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RESEARCH AGENDA
A PRELIMINARY CONSOLIDATED LIST OF ISSUES[1]

[1] Prepared by UNSD on the basis of the contributions received from countries and organizations in response to the call for issues which was widely distributed among groups active in environmental-economic accounting and related statistics.

Introduction

1. With the objective of the Committee to elevate the SEEA to an international statistical standard on environmental-economic accounting by 2010, the advancement of methodologies in environmental-economic accounting is an important element of work for the Committee.

2. The update of the 1993 SNA and the revision of the Balance of Payments Manual Fifth Edition are important milestones in economic statistics. As a result of the changes in these and other international economic statistics standards, such as the International Standard Industrial Classification (ISIC Rev.4) and Classification of Products (CPC Rev.2), the SEEA-2003 should be updated and its release, as a standard, linked to the issuance of those standards.

3. The handbook of national accounting *Integrated Environmental and Economic Accounting 2003 (SEEA-2003)* has been issued as a white cover publication and will be published by five international agencies, namely the United Nations, the European Commission, the International Monetary Fund, the Organisation for Economic Co-operation and Development and the World Bank. The SEEA-2003 represents a major step forward in the harmonization of concepts and methods in environmental-economic accounting. However, it is not a statistical standard. In those cases in which there is consensus, the SEEA-2003 reports best practices. In those cases in which a variety of approaches exist, the SEEA-2003 presents a list of options, including a discussion on advantages and disadvantages of each option.

4. Since the issuing of the SEEA-2003, countries have gained further experience in the implementation of environmental-economic accounting. They have expressed the need to reach a consensus on some of the unresolved issues in the SEEA-2003 as well as on furthering research in new and emerging issues (e.g. measurement and valuation of ecosystems, etc.).

5. As a first step in developing a research agenda, a preliminary list of issues has been compiled on the basis of contributions received by countries and organizations that were the major contributors of the SEEA-2003. A preliminary list of issues was discussed at the Preliminary Meeting of the UN Committee of Experts in August 2005. It has been revised on the basis of the contributions received in the response to a call for issues which was widely circulated among various groups active in environmental environmental-economic accounts and related statistics, including energy statistics[2]. National accountants, balance of payments, financial and government statisticians were consulted with the objective of (a) ensuring consistency with major standards like the

[2] The call for issue was circulated among the following groups: the London Group on Environmental Accounting, the Oslo Group on Energy Statistics, the Inter-Secretariat Working Group on Environment Statistics, Inter-Secretariat Working Group on Energy Statistics, Inter-Secretariat Working Group on National Accounts, the Working Group on Environmental Information and Outlooks, the Canberra II Group, the Task Force on Harmonization of Public Sector Accounting, the IMF Committee on Balance of Payments Statistics and the OECD Working Party on National Accounts.

1993 SNA, Balance of Payments Manual – Fifth Edition (BPM5) and Government Finance Statistics (GFS) which are presently under review; and (b) seeking their views on outstanding issues that were not solved during the revision processes because of time constraints.

6. All issues regarding the update of the 1993 SNA and the revision of BPM5 and GFS would have to be solved by the end of 2006. These will provide an input in the update of the SEEA-2003.

7. The present list of issues focuses on the refinement and clarification of those issues that will allow for elevating the SEEA to the level of a statistical standard. Nevertheless, a longer term research agenda covering those issues that are considered policy relevant but for which a consensus cannot be reached between now and 2008.

8. The list of issues in this document has been structured according to chapters of the current SEEA 2003 and has been further classified on the basis of whether the issue is "short-term", meaning that the issue is expected to be solved before 2008, in time for the 2010 deadline for the update of the SEEA, or "long-term", that is the issue will require longer time to be solved. It should be noted that the list and the classification of issues as short or long term is still under discussion.

GENERAL ISSUES

Scope of the issues and the update of the SEEA-2003

9. The SEEA-2003 presents best practices in environmental-economic accounting. It is a combination of a conceptual handbook, providing concepts, definitions and classifications which serve as the basis of the development of standards, and of a compilation handbook providing examples on how countries have implemented environmental-economic accounting.

