BASQUE CENTRE FOR CLIMATE CHANGE
Klima Aldaketa Ikergai

Issues and Options in Accounting for Ecosystem Degradation And Enhancement

Professor Anil Markandya

"Forum on Natural Capital Accounting"

November 2019

Introduction

- Accounting for ecosystem degradation, the cost of using up natural capital, has been a prime motivator of the SEEA since its origins in the 1980s.
- Aim is to adjust measures of Net Domestic Product (i.e. GDP less the capital cost of produced assets) for any natural capital cost loss.
- Presentation gives a summary of the various approaches to measure degradation and discusses the potential for the SEEA ecosystem accounting framework to provide additional alternatives.
- It also considers the related question of recording liabilities associated with ecosystem assets and their links to the accounting framework.

Degradation and Consumption of Capital

- Consumption of produced capital is the decline in the value of the stock of fixed assets as a result of physical deterioration, normal obsolescence or normal, accidental damage.
- Consumption of produced capital is valued at replacement cost – or the cost to replace the capital consumed at today's prices.
- Ecosystems are not produced and consequently, their ´consumption´ or degradation is not covered in the measurement of consumption of fixed capital.
- Because users are able to exploit the ecosystem free of charge there is no "payment" recorded in the SNA with respect to ecosystems that reflects the capital cost.

Ecosystem degradation in the SEEA EEA

- Ecosystem degradation is the decline in an ecosystem asset over an accounting period.
  - It covers only declines due to economic and other human activity and excludes declines due to natural influences and events (e.g. forest fires or hurricanes).
  - Declines in expected ecosystem service flow where there is no associated reduction in ecosystem condition (e.g. because of decreases in output prices or demand) should not be considered ecosystem degradation.
- **Degradation** of an ecosystem covers more than **depletion**, which is the decline due to loss of provisioning services. Degradation also covers loss due to all ecosystem services.
- Degradation can then be measured through **value of loss of future services (damage approach)** or through cost of restoration **(cost approach)**.

Measuring Degradation Via Damage Approach

- The **capacity** of an ecosystem asset is the sustainable supply of a given set of ES while maintaining a given condition for the asset under a given management regime. The value of the asset can then be measured as the Net Present Value with respect to:
  - The expected flow of ES demanded in the future ($\mathbf{V_{act}}$); OR
  - The expected flow of services that could be provided at capacity. ($\mathbf{V_{cap}}$)
- Degradation can then be valued as the change in NPV, giving 2 values.
- It may be easier to value degradation relative to V_{cap} than V_{act} , which is harder to project. But V_{act} is consistent with National Accounts conventions.

Measuring Degradation Via Restoration Cost

- Earlier SEEA had recommended measuring degradation via the costs of restoring the asset to its condition at the start of the period.
- Restoration costs can mean making an ecosystem as productive as it was at the start of the period. This is not easy to estimate. An alternative is the cost of purchasing services that are equivalent to what is lost through degradation. That is easier to measure.
- The restoration cost and the damage cost estimates of degradation may be quite different, although having both are useful for policy.

Accounting for Degradation of Ecosystem Assets

- Assets in the SNA have to have economic owners.
- For ecosystem assets there usually is some kind of legal ownership, if only exercised by government.
- More problematic is the economic ownership of these assets, which is very much related to the question of who claims the benefits and who runs the associated risks from these assets. As many are public goods, perhaps the government has this ownership implicitly.
- The costs of degradation then would be allocated to the government as part of collective consumption.

Recording Liabilities Related to Ecosystem Assets

- Idea of liability makes explicit that current economic activity that degrades the environment leaves future generations with a cost.
- Interpretations of concept of liabilities:
  - **Unpaid ecological costs.** Refers to uncompensated ecosystem and ecosystem services loss. If a system is degraded and not restored, the cost of doing so is an unpaid cost. The challenge here is determining the socially desirable state to which restoration should take place.
  - **Corporate natural capital accounting**. Incorporates an estimate of liabilities that equal future maintenance costs associated with ensuring that the ecosystem asset meets required standards set in law/regulation or in business policies. This cost should be subtracted from ecosystem asset value to get a net value.

Issues Arising with Accounting for Liabilities

- In national and corporate accounting, liabilities only arise when there are clear and accepted future obligations and costs. Recognition of liabilities should therefore be seen as distinct from the valuation of assets.
- If there is no expectation that the restoration will occur, then, at least for accounting purposes, no liability can be recognized.
- One proposal is for (net) degradation of ecosystems to be entered as “unpaid ecological costs” to the final expenditure categories, thus arriving at final consumption and gross fixed capital formation at “total costs”. The unpaid costs would feed as a negative into saving, which would subsequently add to the increase of a new liability category, “ecological debt of the economy” . Example shows how it could be recorded.
- Problem is: (a) liability needs to be accepted (by whom?) and (b) it must be paid.

	SNA Extended to Include Ecosystem Services			
	Farmer	Households	Ecosystem	Total
Income Accounts				
Output-Products	200			200
Output-ES	80		30	110
Total Output	280			310
Intermediate Consumption-Products	0			0
Intermediate Consumption-ES	80			80
Gross Value Added	200			230
Less Consumption of Fixed Capital	10			10
Less Ecosystem Degradation	10		5	15
Degradation/Deprecation Adj. Net VA	180		25	205
Less Compensation to Employees	50			50
Net Operating Surplus	130		25	155
Allocation/Use of Income Accounts				
Net Operating Surplus	130		25	155
Compensation to Employees		50		
Ecosystem Transfers		30	-30	0
Net Disposable Income	130	80	-5	205
Less Final Consumption-Products		200		200
Less Final Consumption-ES		30		30
Degradation Adjusted Net Saving	130	-150	-5	-25
Capital Accounts	Farmer	Households	Ecosystem	Total
Degradation Adjusted Net Saving	130	-150	-5	-25
Plus Consumption of Fixed Capital	10			
Plus Consumption Via Degradation	10		5	15
Net Lending/Borrowing	150	-150	0	0
Change in Balance Sheets				
Changes in Fixed Capital	-10			
Changes in Ecosystem	-10		-5	-15

Liability shown in red

Points for Discussion

- For valuing degradation what is your opinion of damage cost approach versus restoration cost approach?
- If we use the damage cost approach what is your opinion about valuing it relative to capacity and valuing it relative to actual use?
- Do you agree with the proposal to interpret of concept of liability as unpaid ecological cost?
- What are the considerations that have to be taken into account, or what is the best approach, to measure/value unpaid ecological cost?