DEPARTMENT OF ECONOMIC AND SOCIAL AFFAIRS
STATISTICS DIVISION
UNITED NATIONS

System of Environmental Economic Accounting

System of Environmental-Economic Accounting 2012 – Experimental Ecosystem Accounting Revision

First Global Consultation on:

Chapter 8: Principles of valuation for Ecosystem Accounting

Chapter 9: Accounting for ecosystem services in monetary terms

Chapter 10: Accounting for ecosystem assets in monetary terms

Chapter 11: Integrated and extended accounting for ecosystem services and assets

Comments Form

Deadline for responses: 6 July 2020
Send responses to: seea@un.org

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The comment form has been designed to facilitate the analysis of comments. There are twelve guiding questions in the form, please respond to the questions in the indicated boxes below. To submit responses please save this document and send it as an attachment to the following e-mail address: seea@un.org.

All documents can be also found on the SEEA EEA Revision website at:
https://seea.un.org/content/seea-experimental-ecosystem-accounting-revision

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Questions related to Chapter 8

Question 1: Do you have comments on the principles proposed to underpin monetary valuation for the revised SEEA EEA, including the use of exchange values and net present value approaches?

These draft chapters conclude a long run process and reflect the important involvement of many people. The willingness to closer the SEEA to the SNA in terms of methods and concepts is very clear. We think this is a central point to make the SEEA more useful and broadly accepted. The separation in four chapters makes the description of the proposed system very clear. Their order makes them very didactic. The redaction is clear and concept well defined. However, we propose several points that could improve the draft chapters.

The central position of ecosystem services (ES) valuation rather than maintenance cost and the choice of net present value (NPV) of ES to value assets is based on the implicit resolution of an old debate, running from 1993 to today: the cost-borne VS cost-caused debate (it later evolved to cost-based approach vs damage-based approach).
Still explicit in the 2003 version of the SEEA, this debate has been mainly resolved by the choices of individuals involved in the revision process and contingencies rather than on strong theoretical grounds or according to needs of statistical offices. From 2005 to 2010, the UNCEEA repeatedly call the leader of the valuation research agenda (the World Bank) to work on cost-based approach, unsuccessfully. The final rush for publication of the SEEA gave very little space for cost-based methods. After 2013, the ES approach, supported by an international interest (Millennium Ecosystem Assessment 2003; TEEB 2010; IPBES; the work of the World Bank) and thanks to the departure of the last defenders of the cost approach, was almost the sole method explored in research agendas. Once the perspective chosen, good arguments arose to exclude the cost-based approach (Obst, Hein, and Edens 2016). In fact, these arguments only show the inconsistencies of both approaches, but do not kill the alternative. The cost-based approach only remained as an old-fashioned heritage and has not really been studied anymore.
Thus, concerns expressed by the German Federal Statistical Office in a paper presented during the preliminary meeting of the UNCEEA in August 2005 were well-founded: a change of majority resolved the debate, not joint experiments of the two approaches in several countries (see annexed document below). Unfortunately, these experiments have never been carried out.

This choice is somehow explained for what seems to be good reasons: the underlying context on ecosystem degradation calls for making the value of nature, as well as gain and loss of benefits visible. In comparison, the climate change issue is already accepted enough so that we mostly focus on the cost of reduction (and maybe of restoration) of the atmosphere.
However, a number of scientific publications showed that ES failed to usefully equip decision processes about ecosystems conservation and restoration. In addition, in some countries, political and social contexts already call for cost-based valuation in order to manage ecosystems at a national level. Since this approach draw on society's decisions, it includes more values and better reflect the overall value of nature.

