DEPARTMENT OF ECONOMIC AND SOCIAL AFFAIRS
STATISTICS DIVISION
UNITED NATIONS

System of Environmental Economic Accounting

System of Environmental-Economic Accounting—Ecosystem Accounting

Global Consultation on the complete document: Comments Form

Deadline for responses: 30 November 2020
Send responses to: seea@un.org

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The comments form has been designed to facilitate the analysis of comments. There are six 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: seea@un.org.

All documents can be found on our website at: https://seea.un.org/content/global-consultation-complete-draft

In case you have any questions or have issues with accessing the documents, please contact us at seea@un.org

General comments

Question 1: Do you have comments on the overall draft of the SEEA Ecosystem Accounting?

First of all, we would like to express full support for the overall initiative and to congratulate UNSD for the remarkable effort in successfully addressing such an ambitious challenge.

The European Commission acknowledges the importance of ecosystem accounting: already the "7th Environment Action Programme" and the "EU Biodiversity Strategy to 2020" included objectives to develop natural capital accounting in the EU, with a focus on ecosystems and their services. For this reason, a Knowledge Innovation Project on an Integrated system for Natural Capital Accounting (KIP INCA) was set up by the European Commission (including Eurostat, JRC, DG Environment, DG Research and Innovation) and the European Environment Agency. The INCA project (2016-2020) aimed to design and implement an integrated accounting system for ecosystems and their services in the EU, compliant with the SEEA EEA guidelines and Technical Recommendations.

We believe it is essential to acknowledge and quote the important contribution that the INCA project provided to conceptual and empirical advancements in ecosystem accounting. For such acknowledgement, we propose the following additions.

Concrete proposal (in red the suggested additions):

Chapter 6, paragraph 6.2

"The potential of applying an ecosystem services approach to foster an understanding of the relationship between humans and the environment has been further strengthened through work in various initiatives including The Economics of Ecosystems and Biodiversity initiative (TEEB, 2010), the Mapping and Assessment of Ecosystems and their Services (MAES) framework (Maes et al., 2013); the Integrated system for Natural Capital Accounting (INCA) project (Vallecillo et al., 2019); the Natural Capital Project at Stanford University; and the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) (Díaz et al., 2015);

Please retrieve the suggested article at https://www.sciencedirect.com/science/article/pii/S2212041619302815

Chapter 6, paragraph 6.134

"The description and measurement of ecosystem capacity will vary across different types of ecosystem services, as described in La Notte et al. (2019) (ref. Section 4 and Table 1)."

Chapter 6, paragraph 6.137

Please consider modifying this paragraph as follows:

"It is important to distinguish between ES where exceeding the regeneration and absorption rates cause overuse of the service (that eventually lead to degradation) and the other ES. Regeneration and absorption rates only apply to part of "source" and "sink" services, not to all ES (as described in La Notte et al., 2019). These services require that a sustainability threshold is set to calculate a "potential" or "sustainable" flow. All the other ES do not need sustainability thresholds: the capacity (in monetary terms as NPV) can be calculated by using the actual flow."

Please retrieve the suggested article at https://www.sciencedirect.com/science/article/pii/S2212041617307246

Chapter 12, paragraph 12.36

"…An alternative perspective is to allocate the costs of degradation to the economic unit that is considered to have caused the degradation, for example costs may be assigned to a polluter. Underneath this alternative, there is in fact an ongoing debate about the role of polluters in the attribution of sink services, that needs to reconcile accounting requirements with policy needs (La Notte and Marques, 2017)."

Please retrieve the suggested article at https://oneecosystem.pensoft.net/article/20834/.

Finally, it would also be important to add in a section dedicated to the future research agenda the following paragraph:

"A step forward made by the INCA project is to consistently identify and structure the role of ES potential (i.e. the ecosystem's ability to generate services irrespective of the demand) and the ES demand in generating the ES actual flow (La Notte et al., 2019). This interaction can also map and quantify where a mismatch between ES potential and ES demand occurs (i.e. there is a socio-economic need for ES flows, but the ecosystems able to provide those flows are not there), which is an important information for policy makers especially when ecosystem restoration actions have to be planned. Concrete applications (Vallecillo et al., 2019) illustrate the advantage of the INCA structure for ES accounting."

Please retrieve the suggested articles at https://www.sciencedirect.com/science/article/pii/S2212041617307246 and https://www.sciencedirect.com/science/article/pii/S2212041619302815

Comments by sets of chapters

Question 2. Do you have comments on Chapters 1-2 of the draft SEEA Ecosystem Accounting?

