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**The organisation of Part III on applications of the SEEA:
Issue paper for the London Group**

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Summary

Chapter 11 of the SEEA2003 describes applications of the accounts, and is structured by reference to the preceding chapters. This has limitations in terms of the way it deals with major policy issues such as climate change. Other options, such as organising the chapter by reference to environmental assets or environmental issue, also have limitations because they don't readily cover all the potential applications of the accounts. This paper proposes a new structure which loosely follows the current chapter, but is repackaged so that the major environmental issues are dealt with first, followed by applications which focus on accounting for the stocks of assets (to the extent that they have not been covered in the first part), and finishing with other applications such as those relating to environmental expenditures etc.

1. Background

At the last meeting of the London Group in Johannesburg the Group discussed how best to link the important policy themes of sustainable development and global warming to the sections of the revised SEEA on applications and indicators. It was noted that in the revision to SNA there was a proposal to organise the section on applications by institutional sector, and it was concluded that the SEEA could likewise be organised according to the classification of natural resources. It was also noted that the structure of the applications chapter might facilitate CBS work on organising the information on indicators.

This note discusses four options which might serve as a basis for organising the revised chapter on applications.

2. Current organisation of SEEA chapter

The current SEEA 2003 chapter 11 is an attempt to demonstrate how the accounts can be used to throw light on real world issues and problems. The emphasis is on why to undertake applications, in contrast to examples given in earlier chapters which are intended to inform how the calculations might be made.

The chapter has five parts which broadly follow the content of the preceding chapters:

- physical flows and the degradation of environmental media (3 and 4);
- combating degradation through expenditure and economic instruments (5 and 6);
- sustaining wealth by assessing depletion of natural assets (7 and 8);
- the application of cost estimates of degradation to assess cost-effectiveness of policy options (9);
- adjustments to macro-economic aggregates (10). Final section covers relevance of handbook to SD indicators.

Within this structure each part has separate sections which cover i) indicators and descriptive statistics and ii) policy analysis and strategic planning. The intention is that the more sophisticated applications, which might require some modelling and might not be commonly undertaken by National Statistical Institutes, are separated from the more routine use of the accounts.

3. Options

There is no strong reason to conclude that the structure of the chapter in the SEEA 2003 is particularly flawed. However, the revision of the SEEA gives us an opportunity to review the structure and if necessary address some of its weaknesses.

As suggested at the last meeting, an alternative to the current structure would be to organise the chapter by reference to the classification of natural assets. A related possibility, given the link between this section and that on indicators, is to structure the part by reference to environmental issues. This would be more accessible to a policy audience. One possibility might be to base the structure on the grouping of environmental issues covered by sets of sustainable development indicators.

A further option would be to structure the chapter by reference to the policy cycle. In a sense this option follows from the proposal put forward by the Federal Statistical Office of Germany¹ which describes how the information requirements from different stages of the policy cycle are closely linked to the analyses and models which can only be derived from integrated datasets such as environmental accounts.

This paper therefore discusses the following four options:

- A. a structure which follows the order of the current chapters (the status quo)
- B. the use of the SEEA classification of natural resources²
- C. a classification of environmental issues
- D. organisation by information required at different stages of the policy cycle

Option A: Status quo

As noted above, the current structure of Chapter 11 follows the order of the preceding chapters. It is therefore a good showcase of how each account can be used in the real world. It is however more difficult to read as a stand-alone document: the reader is implicitly expected to be familiar with the different approaches set out in the earlier chapters, and assumed therefore to be seeking examples of ways in which, if the relevant account were to be compiled, they might contribute to the policy debate.

Advantages

Clear links between chapters and applications. Comprehensive coverage of how the key results from each account might inform policy decisions.

Disadvantages

It may be difficult for a reader from a particular policy background to work out how to use the different accounts to meet their needs. In particular, the relevance of the applications to the themes of sustainable development and global warming is not always readily apparent.

¹ Sustainable Development Indicators and Environmental-Economic Accounting. Karl Schoer, Federal Statistical Office, Germany. June 2006.

² See Annex 1 of SEEA 2003: SEEA asset classification.

