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Issues Related to Valuation

Paper prepared by the World Bank

(for discussion)

Issues Related to Valuation

At its meeting in 2006, the London Group agreed to establish a Sub-group on Valuation Issues headed by the World Bank with ABS taking the lead on issues most closely related to the SNA (e.g., asset valuation and depletion). A list of issues related to valuation was discussed in the March 2007 meeting of the London Group in Pretoria and is included in the minutes to that meeting. These include:

#12. Valuation of asset stocks
#13. Recording of natural resource depletion
#14. Determining depletion of renewable resources
#18. Valuation of water
#19. Land valuation
#20. Soil valuation
#21. Forest accounts

Further elaboration of some of these issues, and additional issues related to Chapters 9 and 10 are briefly described below.

Title of Chapter 9
The current title of Chapter 9 refers only to environmental degradation, but there are many non-marketed environmental benefits that countries might also want to account for. *Should the title and scope of this chapter be expanded to include environmental benefits?*

Issues related to valuation of environmental benefits and degradation
Most environmental benefits and environmental degradation are already included implicitly in the SNA and accounting for them would not change the asset accounts or macroeconomic aggregates. The exceptions include environmental damages that occur in the distant future (e.g., greenhouse gases), damage to human health from pollution, and amenities that are not fully captured in asset values such as the amenities generated by national parks and public lands, which do not have market prices. Two general issues arise from this:

- *To what extent should the SEEA make the implicit values explicit, and which of those, if any, should be part of the standard?*
- *To what extent should the SEEA include the damages and amenities that are not included in the SNA, and which of those, of any, should be part of the standard?*

The overarching framework is asset accounting and relating benefits and degradation to changes in assets, and flows related to assets: income, investment, depletion/depreciation. Several major topics were identified, and will be discussed below:

1. Soil degradation
2. Valuation of environmental degradation & impacts on human health
3. Treatment of transboundary pollution damages
4. Valuation of ecosystem services (amenities, positive externalities)

1. Soil degradation

Soil valuation was identified as an issue in the recent meeting of the London Group but nothing specific was mentioned and no agency was identified to take the lead on this issue.

Soil degradation can take many forms. The forms of damage receiving the most attention in the literature are those closely related to agricultural productivity:

- Physical loss of topsoil (erosion), which is typically modeled
- Soil nutrient depletion, which is estimated through a combination of direct measurement and modeling
- Salination of soils, which is estimated through a combination of direct measurement and modeling. ABS has included an estimate of the value of soil salination.

But there are other forms of soil degradation of significant economic impact, notably

- Soil degradation associated with industrial contamination

Soil erosion results in both on-site and off-site damages; other forms of soil degradation usually have only on-site impacts. The correct way to value on-site damage is as the resulting change in (agricultural) productivity. Given the difficulty of measuring a change in productivity, it is common to estimate the damage to agricultural land as the cost of replacing lost nutrients by artificial fertilizer—although the fertilizer cost may exceed the value of crops produced.

This impact should be reflected in a change in land rents and asset value, but in developing countries, there may not be a market for land. Even in countries with well developed land markets and where statistical offices construct land accounts it is hard to isolate the impact of land degradation from other effects. Farmers typically adapt to compensate for changing land productivity so that it is hard to isolate the impact of soil erosion on productivity and land value.

Off-site damages are determined by where the soil goes and how it affects other assets. Commonly observed impacts include siltation of reservoirs, increased turbidity of water (increasing costs of water treatment), and contributing to dust storms which may have negative health effects or a loss of amenity, particularly in China and Central Asia.

Recommendation/Issue for discussion:

There is a reasonable conceptual framework for valuing soil degradation, but severe measurement problems. There are few good examples of valuation based on loss in productivity, so this issue is likely to remain experimental in the revised SEEA, although an important issue for some countries.

2. Valuation of environmental degradation

There are three issues concerning environmental degradation from pollution

a. Most damage from pollution, including loss of amenity values from air pollution, is already included in the SNA in production and asset accounts. But that damage is not explicit. There are definite policy advantages to making damages explicit.

b. Some pollution damages may not be fully included in the current national accounts because at least part of their impact occurs far in the future (e.g., greenhouse gas emissions (GHG)), and sometimes also in territories other than the one responsible for the pollution. The current value of such damages (the discounted value of future damages) is difficult to estimate, but, at least in the case of climate change, is of increasing public concern. A market for rights to emit GHG has developed and the prices established could be considered a measure of the value of pollution.

   The treatment of pollution permits is also raised under issue #8 in the minutes of the London Group meeting. The permits can be viewed as a property right and the transactions establish the value of that right, but the SNA is treating transactions as taxes. The permits are paid for by the polluter, not the territory which will suffer the damage. This contrasts with the SNA which implicitly records damage in the territory where & when it occurs, not at the source & time when pollution is generated. Alternative treatment in the SEEA should be considered.

c. Damage to human health is not included in the SNA. Damage to human health can be added if health is thought of as an aspect of human capital. One issue is how to value human capital, in terms of productivity or willingness-to-pay. The approaches can differ by a factor of five and it is not clear which is correct.

