Accounting for ecosystems in monetary terms – sequence of accounts

Ottawa, Canada, 2-4 October 2012

Bram Edens
Content

• Background
• Recording ecosystem services
• Recording degradation
• Questions for the London Group
Background

- The SNA describes a sequence of accounts:
  - Current accounts (production; income)
  - Accumulation accounts (capital; changes in volume)
  - Balance sheets
- Basic building blocks:
  - Units (classified into sectors or activities);
  - Engage in transactions;
- Boundaries:
  - Production (income; consumption)
  - Asset boundary
  - Economic territory / residence
- SEEA CF uses this sequence adapted for depletion
- Q: How can ES and/or degradation be incorporated?
Recording ES in sequence of accounts

Two approaches:

• Ecosystems as independent producing unit that engages in transactions with standard institutional sectors; separate quasi-institutional sector (Model A)
  • Production function: \( s_i \equiv F_i(E) \)

• Ecosystems as part of the stock of assets of the various institutional sectors and hence no additional, quasi-sector is needed (Model B)
  • Production function: \( s_i \equiv F_i(i, K, L, E) \)
<table>
<thead>
<tr>
<th>Model A</th>
<th>Model B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farmer</td>
<td>Household</td>
</tr>
<tr>
<td><strong>Production and generation of income accounts</strong></td>
<td></td>
</tr>
<tr>
<td>Output – SNA</td>
<td>200</td>
</tr>
<tr>
<td>Output – non-SNA</td>
<td></td>
</tr>
<tr>
<td>Total Output</td>
<td>200</td>
</tr>
<tr>
<td>Int. consumption – SNA</td>
<td>0</td>
</tr>
<tr>
<td>Int. consumption – non-SNA</td>
<td>80</td>
</tr>
<tr>
<td><strong>Gross value added</strong></td>
<td>120</td>
</tr>
<tr>
<td>Less Consumption of fixed capital (SNA)</td>
<td>10</td>
</tr>
<tr>
<td>Less Ecosystem degradation (non-SNA)</td>
<td></td>
</tr>
<tr>
<td>Degradation adjusted Net Value Added</td>
<td>110</td>
</tr>
<tr>
<td>Less Compensation of employees - SNA</td>
<td>50</td>
</tr>
<tr>
<td>Degradation adj. Net Operating Surplus</td>
<td>60</td>
</tr>
<tr>
<td><strong>Allocation and use of income accounts</strong></td>
<td></td>
</tr>
<tr>
<td>Degradation adj. Net Operating Surplus</td>
<td>60</td>
</tr>
<tr>
<td>Compensation of employees - SNA</td>
<td>50</td>
</tr>
<tr>
<td>Ecosystem transfers – non-SNA</td>
<td>80</td>
</tr>
<tr>
<td>Disposable income</td>
<td>140</td>
</tr>
<tr>
<td>Less Final consumption - SNA</td>
<td>200</td>
</tr>
<tr>
<td>Final consumption – non-SNA</td>
<td>30</td>
</tr>
</tbody>
</table>
Pros and cons

• Both models extend the SNA production boundary
• Model A treats ecosystems similar to factories.
  • However, typically producing units are active (and not passive)
• Model B recognizes that ecosystems (and ES) are in almost all situations the result of human interaction with nature (e.g. a farmer modifies his land in order to increase crop yields).
  • However producing units may be unaware of their production of ecosystem services
Key degradation issues

- Degradation more complex than depletion:
  - Time dependency (e.g. environmental debt)
    - Some of the degradation costs may already be reflected in current output
  - Spatial dependency (e.g. transboundary flows)
  - Degradation supply vs degradation use
    - Capital services: producer is considered as both the supplier and user of the capital services delivered by the fixed asset.
    - The value of the CFC caused and borne is equivalent for the producing unit
    - ES: this is usually not the case
  - Possibility of rehabilitation / regeneration / enhancement
  - Assessed based upon existing use patterns or sustainable use patterns
  - Physical concept or monetary?
Degradation

Model A and B recommend to disentangle the production of ecosystem services from the degradation of assets that generate these services

- NB: there is an alternative approach: (e.g. Vanoli 1995 increasing consumption hereby reducing net savings)

Still, there remain two approaches:

- Degradation1: reduction in expected service flows from an ecosystem
  - Necessary conditions
    - Capacity could be assessed using reference benchmark conditions (changes in state of ecosystems)
    - Due to human activity
    - Both physical and monetary
  - Degradation2: reduction in ecosystem capacity
    - Based on changes in sustainable yield
Questions to the LG

• Is the sequence of economic accounts useful for ecosystem accounting?
• Would you favor Model A or B (or perhaps a mixed option)?
• Which approach do you favor in terms of degradation?
  • Multiple degradation concepts or favor a single one?
  • Which one?