

Ecosystem Accounting in the context of the SEEA, and linking accounts to policy making

Prof. Dr Lars Hein



Contents

1. Introduction

- Ecosystems and ecosystem capital
- Why Ecosystem Accounting ?
- The System for Environmental Economic Accounting (SEEA) and Ecosystem Accounting
- Policy Applications

2. Key concepts in Ecosystem Accounting

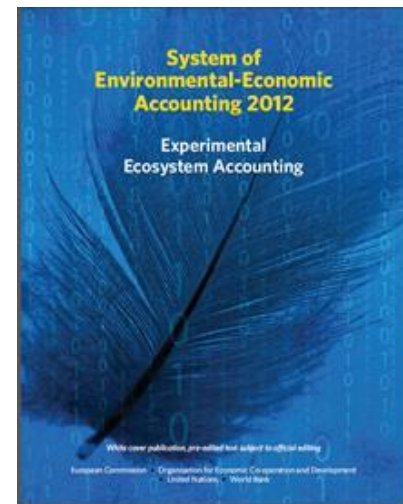
- Basic concepts
- Example

Ecosystem capital

- We can see ecosystems as presenting a form of 'capital', i.e. an asset, or aggregation of ecosystem assets that is fundamental to sustaining human well-being by:
 - setting the conditions for human life (regulating environmental processes),
 - providing (renewable) inputs to a broad range of economic activities, and through
 - absorbing and assimilating waste and emissions.
- The Experimental Ecosystem Accounting Guidelines (EEA) do not use the term ecosystem capital but rather 'ecosystem assets', defined as "spatial areas containing a combination of biotic and abiotic components and other characteristics that function together"
- Ecosystem capital \neq natural capital

Environmental and Environmental Economic Accounting

- Basis: System of National Accounts (2008) (UN-DESA)
- **Environmental** Accounting: measuring and recording water and energy use, emissions, discharges, environmental expenditure, environmental taxes
- **Environmental Economic** Accounting
 - Central Framework
 - Land and Water Accounts
 - Carbon Accounts, Biodiversity Accounts
 - **Ecosystem Accounting**



Why Ecosystem Accounts ?

- In recognition of the holistic nature of ecosystems: the combination of biotic and abiotic components and processes, and human management leads to the generation of services and benefits to people
- Allows linking to the work on ecosystem services, among others in the context of the Millennium Ecosystem Assessment and the TEEB Projects.
- An ecosystem services approach allows for a comprehensive recording of the various services of ecosystems, hence better insight in trade-offs and complexities
- Spatial approach allows more comprehensive assessment PLUS additional applications

