



A global framework for natural capital accounting - the System of Environmental- Economic Accounting (SEEA)

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Overview of presentation

- *Basic idea of environmental accounting*
- *System of environmental-economic accounting 2012 (SEEA central framework) and SEEA Experimental ecosystem accounts*
- *Natural capital in the SEEA*
- *SEEA asset accounts for land, forests, fish, etc.*
- *SEEA ecosystem accounting*
- *Lessons learnt and conclusions*

Environmental accounting

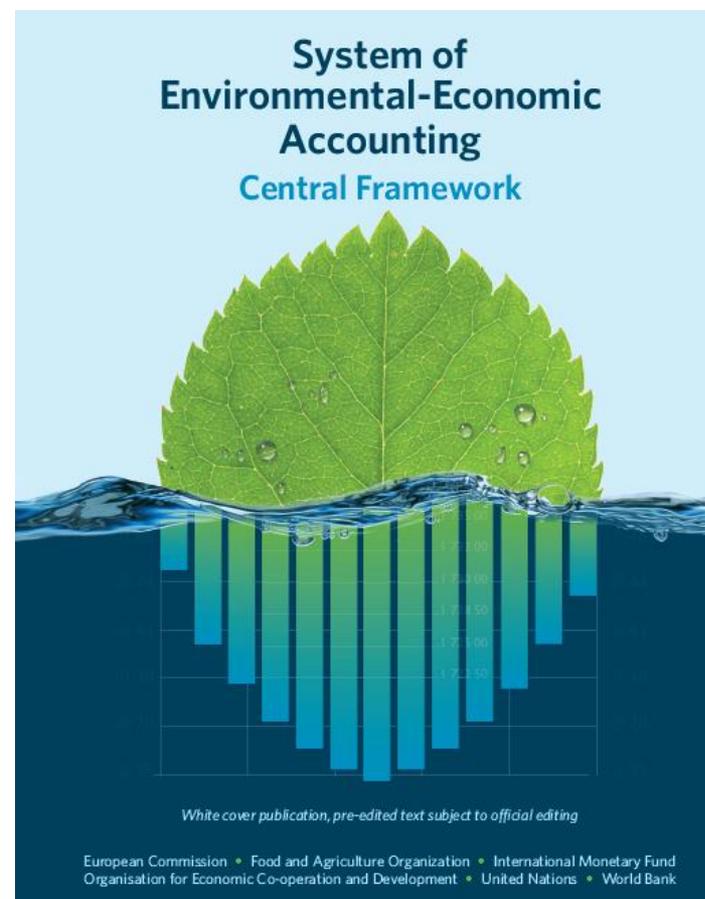
- *Presents environmental information in a way that is compatible with national accounts using the same concepts and classifications*
- *Integrates existing data into a coherent system*
- *Allows analysis and modelling of environmental effects of economic activities and of policy measures – integrated set of statistics linking flows and stocks*
- *Basic frameworks supply-use tables and balance sheets*
- *Main areas:*
 - **Physical flow accounts**
 - **Monetary environmental accounts**
 - **Asset accounts (physical and monetary)**
 - **Recently research in ecosystem accounting**

The world-wide System of Environmental-Economic Accounting (SEEA)

- **1993:** *Handbook – interim publication by UN*
- **2003:** *Updated SEEA handbook – UN, IMF, OECD, World Bank and European Commission*
- **2012: SEEA – central framework (2012 SEEA or SEEA CF)** *(international statistical standard adopted by the United Nations Statistical Commission in March 2012) – will be **published by European Commission, FAO, IMF, OECD, UN, World Bank***
Chapter 5 – Asset accounts
- **2013: SEEA – Experimental ecosystem accounting**
- **2013: SEEA – Applications and Extensions** *(complement to SEEA CF)*