In addition, feasibility is a central issue in national accounting and ES valuations have important weaknesses: some valuation methods are not consistent with accounting; each method covers few ES; valuing all current production and use of ES in a useful way costs very much; statistical offices are not able to do it yet; measuring expected future ES lies on assumptions about the future.
In contrast, cost-based approaches are easy to implement. Costs are consistent with accounting as they are actual transactions; they are inclusive and covers almost all ecosystems (and all environmental issues); they are measured based on existing technologies (if they evolve, revaluation is easy).
Feasibility is the main reason why current policies use cost approaches. This is the case of the Marine Strategy Framework Directive (for an analysis, see for instance Levrel et al., 2014); several countries use this approach for Water Framework Directive; in French CBA, biodiversity value is measured as costs of the mitigation hierarchy. On the contrary, TEEB's cost of policy inaction (see Levrel 2013), and several French institutional exercises (Chevassus-au-Louis, Salles, and Pujol 2009; Quinet et al. 2019; 2009) failed to use damage-based approach because of technical and data availability problems. Even if, from a theoretical point of view, cost-based approach is second-best, often it is finally used.

Therefore, as a minimum, we believe the introduction of chapter 8 should explain the choice of the final method explicitly and trace the history of the underlying debates in the SEEA.

And we think that the SEEA needs to go further, as this choice may be made at a national level rather than an international one. Thus, cost-based approach must be explained in detail and efforts need to be made in order to improve this method, which is not weaker than valuations of ES are. A good starting point would be the SEEA 2003 (United Nations et al. 2003) and all experiments carried out for this version.

This would improve the SEEA and its use in several ways:

- Countries can choose the best approach, according to progress made by environmental issues in their own contexts;
- As the second alternative method for valuing assets outside markets is the cost of production (United Nations et al. 2009, para. 13.23), and the net present value is only the third one (United Nations et al. 2009, para. 13.24), it will bring the SEEA closer to the SNA;
- Focusing on ecosystem themselves, it will lower the risks of managing them through the exclusive lens of ES, which can reduce the set of values considered and mislead conservation choices.

Question 2. Do you have any suggestions for topics to include in Annex 8.1?

Click here and start typing (The length of your response is not limited by this text box.)

Question 3. Do you have any other comments on Chapter 8?

We fully agree with the definition of ecosystems as ecological entities. This is an important precondition to create a dedicated institutional sector.

More generally, the draft chapters of the SEEA EEA often consider the SNA as a very rigid and almost frozen system, while SNA's principles are discussed in every session of the UNSC. The SEEA could propose more important changes in the SNA.

As explained in paragraphs 8.2 to 8.4, these policy motivations are in fact inconsistent if we consider that ecosystem preservation is indeed necessary. Paragraph 8.2 states that "the motivation for monetary valuation using a common monetary unit or numeraire is to be able to make consistent comparisons of different ecosystem services and ecosystem assets in the context". However, the rationale of Ecosystem Accounts is that ecosystems are not always abundant and safe: some are scarce and degraded; therefore, degraded ecosystems are not comparable to healthy ones and should be included in separate accounts, using different valuation approaches. Paragraph 8.3 states that "making explicit the relative importance of ecosystem services and assets will support public awareness". However, awareness is needed for the absolute, not relative, importance of the ecosystems which would appear to be in a critical situation.

The policy motivation for this attempt to put a monetary value on all ecosystem services and assets seems also in accordance with the exhaustiveness rule of accounting. However, this attempt is misleading and it demonstrates that the roots and the motivations for ecosystem accounting still need to be clarified. Indeed, a general national account does not represent a whole country and all the actions of its people: it represents (with an inclusion criterion in terms of minimum value or size) the production, exchange and consumption of goods and services (including public services), and the means which are necessary to ensure these operations. Similarly, an ecosystem account should not attempt to represent all the ecosystems and their services (we will never be able to fully estimate with monetary values the cultural services linked to the spiritual benefits of ecosystems), but a narrower set of interactions, which should be carefully designed (for instance the actions that societies currently implement for using and preserving ecosystem and their services, according to the existing institutions and the actual state of ecosystems). Adopting such a narrower and more operational scope for ecosystem accounting would remove this difficulty of trying to create "exchange values" where they do not exist.