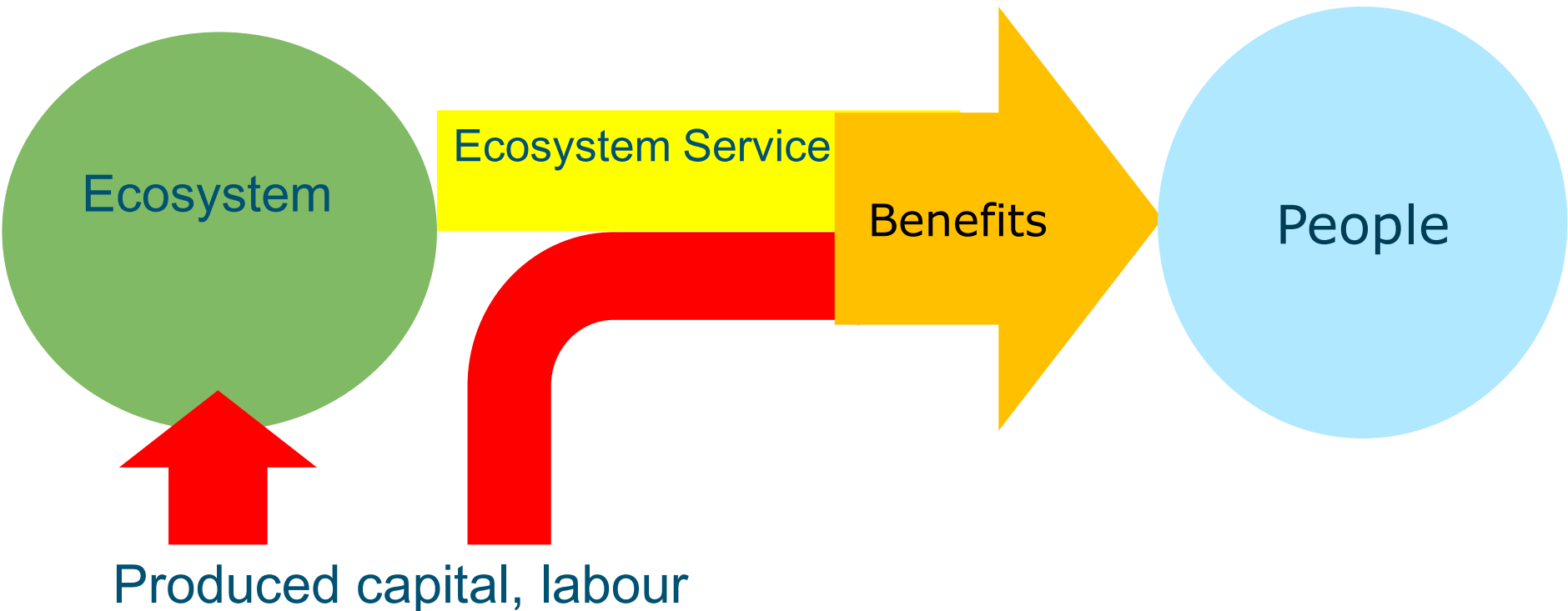


Policy applications of ecosystem accounts

- Measuring and monitoring sustainability: what are the changes in ecosystem capital / ecosystem assets from one year to the next
- Identifying ecosystem types/ areas / services under particular threat
- Understanding the contribution of ecosystems to economic activities (and the monetary value of these ecosystems)
- Spatial approach: land and resource use planning



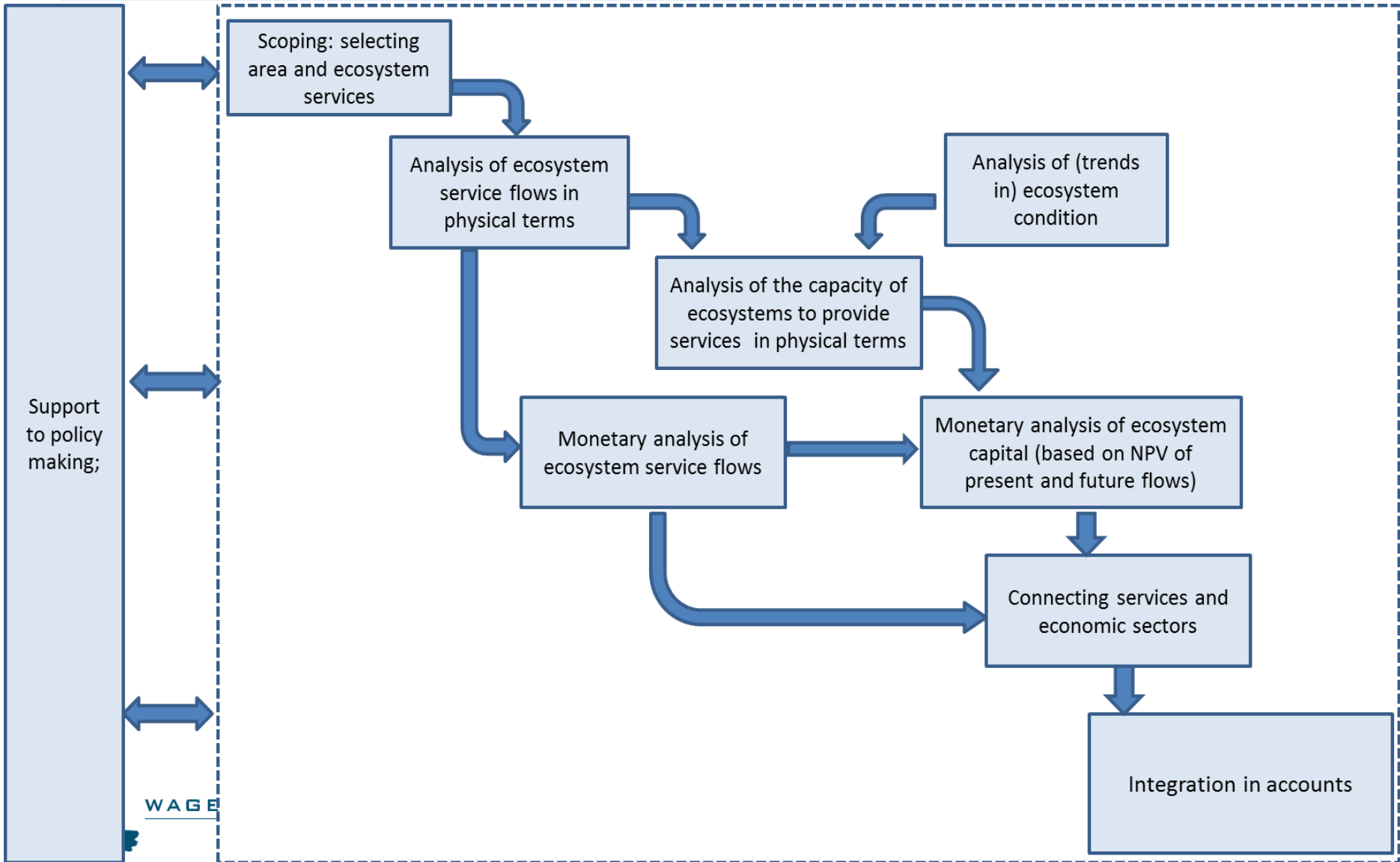
Key elements of Ecosystem Accounts (1)