10. The updated SEEA-2003 will be a standard. It is important from the outset to agree on the scope and coverage of the handbook. Should country practices and examples be included in the handbook? Should compilation and implementation issues be addressed in the handbook? or they be addressed in satellite handbooks?

11. The issues listed below cover mostly methodological issues. Issues linked to implementation have not been included in the issue list as deemed beyond the scope of the update of the SEEA-2003.

Links with the 1993 SNA Rev.1 and BPM6

12. In many parts of the handbook and in particular in Chapters 3 and 4, dealing with material flow accounts and energy and emission accounts, there are several instances where other approaches differ from environmental-economic accounting approach. This is the case for example of material flow accounting, energy and air emission statistics.

The main differences are two. The first has to do with the residence versus the presence principle. According to the residence principle embraced by the 1993 SNA and BOP frameworks and, as a result, by the SEEA-2003, the use of natural resources and emissions that result from production and final consumption processes are allocated to the units residents in a country. According to the presence principle, which is embraced by energy and environment statistics, the use of material (natural resources) and emissions within the national territory, regardless of whether it is carried out by a resident unit is recorded. The second difference is the treatment of mobile sources. In the case of the SEEA, mobile sources should be allocated to the relevant industry or households.

13. As a general principle, the differences between the various approaches and the SEEA-2003 should be analysed and, when possible, consistency with the national accounts principles should be advocated. When it is not possible to achieve full consistency with the national accounts because of specific users' needs, bridge tables showing the differences between the SEEA and other approaches should be developed.

CHAPTER 3 - PHYSICAL FLOW ACCOUNTS (Statistics Denmark)

1. Economy Wide Material Flow Accounting – Short Term

Economy Wide Material Flow Accounts present two aggregation issues: (a) aggregation across industries; and (b) aggregation over products. Industrial breakdown and thus the use of SUTs and I-O tables should be advocated for the derivation of MFA indicators, as it is current practice in many countries. Should a single indicator of economy wide MFA be derived, aggregating over industries and products? Should standard aggregation methods of material/physical flows to assess the different impacts on the environment be developed so as to obtain a limited set of aggregated indicators, which would be more policy relevant? Can agreed standards on weights and impact factors be agreed upon in the short term or be included in the longer-term research agenda?

CHAPTER 4 – HYBRID FLOW ACCOUNTS (Statistics Netherlands)

2. Waste accounts –Short Term

The terminology and classification of waste and waste products differ across countries. There is a need for standardizing methodologies to compile waste accounts and for harmonizing concepts and definitions used in waste statistics and waste accounts, including the links with MFA. The European Union Waste Statistics Regulation could serve as a starting point for developing waste categories, waste treatment methods and industrial classifications for the waste accounts. Standardized waste tables should also be developed.

Energy accounts

[LIST OF ISSUES TO BE PROVIDED BY THE OSLO GROUP ON ENERGY STATISTICS]

The issue of linking energy and emission statistics (including the Kyoto protocol) to the national accounts are very relevant for energy and air emission accounts.

3. Renewable energy resources – Short term

Renewable energy resources (e.g. hydropower, solar energy, bio fuels etc.) are becoming increasingly important. Several National Statistical Offices are developing statistics to include renewable energy in their energy statistics. Methodology should be developed to expand the energy accounts to include renewable energy so as to link this information to the economic variables.

CHAPTER 5.- ACCOUNTING FOR ECONOMIC ACTIVITIES AND PRODUCTS RELATED TO THE ENVIRONMENT

4. Environment industry – Short term

There is a need to clarify some of the concept presented in the OECD-Eurostat Manual *The Environmental Goods and Services Industry*, in light of country experiences. [TO BE ELABORATED BY EUROSTAT TASK FORCE]

CHAPTER 6 – ACCOUNTING FOR OTHER ENVIRONMENTAL RELATED TRANSACTIONS (Statistics Sweden)

5. Environmental taxes and subsidies – Short term

Environmental taxes and subsidies are broadly defined in the SEEA-2003. Recently OECD and Eurostat have tested a definition of environmental taxes in several countries. There is a further need to standardize the definitions of environmental taxes and subsidies keeping also into consideration the practical implementation of these concepts.