Questions related to Chapter 9

Question 4. Do you have comments on the range of valuation methods proposed for use in estimating exchange values of ecosystem services?

Residual method (resource rent) assumes that markets fully take into account the value of ES. This is in contradiction with the primary motivation expressed in introduction of chapter 8. In addition, rents hardly exist in reality. Horlings et al. (2020) mention this issue in their conclusion, taking the example of agriculture and tourism, where rents barely exist due to the high level of competition. This considerably reduces the scope of this method. An assessment on this issue is needed in order to know if this method can or cannot remain in the chapter.

Opportunity cost simulates an economy that does not exist. Simulate a virtual economy in national accounting has been discussed between 1995 and around 2005 and has been rejected. National accounting should indeed represent the real economy. Imputations are virtual transactions that, if occurring, would not change the structure of the economy. In contrast, situations used to calculate opportunity costs would change it.
As a consequence, we propose to exclude this method from the range of valuation methods.

Contingent valuation and choice experiment: in contrast with opportunity cost (that use virtual situations based on existing markets), these methods are based on non-existing markets. This goes very much further than current imputations of the SNA.

Defensive expenditure is awkwardly described and used: consistently with the current logic, we would have rather use defensive expenditure values as input to calibrate the replacement cost method. But make it standalone seems weird. As defensive expenditures are already included in the production boundary, its use in another context should be more carefully explained.

Question 5. Do you have any other comments on Chapter 9?

Methods used to value ES have several defects, well described in the literature (see for instance, Horowitz and McConnell 2003; Kahneman and Ritov 1994; Kahneman, Knetsch, and Thaler 1990; Pearce 2007; Heal 2000; Stiglitz, Sen, and Fitoussi 2009). In the context of accounting:

- They have microeconomic roots and **aggregation to a macroeconomic level is not possible**. If it is, the description of a detailed method would be a real improvement;
- They are **inconsistent with each other** and cannot be added up (especially to calculate asset values);
- Individually, they are **not compatible with the integrated system** proposed in chapter 11 because they lie on very different principles (rents, costs of production, replacement cost, opportunity costs, willingness to pay, etc.) whereas the sequence of account choose one of this approach (ES as final or intermediate consumption).

This chapter needs major revision with a single method of valuation in mind in order to ensure consistency of the valuation process and integration of ES into national accounting. The most suitable method might be productivity change. Martin et al. (2018) have proposed an interesting example that can provide input to the SEEA. In case no strong method can be proposed, valuation of ES should be abandoned in the context of ecosystem accounting. Indeed, in practice, when weak numbers are calculated, they are barely used. In this case, ecosystem accounting could focus on producing robust information on ecosystem capacity and use, while valuation would be performed by users, following fit-for-purpose methods.

Questions related to Chapter 10

Question 6. Do you have comments on the definitions of entries for the ecosystem monetary asset account including ecosystem enhancement, ecosystem degradation and ecosystem conversions?

We fully agree with the choice of defining ecosystem variation according to physical variation first, and then derive economic variation. We agree with the list of variations.

Ecosystem enhancement and degradation

We agree with the distinction and definitions of restoration, rehabilitation and reclamation.

The definition needs to be clarified as it lies on an incorrect assumption: that ES increase is positively correlated with ecosystem condition (as described in draft chapter 5). A few but common cases logically invalidate the assumption: agricultural intensive lands increase the value of provisioning services, but decrease the condition of the ecosystem; beehives in cities or near field increase pollination service, but decrease biodiversity due to competition with wild species (first papers about this issue have been published). We can imagine other cases of ecosystems specialized to provide a few ES.

The choice of ES approach to value ecosystem is problematic because only a restricted set of values and uses will increase asset value, regardless of ecosystem condition. Very often, ecosystem enhancement will only reflect specialization of ecosystems to produce intensively few ES. This information is not able to wisely inform decision makers such as financial and economic ministries, prime ministers, etc. who are the addressees of economic values provided by national accounts.

