

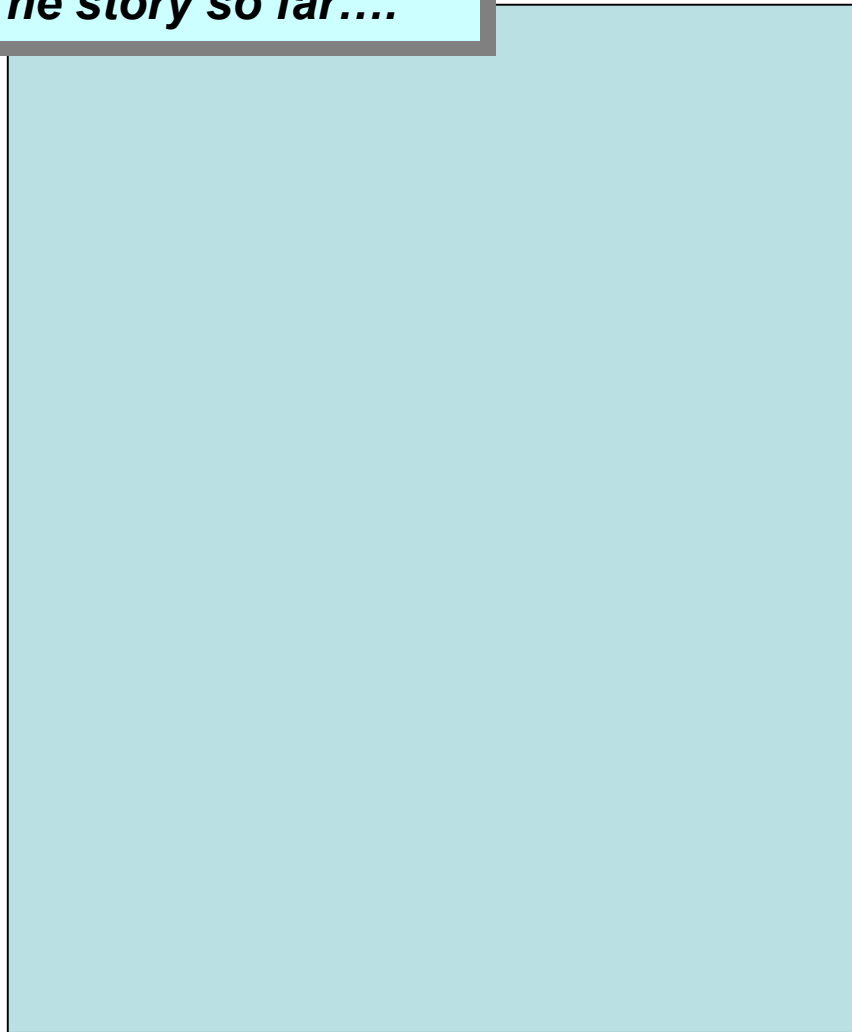
Boyd and Banzhaf 2005

European Environment Agency

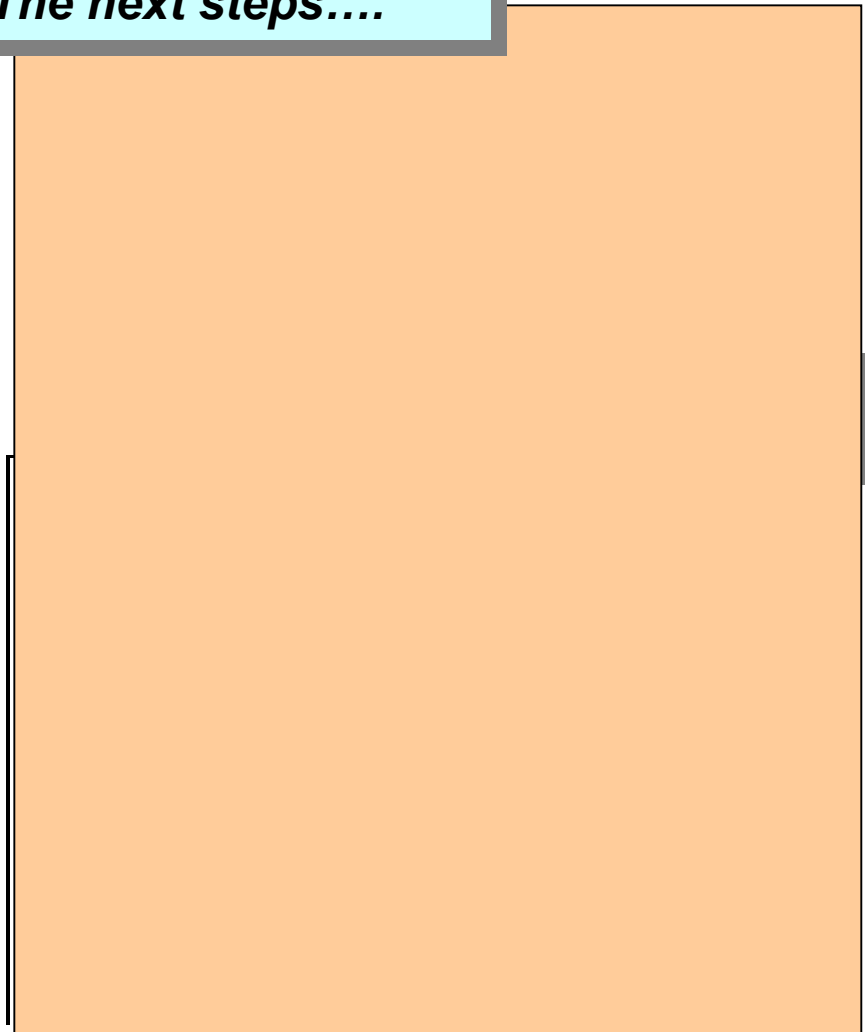


The way forward (development and compilation) e.g. Accounting for Ecosystems at the EEA

The story so far....



The next steps....

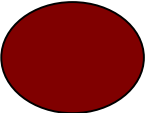


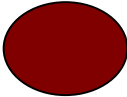





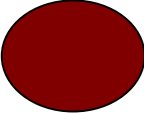


Land use and ecosystem services

- Land Cover Accounting as a basis for accounting for ecosystem assets, functions and resilience
- Land Use Accounting as a basis for accounting for ecosystem services
- Integration of land cover, ecosystem and land use monitoring



Land use functions & ecosystem goods and services

Use Cover	Residential services	Food supply	Recreation	Nature conservation	...
Urban					
Rural					
Forest, nature					

Summary of issues for future work

- Accounting units
 - Physical units
 - Generation / production units: ecosystems, socio-ecosystems
 - Service units: users and uses, land use (and the sea, the atmosphere)
 - Monetary units
 - Households consumption
 - Fixed natural capital consumption
 - Production (beyond GDP)
 - Classification of ecosystem goods and services
 - Review of MA & similar classifications
 - Categories
 - Ecosystem functions vs services (contribution to well being)
 - Goods vs services
 - Products, non products
 - Intermediate consumption vs final consumption
 - Households consumption vs capital consumption
 - Bridging to SNA, ISIC, CPC, other classifications of functions (COFOG...)
 - Values, valuation
 - Implementation, priority setting
- ➔ A guideline for non-standard accounts
- ➔ Practical case for Europe; draft classification to be discussed from this autumn 2007; expert meeting in CPH

