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THE SEEA AND THE OPERATIONAL MANUAL

- A comparison -

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¹ The views expressed are those of the author and may not reflect the official position of the United Nations.

1. Introduction

The United Nations Statistics Division (UNSD) published in 1993 a Handbook of National Accounting *Integrated Environmental and Economic Accounting*.² The handbook was based on numerous approaches to environmental accounting. Several “versions” or modules representing extensions or modifications of the 1993 System of National Accounts (1993 SNA)³ were presented. Discussion of concepts and methods had not come to a final conclusion and the handbook was published as an “interim” version of work in progress.

Before the publication of the SEEA, environmental accounts had been tested only in few case studies. In Indonesia and Costa Rica the World Resources Institute carried out case studies and in Mexico, Papua New Guinea and Thailand, UNSD and the World Bank carried out pilot projects. After the publication of the SEEA, several developing and developed countries started experimenting on the compilation of the SEEA. In 1994 the London Group on Environmental and Natural Resources Accounting was created providing a forum for discussion of methodological issues linked to the implementation of the SEEA. Increased discussion of concepts and methods of environmental accounting accompanied with country experiences led to a convergence of compilation methodologies for selected modules of the SEEA.

The *Integrated Environmental and Economic Accounting – An Operational Manual*⁴ which the United Nations Statistics Division (UNSD) and the United Nations Environment Programme (UNEP) will publish at the end of 1999, reflects the progress made world-wide on concepts and methods of environmental accounting since the publication of the SEEA. It provides hands-on guidance for the implementation of those modules or “versions”, which country studies have shown possible to compile within reasonable time and cost constraints. It is accompanied by a user-friendly software consisting of a sequence of worksheets linked through a set of automatic formulae.

The manual is, therefore, intended for countries that plan or are in an initial stage of implementation of integrated environmental and economic accounting. Countries that have had a long programme of environmental accounting are compiling most of the modules discussed in the handbook as part of their routine work.

The Operational Manual discusses in some details possible uses and applications of the results of the SEEA compilation in policy making. This is an innovation with respect to the 1993 SEEA. It reflects the need to promote the importance of implementing the SEEA in cooperation with data users and producers from diverse line ministries and institutions. It also tries to link the SEEA to the discussion of measuring sustainable development.

The Operational Manual is the result of the collaboration within the so-called “Nairobi Group” established by UNEP to advance international work in the fields of environment and natural resources accounting. Members of the Group include internationally recognized experts in the field from developed and developing countries, international organizations and non-governmental organizations.

² Referred in the following as “SEEA”.

³ Referred in the following as “1993 SNA”.

⁴ Referred in the following as “Operational Manual”.

The Operational Manual supplements the handbook *Integrated Environmental and Economic Accounting* by: 1) further developing and clarifying concepts discussed in the SEEA on a theoretical level on the basis of the on-going discussions in various international fora; and 2) providing a practical tools for the implementation of the SEEA. The Operational Manual abandons the concept of “versions”, representing different approaches to environmental accounting, and presents one single approach with possible implementation alternatives. The system is represented by a sequence of steps and related worksheets, which are linked to the SEEA “versions”, which were tested in practical applications. The worksheets represent tabulations of the raw data that need to be compiled from different sources in order to fit them into the accounts. They can be grouped into four main modules: 1) environmental protection expenditures; 2) asset accounts; 3) emission accounts; and 4) analysis tables.

This paper attempts to identify the concepts that have been further elaborated in the Operational Manual as a result of progress made since the publication of the SEEA and to discuss the link between the Operational Manual modules and the SEEA “versions”.

2. Comparison between SEEA and the Operational Manual

Objectives and target audience

The **SEEA** is a conceptual manual, which describes different approaches of environmental accounting from a theoretical point of view. One of the disadvantages of the SEEA, which is a “comprehensive” system, is that some approaches are contradictory with one another and cannot be implemented in practice. The SEEA does not have a definite audience as it is work-in-progress and not a manual on best practices. It addresses, in addition to data producers (mainly national accountants), researchers and economists interested more in the methodologies, at times controversial and experimental, than with data compilation or organization.

The **Operational Manual** is a compilation manual, which accompanies the SEEA. It presents only selected modules that have proven applicable in country case studies and it is written in an easy-to-understand way. It has a definite audience, which includes data producers, who are at the beginning of or want to start implementation of the SEEA, and data users who want to know what is the usefulness in investing considerable resources to carry out the SEEA compilation. Particular attention is devoted to the use of the accounts as well as to the coordination mechanism that needs to be set up in a country for the successful long-term implementation of the accounts.

