SEEA EXPERIMENTAL ECOSYSTEM ACCOUNTS: BROAD CONCEPTS AND STRUCTURES

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Scoping ecosystem accounting
SEEA Experimental Ecosystem Accounts: context and proposed structure
Key concepts: ecosystem services and ecosystem capital
Statistical Units for ecosystem accounting
Measurement issues for ecosystem services
Measurement issues for ecosystem capital
Approaches to valuation and pricing
Ecosystem accounting in monetary terms
SCOPING ECOSYSTEM ACCOUNTING

- Measurement of state and change in state of ecosystems and flows from ecosystems to individuals and society
- Accounting for multiple ecosystems
- Spatial approach: Key difference from SEEA CF
- Multi-disciplinary approach: ecological science, ecological economics, national accounts and official statistics
- Accounting approach: organises large range of information, includes both physical and monetary data, describes conceptual relationships
SEEA EXPERIMENTAL ECOSYSTEM ACCOUNTS

- Complement to SEEA Central Framework
  - General topic of ecosystems and degradation discussed in SEEA-2003
  - Topic of ecosystem accounting separated through the SEEA revision process
- Links to SEEA Central Framework
  - Physical flows and ecosystem services
  - Asset accounts for individual environmental assets and ecosystem capital
- Links to SNA
  - Valuation principles
  - Sequence of accounts and balance sheets
“EXPERIMENTAL” ACCOUNTS

- Underlying concepts from ecology, ecological economics, national accounts and official statistics well established
- Integration is relatively new although ideas for various aspects have existed for many years
- Significant convergence on core measurement objectives and framework
- Experimentation lies in the need for testing of methods and approaches and the need for trials at national scale
CHAPTER OUTLINE

1: Introduction
   - Set context and policy relevance, objectives and measurement basis

2: Principles of ecosystem accounting
   - Perspective on ecosystems
   - Relationships between stock and flows
   - Statistical units
   - General measurement issues

3: Ecosystem services in physical terms
   - Measurement boundaries and classification
   - Accounting structures
   - Measurement approaches
CHAPTER OUTLINE (CONTINUED)

○ 4: Accounting for ecosystem capital in physical terms
  • Ecosystem capital model including ecosystem change
  • Measurement approaches
  • Accounting for carbon and biodiversity

○ 5: Approaches to valuation
  • Concepts of value
  • Approaches to valuation of ecosystem services

○ 6: Accounting for ecosystems in monetary terms
  • Sequence of accounts and wealth accounting
  • Ecosystem degradation and enhancement
  • Related monetary transactions
Individual & societal well-being

Benefits
SNA & non-SNA

Ecosystem services

Human inputs (e.g. labour, produced assets)

Ecosystem processes

Ecosystem characteristics
Intra-ecosystem flows
Inter-ecosystem flows

ECOSYSTEM
CAPITAL
ECOSYSTEM SERVICES : KEY POINTS

- Recognise private and public benefits – i.e. beyond SNA production boundary
- Three types of ecosystem service: provisioning, regulating, and cultural
- Only “final” outputs of ecosystem – a “chained” approach
- Significance of assessing trade-offs and dependencies – some services generated in tandem, some are competing
ECOSYSTEM CAPITAL: KEY POINTS

- Must measure/assess ecosystem condition and extent in physical terms since these underpin flows of ecosystem services.
- Assessing ecosystem capacity and expected flows will relate to issues of sustainability and patterns of use.
- Focus on a stable spatial area and changes in the state of that area.
- Multiple services and multiple land managers in each area.
- Intent to account for ecosystem degradation, enhancement and conversion – and distinguish human v natural impacts.
STATISTICAL UNITS: KEY POINTS

- **Ecosystem Accounting Unit (EAU)**
  - Stable over time
  - Sufficiently large to be relevant for policy purposes

- **Basic Spatial Unit (BSU)**
  - Small areas – possibly formed by overlaying grid
  - Ideally the level at which data are organised

- **Land Cover / Ecosystem functional Unit (LCEU)**
  - Area defined by common set of ecological characteristics
  - Often focal point for measuring ecosystem services

- Through mapping can link to economic units – particularly at BSU level
MEASUREMENT ISSUES FOR ECOSYSTEM SERVICES

- **Classification**
  - Definition of “final” ecosystem services for cultivated biological resources (especially crops)
  - Placement of flows relating to mineral and energy resources, energy from renewable sources (wind, solar, etc), space provisioning services

- **Aggregation**
  - Defining possible approaches especially relevant weights
  - Distinguish aggregation within an ecosystem and aggregation for multiple ecosystems

- Links to intra- and inter- ecosystem flows
MEASUREMENT ISSUES FOR ECOSYSTEM CAPITAL

- Ecosystem condition
  - Defining suitable reference or benchmark conditions to form a basis for assessment
  - Incorporating notions of resilience and thresholds

- Expected ecosystem service flows
  - Defining links to overall ecosystem condition in terms of availability of services in the future

- Defining ecosystem degradation
  - Demand side and supply side notions of degradation

- Aggregation
  - Direct measurement of whole not possible but question of how to combine variety of indicators
Approaches to Valuation and Pricing

- Motivation for valuation needs to be clear
  - Integration/comparison with accounts requires SEEA / SNA based values

- Concepts of value: welfare economic and exchange value
  - Accounting for consumer surplus

- Many approaches based on welfare economic valuation principles have been developed and tested for valuing ecosystem services

- Potential for market related prices to be used

- However, conclusions on consistency of methods with SEEA & SNA valuation principles still to be drawn
Producers' & consumers' surpluses

A
B
C

Supply
Demand

Price
Quantity

Q
P
ECOSYSTEM ACCOUNTING IN MONETARY TERMS

- Valuation of ecosystem degradation
  - Restoration cost as a deduction from economic aggregates
  - Change in value of expected flows of ecosystem services
    - Use of NPV approaches (as explained in SEEA CF)
    - Assumes weak sustainability – i.e. substitutability of different types of capital

- Sequence of accounts
  - Aim to reflect entries for ecosystem services, and ecosystem degradation and enhancement in standard SNA accounts
  - Various models depending on characterisation of ecosystem with respect to economic units
  - Requires valuation of ecosystem services and uses extension of SNA production boundary
ECOSYSTEM ACCOUNTING IN MONETARY TERMS

- **Wealth accounting**
  - Extension of SNA balance sheet to incorporate aspects of the value of ecosystems not in SNA
  - Care needed to understand current coverage of valuation in SNA to avoid double counting, especially for land

- **Combined presentations**
  - Following SEEA CF potential exists to present physical and monetary data together.
  - E.g. physical measures of ecosystem services or change in condition against environmental protection expenditure or industry value added

- **Accounting for payments for ecosystem services**
SUMMARY

- Significant progress has been made
- Solid convergence towards core concepts, terminology and possible measurement approaches noting the need to allow experimentation in methods
- The key ongoing tasks are
  - Discussion of the accounting concepts and approaches with multiple stakeholders across multiple disciplines
  - Highlighting the important role of official statisticians in advancing this work