Option B: Natural resource

The SEEA asset classification separates and distinguishes between three types of environmental assets, namely natural resources, land and surface water, and ecosystems. Intangible environmental assets are included as a memorandum item. The classification is set out in Annex A for convenience.

In brief, natural resources comprise mineral and energy, soil, water and biological resources. The assets of land and surface water are split into land under buildings and structures, agricultural land, wooded land, major water bodies and other land. Ecosystems are divided into terrestrial systems, aquatic systems and atmospheric systems – there is no further subdivision of this last category.

Advantages

The SEEA deals with the stocks and flows of environmental resources and logically applications might be expected to be grouped by the different types of assets. The classification is already established. Applications which use information on the physical volumes and values of stocks and flows would be readily linked. The approach would also relate well to the frameworks adopted for Millennium Ecosystem Assessments (MEAs).

Disadvantages

No clear link with the primary policy concern of climate change, which relates to an element of the atmospheric ecosystem. This is because the classification relates to assets rather than flows of pollutants. If the chapter were to be structured by reference to the classification of assets, then we would need to impose some further structure to it. One possibility would be to disaggregate ecosystems by reference to ecosystem services – particularly provisioning and regulating services³ - as set out in the MEA. However, and as noted in the MEA itself, some of these categories overlap with others and with other environmental assets. There have been a number of recent attempts to reframe the structure of ecosystem assessments⁴ but so far no consensus has been reached.

Option C: Environmental issue

The SEEA deals to a greater or lesser extent with many, if not all, environmental issues, but makes no attempt to present a systematic listing or prioritisation of these issues. This is understandable - environmental sustainability issues are determined by socio-political processes, and not by a system of accounting. It is generally assumed that they are best articulated

³ See MEA conceptual framework at <http://www.millenniumassessment.org/documents/document.765.aspx.pdf>

⁴ See for example Haines-Young et al, 2006; Boyd and Banzhaf, 2006; Binning et al, 2001; De Groot et al, 2002.

by reference to established Sustainable Development Strategies, at either the national or international level⁵.

Such strategies are usually supported by sets of sustainable development indicators, which are compiled to monitor and summarise the strategy, and which are often used as a framework for further analysis and are generally taken as indicative of the political relevance of environmental issues⁶. For the purposes of the SEEA, it would seem that the indicator set established by the United Nations⁷ is most likely to provide sufficient coverage of environmental challenges facing both industrialised and less-developed countries.

The current UN set does not readily distinguish between environmental, economic and social issues, but broadly speaking they can be grouped into the following classes:

- Atmosphere (4 indicators)
- Land (10 indicators)
- Oceans, seas and coasts (6 indicators)
- Fresh water (5 indicators)
- Biodiversity (7 indicators)
- Consumption and production patterns (12 indicators)

Annex B sets out the list of relevant indicators for convenience.

Advantages

Well related to policy concerns. Potential to link stocks and flows, in both physical and monetary terms, as well as the expenditure accounts. The structure would be consistent with the structure of a section on indicators.

Disadvantages

The UN set does not necessarily cover all the relevant issues. The group of indicators labelled as 'Consumption and production patterns' overlaps with other environmental issues. Some issues such as biodiversity are not addressed particularly well by SEEA approaches. There could be some repetition of applications as the methodologies set out in the SEEA can be applied to more than one environmental issue.

Option D: Policy cycle

There are a number of alternative descriptions of policy cycle. Figure A below gives a typical example. Broadly speaking all expressions of the policy cycle

⁵ For references and an overview of relevant strategies and indicators see Schenau, S. and Hoekstra, R. (2007) 'Environmental Indicators: Issue paper for the London Group meeting in Johannesburg'.

⁶ Such a reliance is not always well-founded: indicator sets may miss some particular issues either because of lack of data or lack of agreement over the best means of measurement.