6. Permits to access the resources (e.g. fishing and water rights) and emission permits – Short term

There is a need for further development and standardization of concepts and methods for the recording of permits within the national accounts and balance of payments manual. The issue has to some extent been discussed by the Canberra II group but it could be useful to collect actual experiences and to add the perspective of environmental accountants and the environmental/physical dimension of permits in the discussion. The recent introduction of CO_2 emission trading scheme as a result of the Kyoto protocol will without doubt increase the users demand for this type of information, which will be used for making analysis.

7. Classification of natural resources management accounts – Short term

The SEEA-2003 presents the Classification of Environmental Protection Activities (CEPA 2000). CEPA is an agreed classification, which however does not cover natural resources management activities and expenditures, which are very important in particular for sectoral policies.

CHAPTER 7 ASSET ACCOUNTS AND THE VALUATION OF NATURAL

RESOURCE STOCKS
CHAPTER 8 SPECIFIC RESOURCE ACCOUNTS

General – *Short or long term?*

The SEEA-2003 does not deal with catastrophes but it includes it as part of the future work. Some catastrophes such as flooding and erosion are increasingly seen as the consequence of economic activities in current and previous years. The SEEA-2003 notes that it may be desirable to bring some of these type of catastrophes into the field of environmental accounting (SEEA-2003 para 1.134).

Mineral Accounts (Statistics Denmark and UNSD)

8. Definition of physical reserves – Short term

The terminology and classification used for physical reserves differs across countries. One issue is whether it is possible to aggregate over the different reserves (e.g. proven, probable and possible on the basis of probability of existence, etc.)? Should renewable energy resources be included in the accounts in terms of stocks?

9. Valuation of stocks – Short term

The net present value method has been identified as being the preferred method as compared to the appropriation method. Issues on how to implement the NPV method still remain unsolved. They include, e.g.:

- Calculation of the capital services on natural resources (i.e. resource rent): Should taxes and subsidies be included in the calculation of the resource rent? What rate of return to capital should be used? How to implement the capital service approach in this context by identifying the produced and non-produced assets in production? How should the resource rent be allocated to different products in case of joint production (e.g. in the case of a mine which produces silver and copper)? How to deal with heterogeneity (different quality and costs) of the reserves? How to deal with fluctuations in resource rents over relatively short periods of time? How to deal with year to year volatility and negative resource rents (e.g. should a moving average be recommended)?
- Calculation of NPV? What discount rate to choose? Should the risk factor be taken into account in the discount rate or the return to capital? How to calculate the lifetime of the reserve?
- How can constant price valuation of assets be obtained (e.g. using GDP deflator, constant rent from base period, etc.)?

10. Valuation of changes in stocks and, in particular, depletion – Short term

The following options have been put forward in the SEEA-2003. They include (SEEA-2003 Box 10.8):

Option E1 Is consistent with the SNA. This records the value of the depletion in the other changes in asset account.

Option E2 Partitions the actual payment into two elements. The part which corresponds to the decline in value of the asset is recorded as a capital

transfer from the user to the owner as recompense for the decline in the asset's value; the rest is recorded as property income (rent) payable from the user to the owner in the distribution of primary income account.

Option E3 Maintains the recording of the actual payment from the user to the owner as property income in the distribution of primary income account but treats this as rent gross of depletion. An element for the consumption of natural capital is shown in this account for the owner also to reduce the rent to a value net of depletion.

Option E4 It is similar to option E3 but assumes that the consumption of natural capital allows for the discoveries made during the year as well as the extraction.

More discussion should take place to reach an agreement on the recording of depletion in the SEEA.