The SEEA 2012 central framework

- **Accounting approach: measures stocks and flows in integrated manner, aligned with System of National Accounts**
- **Broad and inclusive approach covers physical and monetary flow accounts as well as asset accounts**
- **Physical flow accounts: flows of energy, water, products (incl. minerals, wood, fish...), emissions to air, waste...**
- **Monetary flow accounts: envt expenditure, taxes and subsidies, envt goods and service sector**
- **Asset accounts: mineral and energy resources, land (land use and land cover accounts, changes), soil, timber, aquatic resources (fish stocks etc.), other biological resources, water**



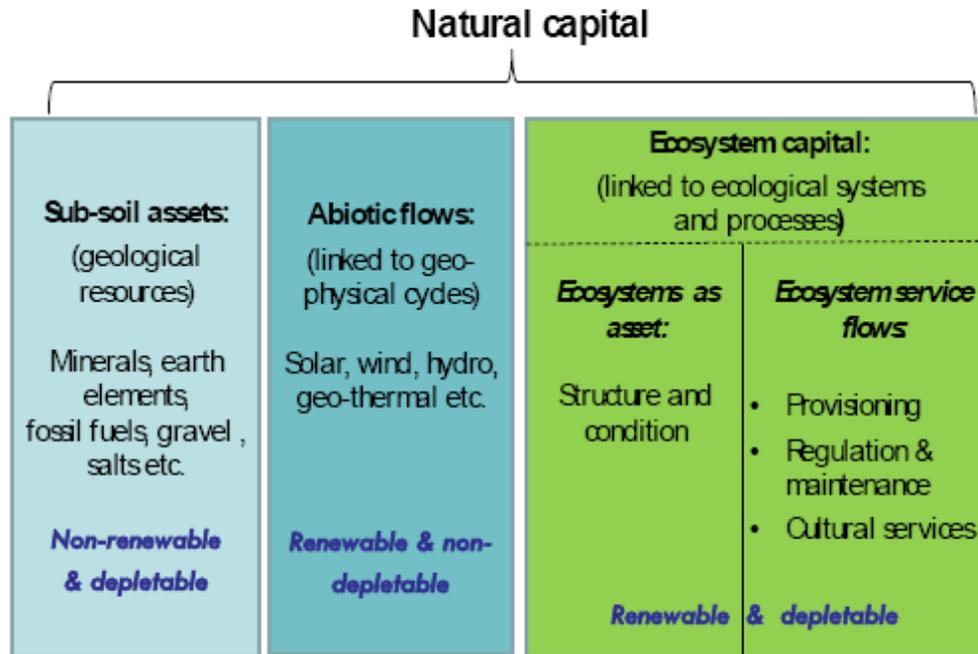
Natural capital

- 1. Natural resources such as stocks of minerals and energy, forest timber, land, fish stocks and water. (SEEA CF -> approach by individual resource -> generally SNA assets included in national accounts balance sheets -> some biotic, others abiotic)***
- 2. Ecosystems producing services that are in part not captured by markets such as air and water filtration, flood protection, carbon storage, habitat for fisheries and wildlife. (SEEA experimental ecosystem accounts -> approach by ecosystem -> some values included in the national accounts, others not)***

Natural capital and accounting

- Natural capital includes biotic and abiotic elements
- It includes renewable and non renewable resources

Components of Natural Capital:



