Accounting for ecosystems in monetary terms – sequence of accounts

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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: $s_i \equiv F_i(i, K, L, E)$

	Model A				Model B		
	Farmer	Household	Ecosystem	Total	Farmer	Household	Total
Production and generation of income accounts							
Output – SNA	200			200	200		200
Output – non-SNA			110	110	30		30
Total Output	200		110	310	230		230
Int. consumption – SNA	0		0	0	0		0
Int. consumption – non-SNA	80		0	80	0		0
Gross value added	120		110	230	230		230
Less Consumption of fixed capital (SNA)	10			10	10		10
Less Ecosystem degradation (non-SNA)			15	15	15		15
Degradation adjusted Net Value Added	110		95	205	205		205
Less Compensation of employees - SNA	50			50	50		50
Degradation adj. Net Operating Surplus	**60**		**95**	**155**	**155**		**155**
Allocation and use of income accounts							
Degradation adj. Net Operating Surplus	60		95	155	155		155
Compensation of employees - SNA		50		50		50	50
Ecosystem transfers – non-SNA	80	30	-110	0	-30	30	0
Disposable income	140	80	-15	205	125	80	205
Less Final consumption - SNA		200		200		200	200
Final consumption – non-SNA		30		30		30	30
Degradation adjusted net saving	**140**	**-150**	**-15**	**-25**	**125**	**-150**	**-25**

Pros and cons

- Both models extend the SNA production boundary
- Model A treats ecosystems similar to factories.
  - However, typically producting 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?