We don't have comment: we support the content.

Question 3. Do you have comments on Chapters 3-5 of the draft SEEA Ecosystem Accounting?

We don't have comment: we support the content.

Question 4. Do you have comments on Chapters 6-7 of the draft SEEA Ecosystem Accounting?

Chapter 6

Concrete proposals:

Chapter 6, paragraph 6.72
"Notwithstanding this diversity of cultivated production contexts, the conceptual intent for ecosystem accounting is to identify the ecosystem contribution, i.e., to recognize that in different production contexts the relative role of ecosystem services will vary. This intent can be aligned with a framing in which there is a focus on the individual inputs such as nutrients, water, soil retention, pollination etc. which will be used in different combinations in different contexts. An example can be found in Vallecillo et al. 2019 (ref. chapter 3) where an emergy-based ratio is applied to assess ecosystem contribution and separate it from human input."

Please retrieve the suggested articles at
https://publications.jrc.ec.europa.eu/repository/bitstream/JRC116334/jrc_technical_report_3_final.pdf

Chapter 6, paragraph 6.73
"Particularly when cultivated production is of high intensity, there may be a significant difference between the ecosystem contribution and the gross biomass harvested, as demonstrated in Cerilli et al. (2020)."

Please retrieve the suggested articles at
https://www.sciencedirect.com/science/article/pii/S2212041620301364

Chapter 6, paragraph 6.74
"Although in practice there is a considerable measurement challenge in either identifying all of the relevant individual inputs or accurately measuring the ecosystem contribution to the gross biomass that is harvested ~~that takes into account the diversity of cultivated production contexts. Thus,~~ the gross biomass harvested cannot be ~~is~~ considered as a suitable proxy to measure for the flow of biomass provisioning services in cultivated production contexts because it does not consider~~, irrespective of~~ the extent of human inputs and the intensity of management practices. To use input-output datasets, agronomic/agricultural production function or energy/emergy based approaches could support in estimating suitable proxies for ecosystem contribution."

Chapters 6, Table 6.3
To delete the last column

Rationale to justify the deletion
The issue of intermediate versus final ecosystem services seems to be a conceptually a never-ending story. However, the practice somehow shows a way. There are two elements that have to be considered: the assessment technique and the users.
Assessment technique
Let's take for granted that there is first a biophysical assessment and then a monetary valuation. (i) The biophysical assessment technique could already embed a number of ecosystem services, e.g. an agricultural production function can already include water supply, in-situ soil retention and pollination. Or (ii) you can choose to assess each service flow separately by using different models. In the first case (i) the three services are intermediate, in the second case (ii) the three services are final. Of course (i) and (ii) cannot be summed up, because you would double count.
In section 7.2.4 the example with fake numbers about pollination and biomass provisioning service is of difficult application in practice. On the other hand, the attempt of extracting all the services "embedded" in crop provision would be worthwhile IFF we are going to "take them out" and assess them separately.
Users
There are services such as "species maintenance" and "global climate regulation" that are directed not to one sector in one country, but to the global society. Supra national initiatives acknowledge climate change mitigation and to stop biodiversity loss as policy targets that must drive policy action. If we add "global society" as additional sector in the use table, these services are final. This satellite accounting entry is a precious information for policy makers.
The conclusion is that all ES can be final: there is no default "intermediate", it depends on how they are assessed and allocated

Chapter 6, paragraph 6.89
To be deleted

Rationale to justify the deletion
In 6.89 it is written "…care is needed to ensure appropriate recognition of the connection of ecosystem services such as water purification and water flow regulation to other ecosystem services and benefits. For example, water purification and water flow regulation will be relevant in the supply of recreation-related cultural services when people swim in a lake or river".
There is a misunderstanding behind this statement. In fact, on the one hand, the tonne of pollutants removed is the measurement unit for water purification and is not used to measure nature-based recreation. On the other hand, the presence of high quality water bodies can potentially increase the nature-based recreation. Moreover, the two services (recorded in two different rows) are allocated to different users for a different purpose. This is synergy, NOT double counting.

Chapter 6, paragraph 6.126
~~This definition builds directly on the definition of Hein et al. (2016) but given the~~ There is a variety of perspectives on ecosystem capacity, only to mention few major contributions: Hein et al. (2016) and La Notte et al. (2019). Given this diversity the following notes are required to appropriately interpret the intention and meaning of the definition.