Benefit versus service



Key elements of Ecosystem Accounts (2)



Biophysical and Monetary indicators

	Biophysical	Monetary
Ecosystem condition	X	
Ecosystem service flows	X	X
Ecosystem service capacity	X	X



Key elements of Ecosystem Accounts (3)

- Condition = reflects the health of the ecosystem
- Capacity = reflects the capacity of the ecosystem to generate ecosystem services, now and in the future (for provisioning services: as a function of the stock and of the regenerative capacity)
- Ecosystem service = the contribution of the ecosystem to a benefit, e.g. the production of a good or to consumption (a flow, to be recorded for a specific time unit – usually a year)



Key elements of Ecosystem Accounts (4)

- Ecosystem Asset (EA) = spatial, heterogeneous area that (i) has a certain size (ha); (ii) has a certain condition and capacity; and (iii) provides services. An EA may contain one or more EAUs or LCEUs.
- Ecosystem Accounting Unit (EAU), large, mutually exclusive units delineated for the purpose of accounting, e.g. a country, province or watershed.
- Land cover / ecosystem functional unit (LCEU), a specific type of land cover (e.g. deciduous forests) for which the ecosystem services can be quantified.
- Pixel / basic spatial unit (BSU): the spatial element underlying the Ecosystem Account

Key elements of Ecosystem Accounts

Land cover map of Province X



- Ecosystem Accounting Unit (EAU) = a country, province or watershed
- Land cover/ecosystem functional unit (LCEU) = e.g. Deciduous forest
- Pixel / BSU = a pixel