As a consequences of the approach adopted in the Operational Manual, the SEEA versions are abandoned in favour of a sequence of how-to-steps, which provide guidance and illustrative tabulations for the compilation of data on environmental protection expenditures, the use of produced and non-produced assets in physical and monetary terms, and for the presentation and interpretation of environmentally adjusted aggregates.

Direct vs. indirect impacts:

The SEEA proposes to monitor environmental changes caused by economic activities by analyzing both direct and indirect impacts of the economic use on the environment and economic activities. Indirect impacts of environmental degradation include impacts on health, produced assets, e.g. buildings, roads and dams, evacuation of people to avoid exposure to the degraded environment, etc. The Operational Manual focuses on the measurement of direct impacts only. Environmental protection expenditures (see below), uses of natural resources (depletion) and emissions into the environmental media are measured.

Environmental Protection Expenditures:

The **SEEA** covers actual costs actual costs to prevent or to restore the immediate negative impacts of economic activities on the natural environment *and* to prevent and compensate for further negative impacts of the repercussions of a deteriorated natural environment. These actual costs include expenditures for environmental protection and expenditures for mitigating the damage (for example to health) caused by the deterioration of the environmental media. The SEEA distinguishes these expenditures into four broad categories: (a) preventive environmental protection expenditures; (b) environmental restoration (reactive environmental protection); (c) avoidance of damage from repercussions of environmental deterioration; (d) treatment of damages caused by environmental repercussions.

The **Operational manual** limits its coverage to actual expenditures incurred by industries, households and the government to avoid environmental degradation or eliminate part of the effects after the degradation takes place. It does not include repercussion expenditures, e.g. expenditures incurred as a result of environmental degradation (secondary impacts). It focuses therefore on the estimation of expenditures 1) and 2) above. It is very difficult, in practice, to assess the additional expenditures for health, repairs and cleaning of buildings and relocation of households as a result of environmental degradation. This is also in line with the decision of considering only direct impact of economic activities on the environment.

Definition of economic and non-economic “environmental” assets:

The **SEEA** does not provide a clear definition of economic and non-economic “environmental” assets. The **Operational Manual** attempts to provide practical recommendations on whether an asset should be classified economic or “environmental”. The SNA definition of economic asset is extended to include all assets that are currently exploitable or likely to be so, for economic purposes, even if no explicit ownership or control is currently exerted over these resources. Economic assets in the SEEA would therefore include fish in the oceans, within the EEZ of a country or commercially exploitable timber in tropical forests, etc. Environmental assets are all those assets that cannot be considered economic. They include ecosystems accounts, which are measured in terms of area and biodiversity. No double counting, even in physical terms is recommended.

Depletion:

The SNA, SEEA and Operational Manual define depletion in slightly different ways. In the **SNA**, depletion is the reduction in value of the asset as a result of physical removal or using up of the asset. The **SEEA** represents depletion as the quantitative use of the assets. The **Operational Manual** develops the definition of the SEEA and distinguishes between renewable

and non-renewable resources. Depletion is the permanent loss in quantity of parts or all of a natural asset, beyond natural regeneration or replenishment. For renewable resources, depletion is thus the part of the harvest, logging, catch etc., which exceeds the sustainable level of resource use. For non-renewable resources (mineral deposits), it is the quantity of the resource extracted.

The **SEEA** suggest to value depletion either at market value or at maintenance cost, according to the SEEA version. It is suggested that the difference between maintenance and the market value of net depletion could be viewed as ecological depletion that is not reflected in the valuation of economic functions of produced natural assets.

The **Operational manual** adopts a more conservative view. It values depletion at market value only, as the imputed cost required to reduce the depletion in order to regain the previous quantitative level of natural assets are linked to the choice of the measure to reduce depletion. Each measure yields very different costs. Moreover, these measures often imply political decisions, such as putting in place logging ban and enforcing it, which are hardly quantifiable in monetary terms.

Degradation:

Degradation in the **SEEA** refers to changes in quality of the asset. Degradation in the **Operational Manual** refers to emissions, which in turns cause changes in environmental quality. In the Operational Manual changes in environmental quality caused by emissions in physical or monetary terms are not directly valued. Instead, physical indicators of environmental quality are reported for analysis of possible links between emissions and changes in quality.

Degradation, that is the change in environmental quality of an asset, is measured both in the SEEA and in the Operational Manual, only insofar as its value can be identified from changes in market price. In practice it is rarely possible to identify how much of the changes in price is due to degradation.

Emissions:

In the **SEEA**, the difference between emissions and degradation is not clear-cut. Changes in quality caused by the economic activities are what we aim to measure and emissions are a proxy for it. Changes in quality and emissions are related, but not directly. The **Operational Manual** attempts to clarify this concept. It is, in practice, very difficult to identify the changes in quality caused by a certain economic activity during the accounting period. For this reason the Operational Manual focuses on emissions by economic activities in physical terms and values them at maintenance cost. This cost does not represent the damage caused by economic activity, but the cost that the polluting industry should have been incurred in order to abate the emissions (see valuation). It provides a rough estimate of the cost of putting in place certain environmental regulations.