   Implementation of valuation requires understanding the relationship between emission-concentration-exposure-impact/damage (the dose-response relationship).
   Water—there is not a good understanding of the dose-response relationship for many water pollutants. Complicating the basic science is the potential for people to change their behavior with regard to water, eg, don't drink contaminated water.
   Air— there is an extensive literature on the dose-response relationship, and monitoring at least in industrialized countries for SOX, NOX, and PM10. For PM10 there is extensive literature and good scientific consensus, so it is possible to add PM10 damage to human health to the SEEA Standard

Recommendation/Issues for discussion:
For values implicit in the SNA,

- *Explore whether the SEEA make (some of) these damages explicit and if so, are there some pollution damages that can be part of the SEEA standard?*

For values not included in the SNA,

- *Consider including damage from PM10 to human health as part of SEEA Standard*
- *Explore whether pollutants for which tradable permits are established such as GHG and SOX can be valued by the resulting market prices.*

3. Treatment of transboundary pollution

Both water and air pollution are highly mobile. Many countries would like to know how much of the domestic damage is due to domestic sources of pollution and how much from pollutants generated by other countries. It is possible, although difficult, to measure the physical quantities of domestic pollution that stays in the territory and pollution 'imported' from other countries, as well as domestic pollution that is 'exported,' but how should the quantities be valued?

The way transboundary pollution is accounted for depends on the property rights recognized in the SEEA.

- If there are no property rights (e.g. a right not to be polluted by one's neighbor), then all one can do is account for damage in the territory where it is borne, regardless of where it is caused. In effect, this is what is currently done by the SNA where damages (except damages to human health) are included in asset values and production.
- If there are property rights, then the damage should be accounted for in the country that caused the damage.

Recommendations/Issues for discussion:

From an accounting perspective, it appears that there is no issue to discuss; pollution is accounted for as if there are no property rights. But this may be changing for some pollutants, notably GHG where property rights are emerging (also SOX in some places). This issue may warrant further exploration.

As a policy issue, countries may find it useful to calculate damages under both property rights' regimes; if all countries constructed complete environmental accounts, countries could do this. But this would be an issue of policy applications rather than accounting.

4. Valuation of ecosystem services and assets

Land and ecosystem accounting has been identified as issue by the London Group, with EEA to take the lead. But it is not clear from the minutes whether the accounting is in physical units or will include valuation.

Most ecosystem services are included, implicitly, in the value of other assets. However, it is useful to disentangle the ecosystem services because they are often provided as positive externalities—e.g., lowland agriculture benefiting from ecosystem services provided upland. It would be misleading to assume that the value is generated by lowland, although it is realized there.

There are many challenges to including these values in an accounting framework. Distinguishing the source of ecosystem services and their values is often done in the context of project evaluation, but the services are highly site-specific; to do this on a national scale, in an accounting framework would require summing up many micro-level

studies. Ecosystems typically produce joint products, and are overlapping and interacting which makes it difficult to attribute values to a uniquely defined asset.

There may be pure amenity values that are not captured in the SNA land assets, such as those derived from public lands. Weitzman-Asheim framework defines income to include amenity values, which is a broader measure of income than SNA. Conceptually this is possible, but would result in a measure of income outside SNA.

Recommendations/Issues for discussion
Ecosystem accounting will remain part of the experimental accounts but further exploration of this topic would be useful.

The Way Forward for the Sub-Group on Valuation Issues

A final list of issues should be discussed by the next London Group meeting, tentatively scheduled for late December 2007. Upon recommendation by the London Group, and after approval by the UNCEEA, the final list of issues will be submitted to the Statistical Commission as a background document.

The Sub-Group on Valuation needs to prepare a number of papers to explain its recommendations to the London Group. Several agencies have already agreed to prepare papers on issues related to valuation; these are listed in Annex I of the minutes of the London Group meeting. Among the additional issues raised here, the treatment of damages from PM10 is the most urgent, as it is being put forth to become part of the Standard.

The issue papers need review by a broad group of experts that includes national accountants and economists with expertise in environmental valuation, both theoretical and applied. While a considerable amount of the review can be done electronically, it would be useful to convene a face-to-face meeting of members of the Sub-group for discussion before the next London Group meeting.

There are several tasks for the Sub-group on Valuation:

- Recruit additional members of the Sub-group to fill gaps in expertise, notably in environmental economics and national accounts.
- Identify issues where papers are needed and commission any additional issues papers necessary. This requires clarification of the scope of work already committed to.
- Convene a meeting of the Sub-group to review the issues papers and discuss recommendations to the London Group.