Question 7. Do you have comments on the recommendations concerning the selection of discount rates for use in NPV calculations in ecosystem accounting?

We agree with the method described.

Question 8. Do you have comments on Annex 10.1 describing the derivation and decomposition of NPV?

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Question 9. Do you have any other comments on Chapter 10?

What is called ecosystem monetary asset account looks more like a variation of asset account.

As mentioned for chapter 8, we do not agree with the choice of NPV as a relevant, or at least exclusive, valuation method for assets. Several reasons motivate this:

- NPV needs a lot of data that would be very costly for statistical offices;
- NPV is assumption intensive. This weakens their use value;
- NPV is prospective work usually done by administrations other than national accounts divisions. Modelling future economy has been rejected in previous UNCEEA meetings as a relevant method for national accounting;
- It is incorrect to calculate the value of an ecosystem asset as the sum of the NPV of its future benefits, because these benefits cannot be aggregated and correspond only to the marginal value of the ecosystem services, while the infra-marginal value is often infinite (Daly 1994, Daly 1998, Pearce 1998).

NPV is used in very few cases in national accounting (for some resources and financial assets). In contrast, all non-marketed product is valued at production cost.

The history of NPV could be explained for the readers and users of the SEEA to understand it. Mentions of financial calculation for private and public decision making should appear in the introduction. The link with the IFRS should also appear.

Questions related to Chapter 11

Question 10. Do you have comments on the proposed structure of the extended balance sheet that integrates the monetary values of ecosystem and economic assets?

We salute the efforts made to deeply integrate the environment into the sequence of accounts, the balance sheet and the input-output table. This proposition of integration is very interesting and many important questions have been studied. This is an interesting proposal to open the discussion to new ways of integration, different from what has been proposed so far in the SEEA.

Whereas a beginning of a discussion about ecological liabilities has been written in discussion paper 5.4, it has not been kept in the accounting structure. It could have been developed and connected to the reflexion proposed in this chapter.

Para. 11.3 does not justify the shift in focus between the cost-based approaches to ES valuation. This is not a reconceptualization of the valuation of ecosystems, but another approach to it with different concepts that does not undermine the validity of the former approach. As written above, the minimum would be to extensively explain why the cost-based approach is rejected. However, we do not see any valid argument to do so. SEEA 1993 (United Nations 1993) and 2003 (United Nations et al. 2003) described both approaches equally, and the choice was then presented as political, not technical or theoretical.
Therefore, even if the current proposal is very interesting, regarding the problems described above on valuation of ES and ecosystem assets, we express concern about the feasibility of this sequence of accounts.

Question 11. Do you have comments on the approaches to assigning the ownership of ecosystem assets that underpins the structure of the extended sequence of institutional sector accounts?

Click here and start typing (The length of your response is not limited by this text box.)

Question 12. Do you have any other comments on Chapter 11?

Attention must be paid to the green-GDP approach. For instance, the French Government has rejected such an approach, as well as the Stiglitz-Sen-Fitoussi commission (Stiglitz, Sen, and Fitoussi 2009). Ecosystem trustee is a very interesting idea that should be kept.

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ESA/STAT/AC.108
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Background paper

Preliminary Meeting of the UN Committee on Environmental-Economic Accounting
New York, 29-31 August 2005
Two United Nations Plaza, Conference Room 23rd floor

RESEARCH AGENDA: SEEA-2003 CHAPTERS 9 AND 10 VALUATION TECHNIQUES FOR MEASURING DEGRADATION MAKING ENVIRONMENTAL ADJUSTMENTS TO THE FLOW ACCOUNTS

Federal Statistical Office Germany

In the chapters 9 and 10 of SEEA 2003 it seems less useful to decide upon an order of priorities for the individual unresolved issues which have been identified and to work on them than in the other chapters of SEEA. The reason is that the question of the monetary valuation of degradation and the derived adjustment of economy-wide aggregates was the most controversial issue during the London Group's SEEA revision process. Basically, two opposing positions may be identified, first, persons or institutions who support – starting from a microeconomic approach – monetary valuation of environmental degradation with the aim to use the results for the adjustment of core economic aggregates. Second, those who recommend – starting from physical accounts – a macro-economic modelling approach in order to show the effect of societies' response activities on the economy.