11. Decomposition of changes in stock value – Short term

The SEEA-2003 provides in the case of asset accounts for mineral resources a method to decompose changes in stock value into changes due to human activities (including depletion), natural causes and revaluation. However there is no agreement on the method. Further, the SEEA-2003 does not provide any indication on how to decompose the changes in stock values in case of renewable resources (e.g. forest and fish).

12. Decommissioning costs and recording ownership of mineral-related assets – Short term

The SEEA-2003 suggested more than one option in recording decommissioning costs and recording of ownership of mineral-related assets. The Canberra II group and the AEG have agreed with changing the current SNA treatment of decommissioning costs. The SEEA will have to be updated to reflect the changes in the 1993SNA Rev.1.

13. Extension of the methodology used for oil and gas accounts to other mineral resources – Short term

Most of the methodological work as well as compilation of mineral accounts has focused on oil and gas. Would the methods for, say calculating the resource rent, valuing the stocks, etc. be applicable also for other mineral resources?

14. Confidentiality and the compilation of minerals and energy resources – Short term

Several countries have raised the issue that although information on stocks is often available, it should be treated as confidential. Further international guidelines have to be made on how to deal with confidential information when compiling and publishing mineral accounts.

15. Inclusion of financial wealth related to natural assets in the SEEA asset boundary (Statistics Norway) *– Short term*

This issue is raised in the context of mineral accounts because in some countries a large portion of the national wealth generated by the extraction of mineral resources is invested

in financial assets. For analytical purposes, the changes in wealth of a country from the exploration of mineral assets should reflect non-produced, produced and financial assets (e.g. Norwegian oil fund).

16. Resource rent and "specific" taxes and subsidies (for example on oil extraction) in the national accounts (Statistics Norway) – *Short term*

There is a question of whether these "specific" taxes should be treated as general taxes and thus excluded from the part of the resource rent that the government captures (as recommended by the SEEA-2003) or they should be treated as royalties. Here consistency with the GFS should be sought.

Water accounting (UNSD)

17. Treatment of water in artificial reservoirs as a produced asset – Short term

Considerable money is spent to build dams to retain the water from flowing downstream to the sea. Also, continuous control and management of the water resources is exercised both in the case in which the water is used for abstraction, purification and distribution, or for other uses such as hydroelectric power generation. Therefore, in line with the definition of cultivated assets in the SEEA and now agreed in the SNA revision process[3], water in the reservoirs should be considered a produced asset. In parallel with the treatment of natural growth of cultivated forest and fish as produced asset, precipitation and inflows of water in the reservoirs should be considered as capital formation. As a result, water in the reservoir should be added to the classification of produced asset.

18. Treatment of illegal tapping – Short term

In many countries, especially developing countries, an illegal connection to the water distribution network from households and industries is frequent. The question is how to treat illegal tapping in the water accounts and, more in general, in the national accounts. The following two options come to mind:

1) Water used as a result of illegal tapping could be considered a loss and thus included as part of water consumption. In this case, the flows in the physical supply and use table (PSUT) would correspond to the flows in the monetary SUT, but, for example indicators of water efficiency by industry would be misleading. Also, whom should the water consumption be allocated to? To the industry that collects, purifies and distribute water (ISIC 37)?

2) Water used as a result of illegal tapping could be allocated to the end user. In this case, the production of water by (ISIC Rev.4 36) is a legal activity but consumption is illegal. If we allocate the water used as a result of illegal tapping to the users, the following questions arise: what value for the production of water should be used (e.g. imputed at purchasers' price)? Should we impute some type of transfer from

[3] Cultivated assets are defined as: "livestock for breeding, dairy, draught, etc. and vineyards, orchards and other trees yielding repeat products ***whose natural growth and/or regeneration is*** under the direct control, responsibility and management of institutional units. (SEEA-2003 para 7.58)

say ISIC 36 to the households or industries? How should these transfers be classified? (They cannot be social transfer as they are from a corporation to household)

The Advisory Expert Group on National Accounts has deliberated not to change the 1993 SNA treatment of illegal activities. Option 1 will thus be in line with the updated 1993 SNA. Option 2 seems more policy relevant.