⁷ They can be found at <http://www.un.org/esa/sustdev/natlinfo/indicators/factSheet.pdf>

set out the same evidence requirements, as they tend to cover the following phases:

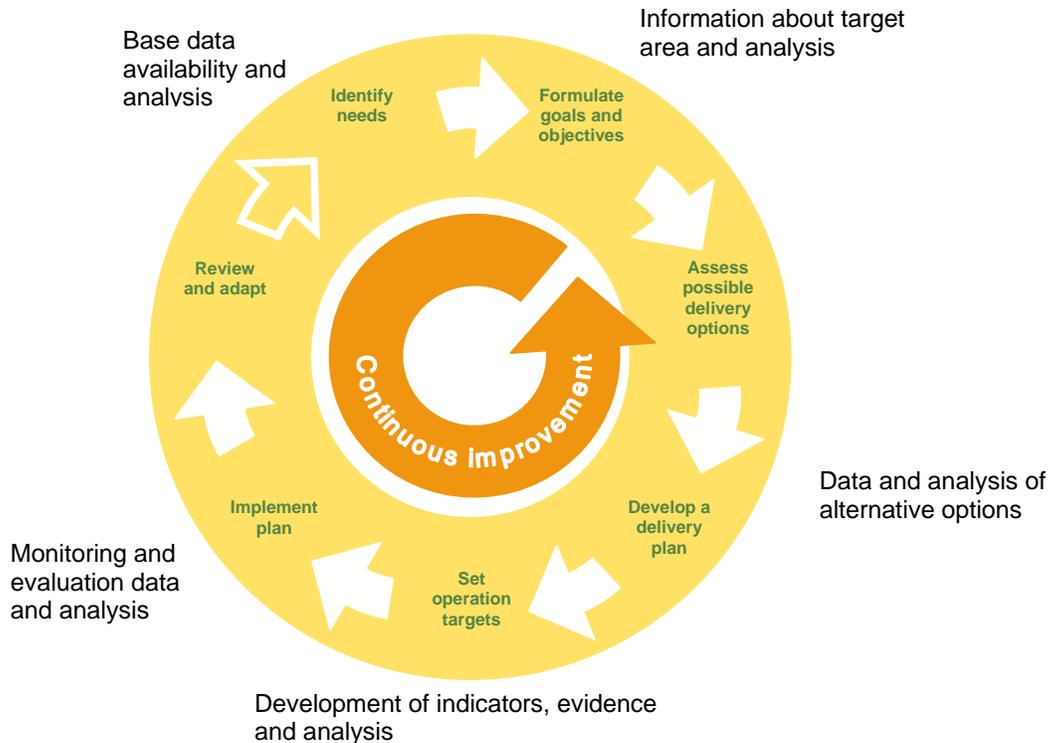
1. Identification of the problem
2. Information about who or what is causing the problem
3. Modelling and analysis of policy options
4. Monitoring and evaluation

These four elements can be taken to represent varying levels of complexity (mirroring the split between indicators/descriptive statistics and policy analysis/strategic planning in the current chapter 11 of the SEEA), and can also be mapped onto the types of analysis set out by Karl Schoer⁸. These were:

- Aggregate indicators
- Branch (sectoral) indicators
- Decomposition
- Indirect effects
- Econometric modelling/simulation

This structure mainly concentrates on flows, and would need expanding to cover approaches dealt with in the other parts of the SEEA.

Figure A: a typical example of a policy cycle



⁸ Sustainable Development Indicators and Environmental-Economic Accounting. Karl Schoer, Federal Statistical Office, Germany. June 2006.

Advantages

Brings all environmental issues into the one basket. Demonstrates integrated nature of the accounts. Good link to the way policy develops.

Disadvantages

More work required to collate integrated stock, monetary and valuation account applications - such good examples of applications from other chapters may not exist for all elements of the structure. No ready way in which to address specific environmental issues.