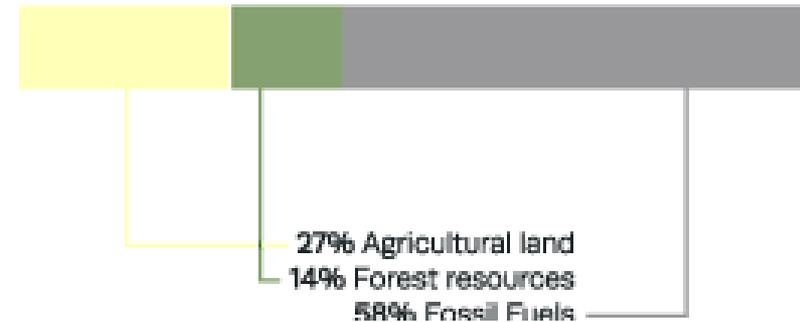
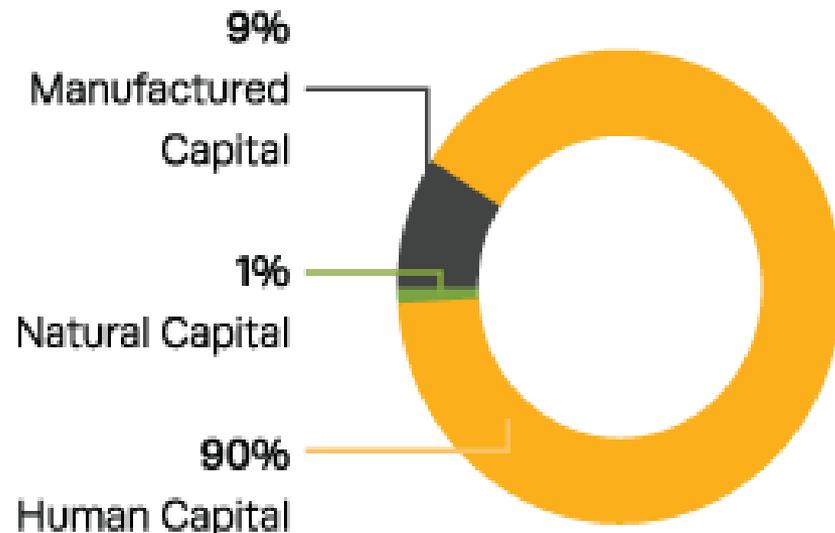
SEEA Experimental ecosystem accounting – focus on biotic component of natural capital (assets that require a living component). Includes non-SNA components.

European Environment Agency

Source: European Union (2013). Mapping and assessment of ecosystems and services. An analytical framework for ecosystem assessments under Action 5 of the EU Biodiversity Strategy to 2020. Discussion paper. Publications office of the European Union, Luxembourg.

SEEA CF – SNA assets. Includes sub-soil assets, land itself, certain assets that offer provisioning services (fish stocks, forests, some sources of water)

Composition of UK's Natural Capital



Canada's natural resource assets and national wealth

Natural resource assets and produced assets annual (dollars x 1,000,000)

Categories	2007	2008	2009	2010	2011
Tangible assets	6,921,644	7,895,586 ^r	7,202,442 ^r	7,711,890 ^r	8,224,864
Selected produced assets	4,023,882	4,280,401 ^r	4,359,974 ^r	4,505,363 ^r	4,721,513
Residential structures	1,593,218	1,668,769 ^r	1,697,729 ^r	1,801,020 ^r	1,905,593
Non-residential structures	1,362,498	1,502,065 ^r	1,534,441 ^r	1,588,577 ^r	1,681,043
Machinery and equipment	441,785	466,181 ^r	487,131 ^r	459,426 ^r	451,246
Consumer durable goods	399,905	402,593 ^r	412,366 ^r	426,831 ^r	441,242
Inventories	226,476	240,793 ^r	228,307 ^r	229,509 ^r	242,389
Selected non-produced assets	2,897,762	3,615,185 ^r	2,842,468 ^r	3,206,527 ^r	3,503,351
Land	1,708,196	1,832,780 ^r	1,905,946 ^r	2,004,683 ^r	2,108,412
Timber	245,187	233,005 ^r	188,523 ^r	165,923 ^r	147,513
Subsoil resource stocks	944,379	1,549,400 ^r	747,999 ^r	1,035,921 ^r	1,247,426
Selected energy resources ¹	673,898	1,218,644 ^r	576,851 ^r	753,859 ^r	879,437
Selected mineral resources ²	270,481	330,756 ^r	171,148 ^r	282,062 ^r	367,989

Symbol legend:

r Revised

Footnotes:

1. Includes crude oil, natural gas, crude bitumen and coal.

2. Includes gold, iron, copper, nickel, lead, zinc, molybdenum, uranium, diamonds and potash.

SEEA Experimental Ecosystem Accounting

- *Extends beyond SEEA CF*
- *Integrated statistical framework for accounting for ecosystem assets and ecosystem services (provisioning, regulating and cultural services)*
- *Experimental – aims at giving structure and direction to research and testing in advanced countries*
- *Adds clarity – definitions and classifications – assets (capital stocks) and services that flow from these assets*



Key aspects of the framework for experimental ecosystem accounting

Statistical units (basic spatial units - BSU, land cover/ecosystem functional units - LCEU and ecosystem accounting units - EAU).