For the first group, the main point is to adjust the economic aggregates according to the environmental degradation, while the second intend to show how economic aggregates change when political measures for reducing environmental pressures are taken. In line with these positions, the discussion about the environmental targets plays a different role for both sides. In the first case, environmental policy targets are defined as a *result* of adjusting the aggregates (only when the effects of environmental pressures on the economy are known is it possible to decide about the aims to be pursued). In the second case, society's targets are a *precondition* for defining policy measures and assessing their effects on the economic process.

For **monetary valuation**, there exist three different approaches, namely the damage cost approach, the maintenance cost approach and the modelling approach:

- The damage cost approach aims at identifying the costs of environmental damages caused by economic activities.
- The maintenance cost approach describes (ex post) the direct hypothetical monetary costs of reducing the actual pressures on the environment/of observing the limits to pressure established by the natural sciences.

  Both (micro-economic) approaches aim at monetarising the use of the environment. By means of such procedures a "sustainability gap" can immediately be determined in monetary terms – at least with regard to the ecological part. In addition, various adjusted macro-economic aggregates such as EDP may be calculated on this basis. Both approaches are based on the following threefold assumption: 1. valuation problems can be solved at the micro level in a broadly accepted way, 2. the calculated results can be added up and 3. feedback to the original aggregates is considered to a satisfying degree.
- The supporters of a **modelling approach** reject monetary valuation of degradation at least as a task of official statistics. They argue that the integration of environmental goods (at least of global ones, such as the climate, for example) would imply serious intervention in the economic system and therefore would lead to substantial – not only marginal – changes of all macro-economic parameters. What sets modelling approaches apart from others is that the core economic model is extended by the relations to the environment measured in physical terms. In the context of such approaches it is therefore possible to model the

different ways of developing towards an economic system respecting the sustainability targets of society.

According to this concept, environmental accounts within official statistics provide rather detailed data on environmental pressures in physical terms which are fully compatible with SNA monetary data. These results may be used to support environmental policies aiming at sustainable development which encompass the entire policy cycle, i.e. from describing the problems, identifying the targets, analysing the interlinkages and defining measures to monitoring the results of the measures taken. In this context, the hybrid analysis is of great importance, which means bringing together physical data from environmental accounts with identically classified monetary data from SNA, especially from input-output-tables. Quite a number of politically relevant indicators linking the environment and the economy may be developed by aggregation or by combination of such data. As a kind work-sharing, the data provided by official statistics then are used (mostly) by scientific and research institutes within their modelling work in order to analyse the economic effects of different environmental protection measures.

The underlying **causes of these opposing positions** go back to differences concerning the respective situation, i.e. the environmental problems regarded as most urgent, experiences gathered in the past, institutional arrangements, user needs and the state of the art within the national statistical system and the development of national environmental accounts. Possibly even more important are differences concerning the theoretical basis and axiomatic background of the supporters of the two directions. As a consequence, acceptance of the inaccuracies inevitably connected with monetary valuation techniques varies substantially in the two groups – and this will certainly stay so for quite some time.

What can be done?

Within the SEEA concept, the physical modules provide the **common data base** for all the approaches shown above. Generally, the damage cost and the maintenance cost approaches both operate rather with natural assets measured in physical terms, whose modifications have to be recorded and evaluated. For assessing changes in the quality of the natural assets (degradation), physical flow data are needed quite often. As explained above, the same goes for the modelling approach. Thus the three approaches overlap considerably as regards the physical data required, i.e. the approaches are not incompatible. This also means that it is generally useful to develop physical accounting even if it is not yet clear which approach will be applied to value degradation.