Valuation – cost caused vs. cost borne:

As mentioned earlier, the **SEEA** embraces different approaches to environmental accounting. It includes in its different modules (see below), market valuation as well as maintenance (cost caused) and contingent valuation (cost borne) methods. Both cost caused and cost borne

approach are entertained in the SEEA. The **Operational Manual** does not discuss the cost borne approach, as the application of contingent valuation approaches at national level are still in experimental stages. Moreover, it is doubtful that contingent valuations are suitable for the incorporation in national accounts, which are based on values of market transactions and do not measure welfare.

Market valuation:

The **SEEA** does not provide practical guidance on how to apply market valuation for assets that are not sold in full on the market, such as subsoil assets, forests, etc. The **Operational Manual** provides detailed descriptions of different valuation methods. It also discusses possible data sources and estimation techniques.

Restoration cost

Maintenance cost in the **SEEA** includes restoration costs that is the costs of imputed restoration activities that diminish actual environmental impacts and reduce physical flows of damaging residuals. The **Operational Manual** does not include restoration costs as part of maintenance costs. Such costs in fact are not consistent with the cost caused approach embraced in the **Operational Manual**. As discussed earlier, in practice it is very difficult to estimate the impact of current economic activities on the quality of the environment. It is even more difficult to estimate the cost to restore the environment as it was at the beginning of the accounting period.

Transboundary flows:

In the **SEEA**, transboundary flows of residuals are recorded as a negative exports or imports, thus affecting GDP. In the **Operational Manual**, transboundary flows of pollutants are shown as "external use of natural assets" and are presented only in physical terms. They are considered as transfers that would affect the current external balance (but not the external balance of goods and services) and thus national (disposable) income, but not GDP/EDP.

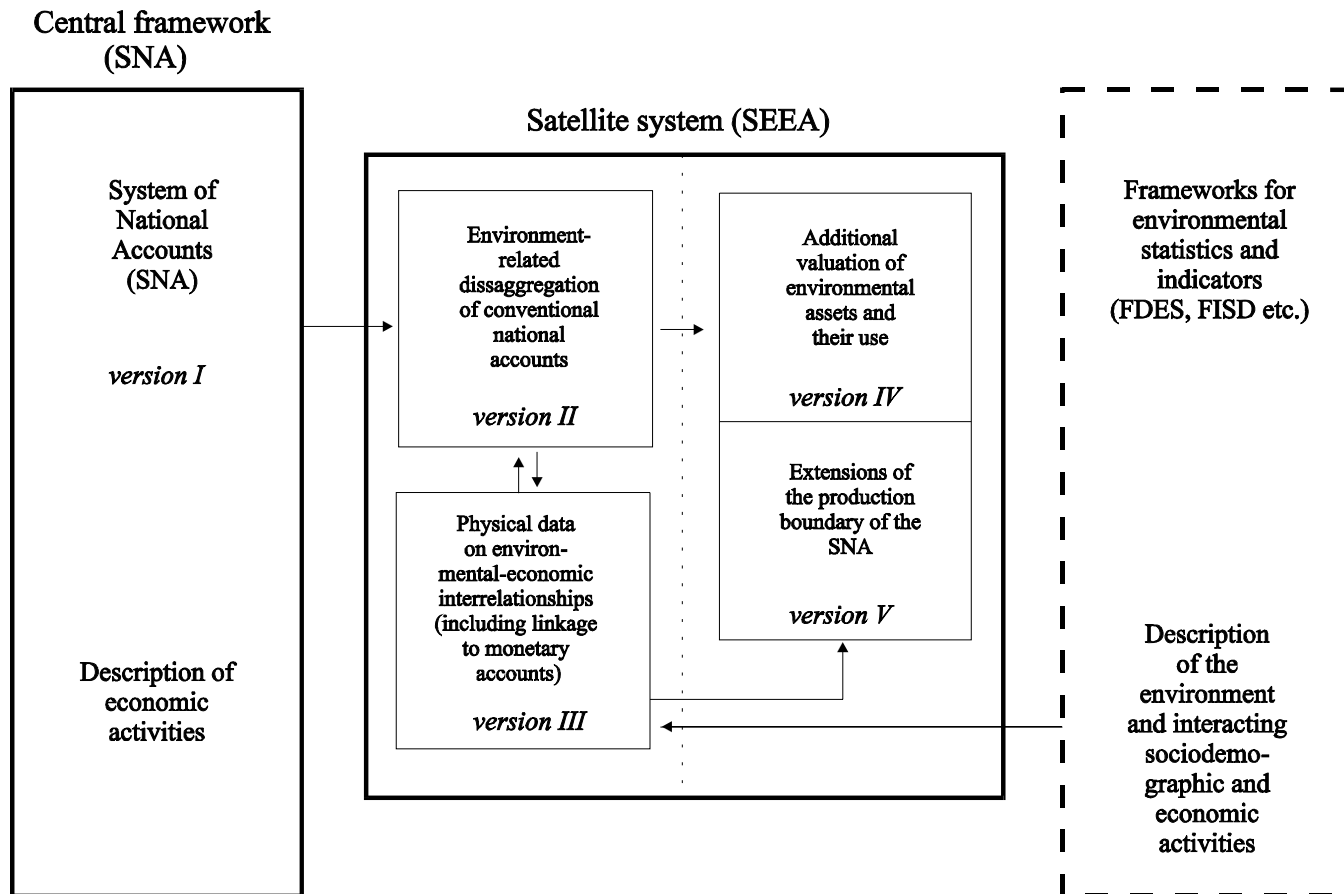
3. SEEA “versions” and the Operational Manual