4. Summary of advantages and disadvantages

	Advantages	Disadvantages
A. Status Quo	Clear links between chapters and applications Good show case of how accounts can be used	Environmental issues not grouped together Difficult to show how accounts can be brought together
B. Natural resource	Environmental issues grouped together to some extent Coherent classification already exists Might be integrated with MEA classification of services	No strong link with major policy concerns May require further sub-classification of flows or ecosystem services May involve some repetition of approaches Some accounts are more generic and may have to be treated separately
C. Environmental issue	Clear link with policy issues Different accounts can be brought together Would be consistent with structure of section on indicators	No ready classification of issues May be difficult to find a range of applications for some issues May involve some repetition of approaches Some accounts are more generic and may have to be treated separately
D. Policy cycle	Good link with generic policy approach Shows integrated nature of accounts May need further structure by reference to environmental asset or issue	More work required to integrate stock, monetary and valuation account applications No clear link with policy issues

5. Conclusions and recommendations

It seems clear that there is no one structure that can meet all requirements: some accounts fit well with one approach but not others, and vice versa. The structure of the current chapter got round this problem by ensuring that all accounts were covered systematically. The best way forward therefore

seems to be to adopt a similar structure but label it slightly differently – for example, by adopting a three part structure which would cover

- 1) Environmental issue – degradation of climate, water, land, biodiversity, mainly based on chapters 3 and 4, but also incorporating valuation from chapter 9. This section would provide the main link to the section on indicators. It could incorporate applications relating to stocks (chapters 7 and 8) and elements of applications relating to taxes and expenditures (chapters 5 and 6), to the extent that such applications were relevant to the environmental issue being covered;
- 2) Environmental resources – renewables, non-renewables, etc, mainly based on chapters 7 and 8, to the extent that they were not covered in the previous part; and
- 3) Other applications – taxes, expenditures, emission rights etc, from chapters 5 and 6, to the extent that they were not covered in the previous parts.

It would even be possible to incorporate the final option by including a discussion on the relevance of the accounts to the policy cycle within the introduction to the chapter.

A significant advantage of this approach is that climate change would be dealt with as the first application within the chapter.

Selected references

- Binning, C., Cork, S., Parry, R. and Shelton, D. (2001) Natural Assets: an inventory of goods and services in the Goulburn Broken Catchment. SCIRO, Canberra
- Boyd, J. & Banzhaf, S (2006) What are ecosystem services? Discussion Paper Resources for the Future DP 06-02, 26pp
- De Groot, R., Wilson, M. & Boumans, R. (2002) A typology for the classification, description and valuation of ecosystem functions, goods and services. *Ecological Economics*, 41, 393-408
- Haines-Young, R., Potschin, M. & Cheshire, D. (2006) Defining and identifying environmental limits for sustainable development. Full Technical Report to Defra, Project Code NRO102

Annex A SEEA asset classification

EA.1 Natural Resources

EA.11 Mineral and energy resources

- EA.111 Fossil fuels (cubic metres, tonnes, tonnes of oil equivalent, joules)
- EA.112 Metallic minerals (tonnes)
- EA.113 Non-metallic minerals (tonnes)

EA.12 Soil resources (cubic metres, tonnes)

- EA.121 Agricultural
- EA.122 Non-agricultural

EA.13 Water resources (cubic metres)

- EA.131 Surface water]
- EA.1311 Artificial reservoirs
- EA.1312 Lakes
- EA.1313 Rivers and streams
- EA.132 Groundwater

EA.14 Biological resources

- EA.141 Timber resources (cubic metres)
 - EA.1411 Cultivated
 - EA.1412 Non-cultivated
- EA.142 Crop and plant resources, other than timber (cubic metres, tonnes, number)
 - EA.1421 Cultivated
 - EA.14211 Yielding repeat products (vineyards, orchards, etc.)
 - EA.14212 Yielding one-time harvests (crops, etc.)
 - EA.1422 Non-cultivated
- EA.143 Aquatic resources (tonnes, number)
 - EA.1431 Cultivated
 - EA.1432 Non-cultivated
- EA.144 Animal resources, other than aquatic (number)
 - EA.1441 Cultivated
 - EA.14411 Livestock for breeding purposes
 - EA.14412 Livestock for slaughter
 - EA.1442 Non-cultivated

EA.2 Land and surface water (hectares)