↔
Scale



Pine forest

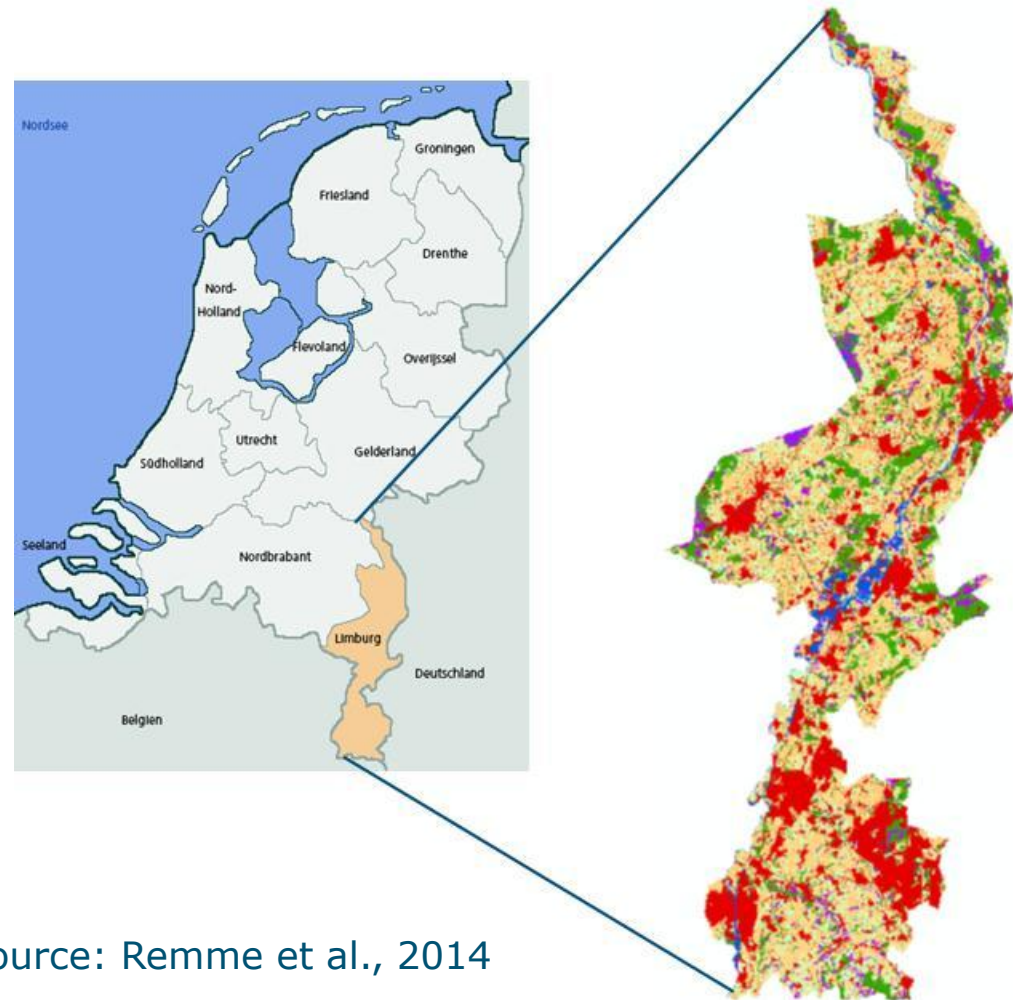


Deciduous forest



Ecosystem accounts example: Limburg

- Biophysical ecosystem account developed for Limburg Province, the Netherlands
- 2200 km², 1.1 million inhabitants
- Analysis of 8 ecosystem services



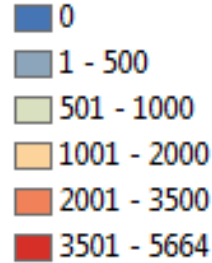
Source: Remme et al., 2014



Ecosystem accounts example: Limburg

PM₁₀ capture

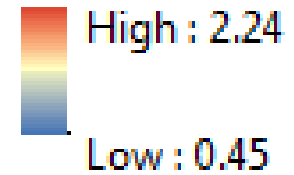
(kg PM₁₀ captured/
km²/year)



Total PM₁₀
capture 2011:
2.3 million
tons of PM₁₀

C sequestration

(ton C/ha/year)



Carbon
sequestration
equivalent to
CO₂
emissions
from 5000
households

Exercise

- Describe for yourself the difference between Ecosystem Accounting and the Central Framework for Environmental Economic Accounting
- Describe for yourself the concepts of
 - Ecosystem Condition
 - Ecosystem Capacity
 - Ecosystem Service

