



LINKING THE SNA AND THE SYSTEM OF ENVIRONMENTAL- ECONOMIC ACCOUNTING: EXPERIMENTAL ECOSYSTEM ACCOUNTING

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Introduction

- General **introduction to ecosystems**
- Accounting for ecosystems and **integration with the System of National Accounts**
- **Questions and issues** for consideration by the AEG on National Accounts



General introduction to ecosystems



What are ecosystems?

ecosystems are a dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit

each ecosystem asset changes in ecosystem condition over time, due to natural factors or human/economic intervention



What type of services are provided by ecosystems?

- **Provisioning services** (e.g. supply of food, fibre, fuel and water)
- **Regulating services** (related to activities of filtration, purification, regulation and maintenance of air, water, soil, habitat and climate)
- **Cultural services** (related to activities of individuals in, or associated with, nature, such as recreation)



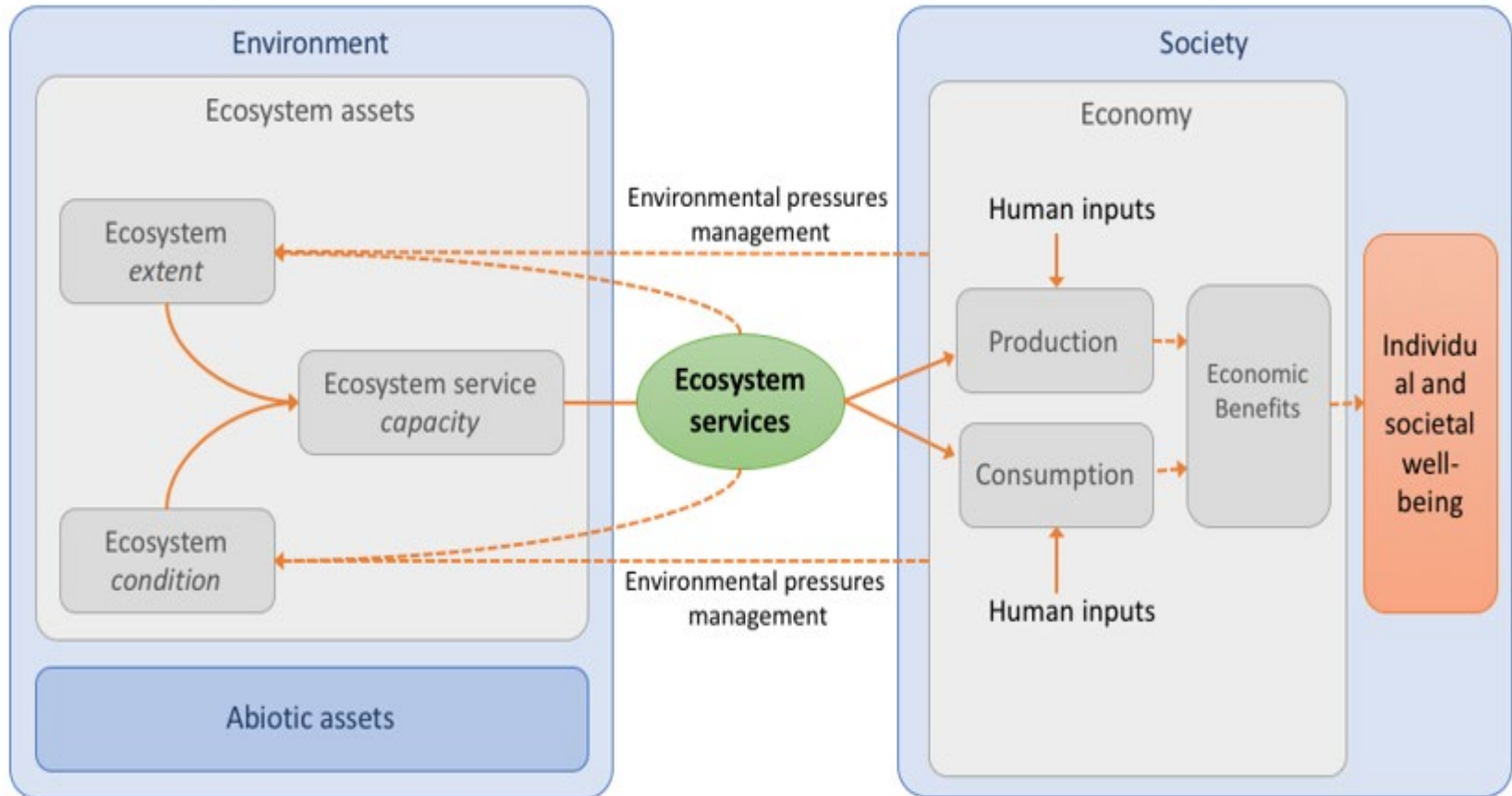
Intermediate versus final services; SNA and non-SNA benefits

- **Intermediate ecosystem services:** services supplied by one ecosystem to another ecosystem
- **Final ecosystem services:** services supplied by ecosystems economic units

- **Ecosystem services \neq Benefits**
- **Benefits encompass both SNA benefits** (related to economic production) **and non-SNA benefits** (benefits which are not produced by economic units)



A schematic overview





Principles of valuation

- **Aim is integration with national accounts**
- **Exchange values:** value of the service at the point of interaction between the supplier (the ecosystem asset) and the user ((groups of) economic units)
- **Transaction is revealed, but usually not the associated price** => need for appropriate estimation techniques
- **Value of ecosystem asset** = Net Present Value of future income flows
- **Not an appropriate reflection of environmental sustainability** => supplementary measures



Accounting for ecosystems and integration with the System of National Accounts



Extending the production boundary (1)