Chapter 6, paragraph 6.127b (to be inserted between 6.127 & 128)

Secondly, the concept of ecosystem capacity is most relevant for services that can be overused (source and sink services, see La Notte et al. 2019). For other services, where there is no (direct) act of "harvest" involved (e.g. flood control, or global climate regulation) there is no sustainability threshold, and capacity will need to be considered differently. Important developments on this workstream are expected.

Please retrieve the suggested article at
https://www.sciencedirect.com/science/article/pii/S1470160X18308501

Chapter 6, paragraph 6.130
"Other observations on the application of this definition are: (...)

- That in monetary terms capacity can be calculated as the net present value (NPV) of ES flows. For those ES where there are regeneration and absorption rates, practitioners can face two situations: (i) the actual flow that is below its sustainability threshold, (ii) the actual flow that is above its sustainability threshold. The latter situation requires that the NPV should be calculated by using a sustainable ES flow. In fact, the use of an actual flow that represent an overuse of the ES would overestimate the capacity in the short run and affect negatively the future supply of the same or other ecosystem services from that ecosystem. A concrete example about the difference between sustainable and actual flows and their implication is provided by La Notte et al. (2017).
- That if the ecosystem service is used at current capacity and ~~, (i.e.,~~ there is no use beyond the appropriate limit~~)~~, ~~then~~ the condition of the ecosystem asset should remain stable compared to its current level. ~~Note that the capacity of an ecosystem to provide an ecosystem service may be very low if the condition of the ecosystem is low relative to a given reference condition. Thus, ecosystem capacity should not be measured in relation to an ecological limit that is present only at high levels of condition.~~ Note also that limits can change over time (e.g., due to climate change) and hence measures of capacity should be regularly reassessed.

Please retrieve the suggested article at
https://www.sciencedirect.com/science/article/pii/S2212041616304545

Rationale to justify the proposed modifications
From an operational point of view, the text is not clear on how to proceed to assess capacity in physical terms. There is a knowledge gap, and this limitation should be acknowledged.
The text did not give useful guidance on the interpretation of capacity for ES without a sustainability threshold, neither on calculating capacity in monetary terms. (These issues are strongly interrelated, as messing up sustainable and actual flows can easily lead to "accounting artefacts" with misleading policy messages -- see the example in La Notte et al., 2017). As explained step-by-step in La Notte et al (2019), there are some ES where regeneration and absorption rates can be exceeded by extraction and pollution activities. In these cases, to consider the actual means to consider the overuse of the service that is unsustainable.
We also propose to remove two sentences from the text which were unclear and (probably) redundant with the messages already there.

Question 5. Do you have comments on Chapters 8-11 of the draft SEEA Ecosystem Accounting?

Chapter 9

Concrete proposals:

Chapter 9, paragraph 9.22

"~~The valuation methods described in this section can be applied to the valuation of both final and intermediate ecosystem services~~."

Rationale to justify the deletion

In other part of the guideline, the term intermediate is used in the accounting term which implies that one input from one sector in an input in another. Intra and inter ES flows can be assessed and appropriately reported in physical terms, but not valued in monetary terms in order to avoid double counting.

Chapter 9, paragraph 9.50

"The simulated exchange value method estimates the price and the quantity that would prevail if the ecosystem service were to be traded in a hypothetical market. It thus provides a direct estimate of the value, the SEV, required for entry into the accounts based on the exchange value concept. The SEV method is applied by using results from demand functions for the relevant ecosystem service (for example estimated using the travel cost method, discussed above, or stated preference methods, discussed below). These are used to calculate the price for the ecosystem service that would occur if it was actually marketed. This requires combining the information on the demand function with a supply function and an appropriate market structure (institutional context). The assumption on the institutional context and the estimates of the supply function play a crucial role in the final exchange price and further research is needed to extend this methodology to other ecosystem services. The method has been mainly tested for recreational services"

Rationale for the proposed modification

We acknowledge that the SEV is a promising approach but the assumption of the institutional context and the simulation of the supply curve, together with the relevant cost structure, play a crucial role and greatly impact the final exchange price. The SEV has been mainly tested in the recreational context which makes the method of limited validity for other ecosystem services. It would be ideal to support this method primarily for recreation until clarity exist on how it can be applied to other ecosystem services, particularly with regards to supply curve and cost structure definition, linkages with biophysical accounting units, and methodological approach

Chapter 9, paragraph 9.69

- "The physical characteristics of the two sites. This might include the ecosystem services that the location provides such as, in the case of a river, opportunities for recreation in general and angling in particular; it might also include different spatial configuration of the beneficiaries relative to the ecosystem which might alter the value of the service significantly (e.g. flood protection)."

