System of Environmental Economic Accounting

SEEA EEA Revision: Ecosystem service capacity

Presentation for the SEEA EEA Virtual Expert Forum

25 August 2020

United Nations

Issue #5: Ecosystem service capacity

- A key motivation for ecosystem accounting is understanding the connection between ecosystem assets and ecosystem services. Thus, the concept of ecosystem capacity is a highly relevant accounting concept.

- Also important to consider the purpose in measuring condition. Possible general questions are:
  - To what extent is the current pattern of use of ecosystem assets excessive such that ecological limits are likely to be breached
  - What is the ability of ecosystem assets to meet the needs of future generations

- Challenge to develop a definition and framing of ecosystem capacity in an accounting context that is conceptually sound/clear and also measurable.

Definitional starting point : SEEA EEA 2012

SEEA EEA 2012 Glossary

- The concept of ecosystem capacity is not defined from a measurement perspective in SEEA Experimental Ecosystem Accounting but it is linked to the general model of ecosystem assets and ecosystem services that is described.
- ***In general terms, the concept of ecosystem capacity refers to the ability of a given ecosystem asset to generate a set of ecosystem services in a sustainable way into the future.***
- While this general concept is very relevant to ecosystem assessment, definitive measurement of ecosystem capacity requires the selection of a particular basket of ecosystem services and in this regard measures of ecosystem capacity are more likely to relate to consideration of a range of alternative ecosystem use scenarios than to a single basket of ecosystem services. (SEEA EEA 2012, Glossary).

Ongoing discussions and research

- Hein et al (2016) "Defining ecosystem assets for natural capital accounting"
- La Notte et al (2019) "Capacity as 'virtual stock' in ecosystem services accounting"
- SEEA EEA Revision
  - Discussion paper 2.1 wrt condition (Keith et al, 2019)
  - Discussion paper 5.4 wrt degradation (Edens et al, 2019)
  - Research note on habitat and biodiversity related ecosystem services (King et al, 2019)
  - Global consultation comments on Ch 3, 4 and 5
- "*Capacity is commonly defined as the long-term ability of different ecosystem types to provide different ecosystem services* (Burkhard and Laes, 2017; Potschin M et al, 2016)"

Three separable perspectives/lines of thought

- #1 – Current individual ES perspective
  - For each individual ES, capacity relates to the current ecological limits/constraints for a given ecosystem asset to supply a given ES in the current/immediate accounting periods

- #2 – Future individual ES perspective
  - For each individual ES, capacity relates to the ability of an ecosystem asset to supply that ES into the future while maintaining ecosystem condition and not affecting the supply of other ecosystem services

- #3 – Systemic perspective
  - For each ecosystem asset, capacity relates to the ability of an ecosystem to regenerate and hence demonstrate resilience to various drivers of change, and reflected in the ability to supply the current bundle or future bundles of ES now and into the future

Considerations #1

- #1 – Current individual ES perspective
  - > Measurable, adaptable to individual ES (i.e. the concept of a limit/constraint will be applied differently for different ES)
  - > Applicable at location scale
  - > Easily communicated, linked to policy targets, indicators
  - > Using individual ES allows targeting "key" ecosystem services – perhaps those of high policy relevance or those related to specific drivers and pressures
  - > No assumptions required of future flows, interactions with other ES flows etc
  - > Limited in terms of connection to systemic concepts, biodiversity, resilience, sustainability, etc.

Considerations #2

- #2 – Future individual ES perspective
  - > Measurable but requires assumptions concerning likely/expected patterns of ES supply and use and related effects on ecosystem condition
  - > Links directly to valuation of ecosystem assets using NPV approach
  - > Can be presented as a stock or in terms of sustainable yield type flow
  - > General idea of sustainability relatively easily communicated but harder to link to policy targets
  - > Using individual ES allows targeting "key" ecosystem services
  - > Some connection to systemic concepts but limited in scope to expected patterns of supply and use of current bundle

Considerations #3

- #3 – Systemic perspective
  - > Not measurable directly generally but reflected in a range of metrics including ecosystem condition indicators and biodiversity measures (one example is IUCN Red List Ecosystems: risk of loss of ecosystem)
  - > Connection to ecosystem service flows indirect and likely unclear
  - > Requires framing of option values and future needs beyond the current bundle of ecosystem uses
  - > Fully reflects systemic notions of resilience and links directly to many notions around intrinsic values of ecosystems and the need for conservation/precautionary management approaches
  - > Conceptually rich but likely challenging to apply unless via regulation concerning, for example, individual ecological targets including biodiversity

GC feedback – NINA, Norway

- It is particularly important that the Ecosystem Condition Typology includes a conceptualization and operationalization of the term ecosystem capacity, as proposed in earlier work on SEEA-EEA, rather than ecosystem service potential, reflecting current use of ecosystem services.
- ***The concept ecosystem capacity reflects the future option value of good ecosystem condition and that future societal values and needs for ecosystem services may be different than ecosystem service flows considered most important today.***
- Ecosystem capacity can be directly related to sustainable use and ecosystem condition (and not an arbitrary gap between demand and use in the current situation).
- A paradoxical result may follow if "potential" is interpreted in short-term sense only, related to ecosystem service flow: the ecosystem service "potential" of a forest can be large if all the trees are cut down immediately, while the "capacity" of the forest ecosystem reflects the regrowth that ensures sustainable use of the ecosystem over time.

Other considerations

- Role of expected / future use of ES
  - Is the level of use relevant in defining / measuring capacity?
  - There may be a desire to avoid the situation of showing large measures of capacity for ES in areas where there is currently little or no demand for the ES
- How can the concepts be best linked to alternative labels/terms, e.g.
  - Potential supply
  - Capability
  - Unmet demand
- How to ensure a degree of coherence across the ecosystem accounting system – i.e. extent, condition, ES and monetary valuation; e.g.
  - Is perspective #3 equal to measures of condition?
  - What is the link to recording intermediate ecosystem services
  - Can an NPV of capacity be derived?

Issue #5: Ecosystem service capacity

- Expanded questions:
  - Is the purpose or rationale for measuring capacity clear?
  - Are these three perspectives comprehensive? Are there other considerations that need to be incorporated?
  - Would a focus in the revised SEEA EEA on measuring the capacity of individual ecosystem services wrt current limits be appropriate?
    - If so, what labels and definitions would be appropriate?
    - How can the link to more systemic concepts related to capacity, such as resilience, be best presented?
    - Should a focus on specific ES be proposed – e.g. wrt provisioning services and related activity?

System of Environmental Economic Accounting

Thank you

United Nations