19. Valuation of water – Long term

Water is increasingly a scarce resource. International agreements such as the Johannesburg Plan of Implementation, the Water Framework Directive, etc. recognize that water is an economic good. How to value water in national accounts framework? A proposals of valuing water as a mineral asset and, in case this is not feasible using payments for water rights as proxy has been put forwards during the update of the 1993 SNA. The issue of water valuation has to be further considered.

20. Quality accounts - Long term

Quality accounts are still experimental. They are important because water quality limits the use of water by the economy and the economy impacts the quality of water. However there are several measurement issues. Water quality is highly variable over time and space. The question is what aspects of water quality can be meaningfully presented in an accounting framework. How should quality classes be defined? How to aggregate across pollutants to obtain a quality index? How to aggregate over space and over time? What is the link between changes in quality of water and emissions?

Land (Statistics Denmark)

21. Land valuation – Short term

The 1993 SNA recommends, whenever possible, valuing the land separate from the building which lies on it. If the value of the buildings based on the perpetual inventory method calculation is deducted from the value of the combined asset, the land value captures all the market fluctuations and, in the cases in which there are big capital losses, it can be negative.

22. Soil

Soil has only marginally been addressed in the SEEA-2003. Although it appears in the asset classification, there is very little text addressing the issues on how to measure changes in soil quantity and quality and valuing soil degradation this is definitely an important issue. Should it be included in the short- or long-term research agenda?

Forest Accounts

[ISSUES TO BE CONTRIBUTED BY FAO AND STATISTICS FINLAND]

Fishery Accounts

[ISSUES TO BE CONTRIBUTED BY FAO]

CHAPTER 9 VALUATION TECHNIQUES FOR MEASURING DEGRADATION

(World Bank)

23. Clarifying concepts - Short term
This chapter needs to distinguish between monetary accounts (previous-period measures of production and consumption, level of assets, additions to and subtractions from assets) and models (applications of the accounts to explore scenarios and analyze policy options). Modelling approaches such as 'maintenance costing' and 'greened economy modelling' should be presented as applications in Chapter 11. Valuing degradation then becomes a matter of valuing the damage to assets (produced, natural or human) associated with use of the environment – it is akin to consumption of fixed capital.

24. Deciding which assets to value - Short term
If degradation = damage to assets, then we need to decide which assets to value (beyond the SNA boundary). Some seem inherently difficult to value, such as atmospheric ecosystems, but it is still possible to link physical change in air quality or ozone layer coverage to damages to other assets which can be valued. Damage to human health (morbidity and mortality) represents damage to human capital (an amalgam of healthfulness, skills and knowledge) – do we require an asset value for human capital in order to arrive at damage-adjusted accounting aggregates (i.e., does the SEEA need to be a fully integrated set of accounts)?

25. Treatment of transboundary pollution – Short or long term?
Fuller treatment is needed for transboundary pollution – the question of damages caused vs. damages borne needs to be explored. Underlying this question are assumptions about property rights – for example, whether countries have the right not to be polluted by their neighbours.

26. Valuation techniques – Short or long term?
Most of the revealed preference and stated preference methods described in the present chapter would seem to apply to valuing non-market assets (such as protected areas) – should this material appear in Chapter 7? Dose-response approaches appear to be the best match to the question of damage valuation. New material needs to be added on valuing morbidity and mortality (i.e. damages to human capital associated with exposure to pollution).

27. Valuation of degradation – Long term
The SEEA-2003 presents three approaches for the valuation of degradation, namely the damage cost, the maintenance cost and the modelling approach. The three methods represent different concepts and philosophical approaches to analysis. Although further research in this area would certainly promote a standardization process, which is needed, it does not seem plausible that these approaches can be reconciled. There is very little practical experience in the valuation of degradation in an accounting context. To date only few countries have experimented with the techniques recommended in the SEEA and no country has implemented the three approaches and compared the results in relation to environmental accounting. It is therefore suggested to adopt a pragmatic

approach and put in place some pilot studies to experiment with the various approaches.