The SEEA has been designed with a high degree of flexibility to facilitate choices from a broad range of theoretical approaches for the adaptation of the system to national priorities, environmental concerns and statistical capabilities. This is achieved by means of "versions" or modules. As shown in Figure 1, the SEEA thus consists of five major versions that expand increasingly the SNA concepts and system boundaries.

Version I is the basic national accounting framework of the SEEA, obtained through reformatting the SNA supply, use and asset accounts. These accounts are modified to present in detail environmentally relevant economic activities. Other activities that do not affect or are not affected by the environment would be shown at an aggregate level only.

Version II describes those flows and stocks that are already part of the conventional accounts but are not separately identified in those accounts. It sets out from the supply and use tables and non-financial asset accounts of version I. Environmental protection activities that prevent and

Figure 1. SEEA versions and links to the 1993 SNA



Source: United Nations (1993).

mitigate environmental deterioration are shown in a classification specifically developed for these accounts, the Classification of Environmental Protection Activities (CEPA).

Version III combines concepts of materials and energy balances and natural resource accounting to present the physical counterpart of the monetary SEEA version IV. It indicates also possible extensions of this counterpart presentation by fully developing materials and energy balances and natural resource accounting.

Version IV of the SEEA introduces different approaches for estimating the value of natural assets and the imputed costs of their uses. Three different valuation methods are presented as different modules of version IV:

- (a) market valuation according to the principles of non-financial asset accounting in the SNA (version IV.1);
- (b) maintenance valuation which estimates the cost necessary to sustain at least the present (or a feasible standard) level of natural assets (version IV.2); and
- (c) contingent and related demand-side valuations for estimating the (damage) value of the loss of consumptive services of the environment, i.e. the damage borne by individuals (version IV.3).

The modules contained in version V represent further extensions of the production boundary of the SNA. They refer to the analysis of household production and its impacts on the environment and human welfare, applying the three basic valuation methods, mentioned in the previous paragraph, to develop versions V.1, V.2 and V.3. A further expansion of this boundary is made by introducing the production of spatial and related services of land (version V.4) and of consumer services related to physiological, recreational and other environmental amenities (version V.5). A last version (V.6) "externalizes" internal (ancillary) environmental protection activities in a broader concept of output and production, based on Version II.

The Operational Manual covers versions I and II and parts of versions III, IV and V. Material and energy flow accounts, discussed in versions III, although have received increased attention in the international for a and have been compiled in several countries are not discussed in Operational Manual because they are data demanding and are therefore not recommended for countries at their initial stage of environmental-economic accounting implementation. Physical resources accounting, on the other hand, are developed in details in the Operational Manual.

A combination of version IV.1 and IV.2 of the SEEA is recommended. In particular, for all assets that can be valued using market valuation, e.g. land, forest, subsoil assets, fish and water monetary asset accounts are recommended. Calculation of depletion at maintenance cost is not included (see above). Instead, emissions into different media, for which a market price does not exist, are valued at maintenance value and environmentally-adjusted aggregates are compiled deducting depletion costs at market value (EDPI) and emission costs at maintenance value (EDPII).

The valuation method suggested in version IV.3 is not completely consistent with the SNA concepts. Moreover, damage caused exclusively during the accounting period is hardly identifiable from the total damage borne. It is therefore not discussed in the Operational Manual. In addition, modules applying valuations of damage of ecosystems and humans from losses of environmental services were also found difficult to implement and therefore are not discussed in the Operational Manual.

Version V and its modules have not been applied, except for the externalization of ancillary services for environmental protection, in country programmes of SEEA application. The reasons are methodological and data problems; version V is therefore not further described in the Operational Manual.