Bringing **additional research** issues concerning valuation to the agenda will not be the solution for reconciling the opposite positions. There is no doubt that further research and methodology work to improve and standardise methods and the introduction of standards will promote the standardisation process within the two groups. As, however, the opposing positions result from differing theoretical backgrounds on the one hand and different interests on the other, a better convergence of these fundamental positions will quite certainly not be achieved merely by ever improving the state of scientific knowledge. On the contrary, it would therefore

even be harmful to a broad acceptance of SEEA to nurture false hopes that differences in this important field could rapidly be overcome. Neither does it make sense to come to a solution by changing majorities within the committee or the London Group. One must not forget that the reason why SEEA 2003 in the chapters 9 and 10 does not give a recommendation as to which valuation method should be used is that none of the approaches presented there was acceptable for all.

In the end the **needs expressed by** international and especially by national **users** will decide which approach will be the one used for national accounts in practice – while it should be stressed that it can not be expected that the needs of users will be equally strong in different countries or may converge. Taking into account the needs of the users will not provide a rapid solution of the disputed issues, either, since general priorities as voiced by the users will scarcely suffice to decide upon the "right" concept. Instead, a sustainable and permanent demand of users for specific data has to develop as a prerequisite, presupposing that sufficient financial resources will be provided for the production of such figures.

In almost all countries, the practical development of environmental accounts is still in an experimental stage with the aim being to develop a new and promising instrument. It is commonly accepted from the viewpoint of users that there is a need for data showing the interrelationships between the environment and the economy, but it is not quite clear which methods and data lead to this goal. Therefore it is rather difficult to assess the actual, specific demand of users for data from environmental accounting at this stage of the work. The potential of this rather new instrument has partly not yet been realised by most of the users. That is why environmental accountants do not only have to develop basic concepts and produce data but also show potential users applications and analyses of accounts data. In this context it should be mentioned that politicians and the general public attach great importance to the fact that results from monetary valuation and figures like EDP should be produced by the same institutions that produce the standard economic aggregates like GDP. At first view this argument seems convincing: as incorrect economic figures bring about the wrong political decisions, the "right" numbers have to be provided. However, this line of reasoning leads to a dilemma which often is tried to be solved at the expense of data quality – especially of data accuracy. However, an EDP that is not sufficiently reliable would be of little value even if published by official statistics.

The **priorities** for the research efforts initiated by the Committee concerning monetary valuation of degradation therefore should at the present time concentrate on gaining practical experiences with implementing the different fundamental approaches and promoting their application rather than on solving numerous detailed methodological questions. To this end, pilot studies should be initiated if possible in large countries, e.g. China or Brazil.

In detail, the following basic approaches should be tested under various conditions:

- Micro-economic valuation
  - Damage cost approach
  - Maintenance cost approach

- Environmental-economic modelling approach

All three approaches should be tested at the same time in one country (or perhaps several) in order to gain knowledge about their advantages and disadvantages or their strengths and weaknesses. This would be a sound basis for the further discussion of the valuation problem. As a part of the pilot study, the physical data base which is – as mentioned above – a foundation for all three approaches should be developed according to common and internationally comparable standards.

The **UN Committee on Environmental Accounts** might wish

- to discuss whether the proposed procedure (test of the different approaches in a selected country in practice) would further the discussion of the valuation problem
- in the case of consent to this proposal to assign the realization of the pilot study to the London Group
- to review what resources would be needed for the test and to discuss how these funds could be raised.

The tasks of the **London Group** then would be

- to design the scheme of the test
- to discuss the relationships between target setting and valuation (as explained above)
- to find the country (two countries) suitable for the test and willing to participate
- to name the environmental problems for which the study should be performed. The subject should be selected in a way that allows to identify the advantages and disadvantages of the different valuation approaches. This would be more likely in the case of global problems such as air emissions than with local problems.
- to establish a working group consisting of members of the London Group who would perform the study together with the experts of the pilot country or support their work intensively.