- **Provisioning services have a clear resemblance with the provision of agricultural products**
- However, the **natural growth** of these agricultural products **only recorded if the assets that ... are controlled by, managed by and under the responsibility of institutional units**
- **If not controlled, etc.**, only the value of goods produced by catching fish, felling trees, picking berries, etc. enter into the production boundary
- **HOWEVER:** § 1.43 of the 2008 SNA: ... *the natural growth of stocks of fish in the high seas **not subject to international quotas** is not counted as production: the process is not managed by any institutional unit and the fish do not belong to any institutional unit*
- **How should control, etc. be interpreted?**



Extending the production boundary (2)

- There may be some discussion on the extension of the production boundary in the case of provisioning services, but for other ecosystem services, this most certainly is the case
- **Questions in all cases is:**
 - **Who is the “economic owner” of the asset, and who receives the benefits? ... or ...**
 - **Who receives and uses the services from ecosystems?**
- Imputed services in the 2008 SNA:
 - Own account: output and use are allocated to the same unit
 - Government: ditto, although later on use may be allocated, with a concomitant transfer, to other units (Social Transfers in Kind, STiKs)
 - No impact on budget identity



Extending the production boundary (3)

- **How to allocate ecosystem services?**
 - Provisioning services, at least part of, may be directly related to an economic unit
 - Other services may benefit the public at large (or even the world at large)
- **Option 1:** Allocate output and (intermediate and final) use to a separate sector “ecosystem”
- **Option 2:**
 - Allocate output and use of ecosystem services, which can be attributed to an economic owner, to the relevant industry/sector;
 - consider the other ecosystem services as “public goods”, the output and use of which are initially allocated to a collective group of units, and subsequently redistributed, via STiKs, to the actual users
- Option 2 has quite some appeal from an accounting perspective, it is more problematic when linking it to the single ecosystem asset in physical terms that will be subject to enhancement and degradation,
- **May require a rephrasing of the text on STiKs in § 22.103 of the 2008 SNA**



Extending the asset boundary (1)

- Relevant definition in the 2008 SNA:
 - § 3.5: *An asset is a store of value representing a benefit or series of benefits accruing to the economic owner by holding or using the entity over a period of time*
 - § 3.22: *... sometimes government may claim legal ownership of an entity on behalf of the community at large. No entity that does not have a legal owner, either on an individual or collective basis, is recognized in the SNA*
- **Legal ownership not an issue**, apart from high seas
- However, **economic ownership**, related to the (imputed) presence of benefits, is **more problematic**
- Whatever the case, **recognition and subsequent valuation of ecosystem assets leads to an extension of the current boundary**



Extending the asset boundary (2)

Biological resources

- If controlled, etc. by an economic unit: cultivated biological resources (produced assets)
- If not controlled, etc., non-cultivated biological resources (non-produced assets)
- § 10.169 of the 2008 SNA: *The growth of animals, birds, fish, etc., living in the wild, or growth of uncultivated vegetation in forests, is not an economic process of production so that the resulting assets cannot be classed as produced assets. **Nevertheless, when the forests or the animals, birds, fish, etc. are actually owned by institutional units and are a source of benefit to their owners, they constitute economic assets.** When wild animals, birds, fish, etc. live in locations such that no institutional unit is able to exercise effective ownership rights over them they fall outside the asset boundary. Similarly, the forests or other vegetation growing in such regions are not counted as economic assets. On the other hand, **fish stocks in the high seas which are subject to international agreement on how much may be caught by individual countries may be counted as falling within the asset boundary***



Extending the asset boundary (3)

Mineral and energy resources

- Usually clear (legal and economic) ownership
- Limitation in availability and exploitation leads to a positive resource rent and monetary value of the related asset
- Ownership and positive resource rent also make it possible to account for and allocate costs of depletion

Public assets of government

- Some of them are also quite problematic in terms of ownership and valuation
- Public infrastructure: legal ownership is clear, but benefits and value of the assets are disputable (market value = 0)
- Public R&D: in the case of freely available and publicly accessible knowledge, no market value, while ownership is also questionable
- Note: No impact on balancing items, also in the case of accounting for depreciation



Integrated accounting

Provisioning services

- Usually clarity about ownership, allocation of benefits (including costs of degradation)
- Note: economic valuation, which does not necessarily reflect environmental sustainability (e.g. in the case of open access)

Other services

- Regulating services, such as flood protection and lowering of local pollution, have much in common with provision of a public good, such as services from public infrastructure
- Same holds for many cultural services, where it may be easier to determine users (e.g. in the case of recreation and tourism)
- More difficult to allocate are e.g. carbon sequestration services, which benefit the world as a whole
- Accounting solution: Allocation of benefits and uses to some kind of collective group of economic agents, with subsequent transfer to the actual users
- However, recording ownership of assets, including costs of degradation somewhat problematic



Questions and issues for consideration by the AEG on National Accounts



Questions and issues for the AEG

The AEG is requested to express its opinion on:

- whether the current guidance of the 2008 SNA regarding the **asset boundary** is adequate when it comes to the **delineation of natural resources, more specifically biological resources** (see the discussion in paragraphs 41 – 42, and 58 – 61)
- whether the **allocation of social transfers in kind should be extended beyond transactions between government and NPISHs to resident households**, noting that this may also be relevant for more traditional services such as education and health (see paragraphs 50 and 68)
- the proposals around the valuation of ecosystem assets, related services and degradation, including the **alignment of the accounting for ecosystem assets with the principles of national accounts**
- whether members of the AEG have proposals for **alternative ways to account for ecosystem assets**
- **how the AEG, and the national accounts community more generally, could/should be involved in the further process of drafting the new standards for ecosystem accounting**, in particular when it comes to valuation and accounting for ecosystems in line with national accounts principles



Thank you for your attention!