CHAPTER 10 MAKING ADJUSTMENTS TO THE FLOW ACCOUNTS
(World Bank)

28. Depletion - Short term (see also issue 10)
We need to establish criteria by which we would choose one of a set of options presented for different aspects of valuing depletion. The choices made here need to be reflected in **Chapter 8**, and in fact it may make more sense to move most of this material to **Chapter 8** – the adjustment of the flow aggregates for depletion is relatively straightforward once these choices are made. The options to be decided include A1-A3 (Box 10.1) on apportioning resource rent between income and depletion, B1-B3 (Box 10.3) on treating mineral exploration, C1-C3 (Box 10.4) on additions and deductions from the asset accounts, D1-D3 (Box 10.7)on ownership of resources, and E1-E4 (Box 10.8) on the treatment of depletion in the owner's balance sheet.

29. Defensive expenditure - Short term
Decision needed on how to treat this – do we agree on the 'gross-gross' method presented? What are the alternatives and their pros and cons?

30. Damage-adjusted aggregates for income, product and saving - Short or long term?
In addition to income, product and saving aggregates, there should be corresponding changes in the asset accounts (if a fully integrated accounting system is the goal).

31. Environmental debt – Short or long term?
This is presented only very briefly and needs further thought. Is it a useful concept? Examples? Toxic waste dump sites? Stock pollutants such as CO2? How should these be priced?

CHAPTER 11 – APPLICATIONS AND POLICY USES OF THE SEEA (All)

32. Uses of the accounts- Short term
The SEEA-2003 presents examples of how the accounts can be used for monitoring performances and for more analytical purposes. Examples of indicators as well as other ways to disseminate the results of the accounts (e.g. environmental-economic profiles, etc.) are presented. There is a general consensus of the need for developing additional standard dissemination techniques as well as for "educating" the users to the potential of using the accounting approach for analysis and policy making. Linking the accounts to the indicators, including millennium development goals indicators, sustainable development indicators, will increase the policy relevance of the accounts and make them more "visible". Moreover, there is a need to provide further guidance and examples on how to use the accounts for modelling (e.g. scenario modelling, decomposition analyses, etc.).

OTHER ISSUES

33. Expansion of the SEEA to social aspects (Statistics Sweden) – *Long term*

The SEEA-2003 addresses the inter-relationship between the economy and the environment. It does not cover the social aspect. It has been argued by some commentators that in order for the SEEA to be considered as the framework to measure sustainable development, it should be expanded to include the third pillar of sustainable development. In particular, the following three issues could be addressed in the expansion of the SEEA to include social aspects:

(a) Socio-economic issues already included in the national accounts, such as employment, education, gender, income, etc.;

(b) Socio-economic issues such as sickness caused by environmental degradation, work environment, traffic accidents, number of people with access to safe drinking water and sanitation, etc.

(c) Social issues that are important to measuring sustainable development in general sense only loosely linked with the economic or environmental spheres such as poverty, sickness, threat of violence, unemployment, etc.

34. Measurement of ecosystems (European Environment Agency) – *Long term*

The SEEA-2003 in Chapter 8 – Section F describes the land and ecosystem accounts. It presents the basic accounts and supplementary accounts. The basic accounts are a standardized approach to land accounting and describe the interface between land use and land cover. Supplementary accounts are issue-oriented and take into account national and regional consideration and thus do not use standard classifications. At the time the SEEA-2003 was written there was little experience in the compilation of such accounts. However, measurement of ecosystems is becoming increasingly an area of interest by policy makers. The SEEA-2003 can offer the framework for building an information system to measure ecosystems, in particular in terms of bringing together information from different sources and harmonizing definitions and classifications used by different data collection activities (e.g. space agencies, environmental information systems available at the country and international levels, etc.). More practical and methodological work is needed in this area.