Classification of ecosystem services (CICES)

- **Provisioning services (food, fibres etc.)**
- **Regulating services (air and water clean-up, flow regulation, etc.)**
- **Cultural services (recreation, knowledge...)**

Ecosystem assets

- **Ecosystem extent**
- **Ecosystem condition (measured through a range of indicators of characteristics)**
- **Expected ecosystem service flows**

Degradation and enhancement

Valuation of ecosystem services and ecosystem assets

- *Some prices and values embedded in market prices of marketed products (fish, timber, agricultural outputs) and marketed assets (land)*
- *Other prices are "missing" reflecting externalities and that many ecosystem services are public goods*
- *Non-market valuation techniques commonly used to place a value on the welfare impact of losing or gaining ecosystem services*
- *For accounting purposes want a measure **not welfare value but exchange value** excluding consumer surplus*
- *For assets: complexity of determining future supply profile – cannot assume current use is sustainable*
- *Defining and valuing degradation very challenging*

Lessons already learnt

- *Cooperation is essential – between agencies and between professions (e.g. accountants, economists and ecologists)*
- *Spatial data and spatial manipulation of data are needed (requires integration of large data sets possibly from different places – choose as host someone who can handle large data sets)*
- *Experimental or pilot studies are useful for developing methods, building capability and demonstrating how accounts can be used*
- *Need to focus on repeatability (i.e. the regular production of accounts) – need simple pragmatic solutions*
- *There will be criticism – the work requires trade-offs between accuracy and frequency (especially if annual production is the aim) as well as fitting imperfect data to the accounting tables – start simple, refine in next round*

Conclusions and outlook

- *Environmental accounts offer an opportunity to compile and present data in a new way*
- *The SEEA Experimental ecosystem accounting provides basic terms and concepts for testing*
- *Starting point is land use and land cover accounts using spatial units adapted to needs of ecosystem accounting*
- *Further layers of data can be added as appropriate and available (leaf area index, net primary production, water availability and use, soil types, harvest data, etc.)*
- *Need to base accounts on the data generated already via satellites, reporting systems and main-stream statistical systems complemented by estimates where needed - > design information systems*
- *Leadership needed – in Europe the European Environment Agency*

Useful links:

For more detail on Eurostat work (data, handbooks, publications) see:

http://epp.eurostat.ec.europa.eu/portal/page/portal/environmental_accounts/introduction

SEEA Central Framework:

http://unstats.un.org/unsd/envaccounting/White_cover.pdf

SEEA Experimental Ecosystem Accounting (currently being edited – new version soon):

<http://unstats.un.org/unsd/statcom/doc13/BG-SEEA-Ecosystem.pdf>

SEEA Applications and Extensions (currently being edited – new version soon):

<http://unstats.un.org/unsd/statcom/doc13/BG-SEEA-AE.pdf>

Regulation EU 691/2011 on European environmental economic accounts

Includes 3 modules (data delivery from 2013)

- **Air emissions (14 pollutants x NACE A*64 + households)**
- **Environmental taxes (4 types x NACE A*64 + households)**
- **Material flow accounts**

3 new modules now in Council WG (data from 2017?)

- **Environmental protection expenditure**
- **Environmental goods and services account**
- **Energy accounts**

691/2011 mentions possible future areas, e.g.

- **Forest accounts** (where sources and methods are advanced)
- **Ecosystem services accounts**

European strategy for environmental accounting

- **Consolidation and quality improvement of current 3+3 modules**
- **Few new development areas (ecosystem accounts = EEA!)**