Of which, recreational land

EA.21 Land underlying buildings and structures

- EA.211 In urban areas
 - EA.2111 For dwellings
 - EA.2112 For non-residential buildings
 - EA.2113 For transportation and utilities
- EA.212 Outside urban areas
 - EA.2121 For dwellings
 - EA.21211 Farm
 - EA.21212 Non-farm
 - EA.2122 For non-residential buildings
 - EA.21221 Farm
 - EA.21222 Non-farm
 - EA.2123 For transportation and utilities
 - EA.21231 Roads
 - EA.21232 Railways
 - EA.21233 Electric power grids
 - EA.21234 Pipelines

EA.22 Agricultural land and associated surface water

- EA.221 Cultivated land
 - EA.2211 For temporary crops

- Of which, drained
- Of which, irrigated
- EA.2212 For permanent plantations
- Of which, drained
- Of which, irrigated
- EA.2213 For kitchen gardens
- EA.2214 Temporarily fallow land
- EA.222 Pasture land
 - EA.2221 Improved
 - EA.2222 Natural
 - EA.223 Other agricultural land

EA.23 Wooded land and associated surface water)

- EA.231 Forested land
 - EA.2311 Available for wood supply
 - EA.2312 Not available for wood supply
- EA.232 Other wooded land

EA.24 Major water bodies

- EA.241 Lakes
- EA.242 Rivers
- EA.243 Wetlands
- EA.244 Artificial reservoirs

EA.25 Other land

- EA.251 Prairie and grassland
- EA.252 Tundra
- EA.253 Sparsely vegetated/Barren land
- EA.254 Permanent snow and ice

EA.3 Ecosystems

EA.31 Terrestrial ecosystems

- EA.311 Urban ecosystems
- EA.312 Agricultural ecosystems
- EA.313 Forest ecosystems
- EA.314 Prairie and grassland ecosystems
- EA.315 Tundra ecosystems
- EA.316 Dryland ecosystems
- EA.317 Other terrestrial ecosystems

EA.32 Aquatic ecosystems

- EA.321 Marine ecosystems
- EA.322 Coastal ecosystems
- EA.323 Riverine ecosystems
- EA.324 Lacustrine ecosystems
- EA.325 Other aquatic ecosystems

EA.33 Atmospheric systems

EA.M Memorandum item. Intangible environmental assets

- EA.M1 Mineral exploration
- EA.M2 Transferable licences and concessions for the exploitation of natural resources
- EA.M3 Tradable permits allowing the emission of residuals
- EA.M4 Other intangible non-produced environmental assets

Annex B

United Nations list of sustainable development indicators relating to the environment

<u>Theme</u>	<u>Core indicator</u>	<u>Other indicator</u>
Atmosphere		
Climate change	Carbon dioxide emissions	Emissions of greenhouse gases
Ozone layer depletion	Consumption of ozone depleting substances	
Air quality		Ambient concentration of air pollutants in urban areas
Land		
Land use and status		Land use change Land degradation
Desertification		Land affected by desertification
Agriculture	Arable and permanent cropland area	Fertilizer use efficiency
Forests	Proportion of land area covered by forests	Use of agricultural pesticides Area under organic farming Percent of forest trees damaged by defoliation Area of forest under sustainable forest management
Oceans, seas and coasts		
Coastal zone	Percentage of total population living in coastal areas	Bathing water quality
Fisheries	Proportion of fish stocks within safe biological limits	
Marine environment	Proportion of marine area protected	Marine trophic index Area of coral reef ecosystems and percentage live cover
Freshwater		
Water quantity	Proportion of total water resources used Water use intensity by economic activity	
Water quality	Presence of faecal coliforms in freshwater	Biochemical oxygen demand in water bodies Wastewater treatment

Biodiversity		
Ecosystem	Proportion of terrestrial area protected, total and by ecological region	Management effectiveness of protected areas Area of selected key ecosystems Fragmentation of habitats
Species	Change in threat status of species	Abundance of selected key species Abundance of invasive alien species
Consumption and production patterns		
Material consumption	Material intensity of the economy	Domestic material consumption
Energy use	Annual energy consumption, total and by main user category Intensity of energy use, total and by economic activity	Share of renewable energy sources in total energy use
Waste generation and management	Generation of hazardous waste Waste treatment and disposal	Generation of waste Management of radioactive waste
Transportation	Modal split of passenger transportation	Modal split of freight transport Energy intensity of transport