Chapter 10

Concrete proposals

Chapter 10, paragraph 10.6

"Section 10.2 sets out the structure of the ecosystem monetary asset account and the associated accounting entries. Practitioners should however consider that this framework can work when ES are assessed with fast track approaches, i.e. based on quantities multiplied by unit prices. The applicability of this structure when ES are assessed and valued by using modelling techniques has still to be tested and validated. Section 10.3 describes the key components in valuing ecosystem assets using the net present value approach including the approach to valuing the accounting entries for changes in ecosystem assets over an accounting period. This approach is applicable to both fast track and modelling based approaches."

Chapter 10, paragraph 10.12

"Ecosystem enhancement is the improvement in the value of an ecosystem asset over an accounting period that is a result of an increase in the condition of the ecosystem asset. Ecosystem enhancement will be reflected in a rise in the net present value of expected future returns, only if a direct link is established between condition indicators and ES."

Chapter 10, paragraph 10.17

"Ecosystem degradation is the decline in the value of an ecosystem asset over an accounting period that is the result of a decrease in the condition of an ecosystem asset. Ecosystem degradation will be reflected in a rise in the net present value of expected future returns, only if a direct link is established between condition indicators and ES."

Chapter 10, paragraph 10.19

"Declines may arise from a range of sources including the overexploitation of natural resources and the short and long-term effects of pollution and emissions, and this is something that can be assessed when setting a sustainability threshold with respect to regeneration and absorption rates (La Notte et al. 2019)".

Please retrieve the suggested article at https://www.sciencedirect.com/science/article/pii/S2212041617307246

Rationale to justify the proposed modifications

In section 10.2 the ecosystem asset is treated the same way environmental assets are defined in the SEEA CF, i.e. opening stock + addition – reduction +/- other changes and revaluation = closing stock. Environmental assets in the SEEA CF are natural resources, such as timber, fisheries, subsoil assets, for which there is one land use type that provides one resource, e.g. woodland and forest provides timber. **This one-to-one relationship** makes it possible to account in a consistent way for all the additions (including enhancement), the reduction of stock (including degradation) and conversion of cover/use.

In contrast, ecosystem assets provide a more complex mosaic of services. Many types of ecosystems (e.g. woodland) can provide many services in the form of bundles (e.g. recreation, carbon storage, etc). When an ecosystem asset is considered individually, the provision of services can be:

• originated by one ecosystem type (one ecosystem type – one service) like in the case of provisioning services (e.g. timber provision);

• originated by many ecosystem types (many ecosystem types – one service), in the case of most regulating, maintenance and cultural services (from flood control, to habitat maintenance, to nature-based recreation and many others), which commonly are supplied by a combination of ecosystem types in a certain landscape setting.

When moving from the ecosystem service perspective to the ecosystem type perspective, it always happens the case:

• One ecosystem type – many services, whose numbers can vary across space and strongly depends on the presence of ecosystem service demand.

Since all ecosystem assets provide more than one service, **the relationship asset-service is many-to-many**.

As a matter of fact, the first part of Chapter 10 (section 10.2) is structured in the same way the SEEA CF structures a natural asset accounts and works according to “the stock provides the flow” direction. In describing each entry, the reference in the text is made exclusively to extent and condition accounts.

When the chapter deals with degradation, it does not explain what is meant by degradation. In

The second part of Chapter 10 (section 10.3) suggests calculating the stock as the NPV of many ecosystem services provided by many ecosystem types (being each ET a separate EA. This definition is based on the many-to-many relationship between ecosystems and services (as reported in INCA applications) and the direction becomes “from flows we calculate the stock”.

There is no consistency between 10.2 (from stock to flow, one-to-one) and 10.3 (from flows to stock, many-to many). Annex 10.1 is the attempt to address this contradiction. Although the decomposition analysis could work for “fast track” accounts where you multiply price * quantity (that works almost exclusively for some provisioning services), its correctness for regulating, maintenance and cultural services (where you likely apply more sophisticated valuation techniques [that go beyond p*q]) has to be tested and proved.

At the moment, the approach proposed in Annex 10.1 could only be proposed for fast track applications. It would be necessary to provide examples that represent more comprehensive ecosystem services (e.g. flood control). The examples proposed (carbon, recreation and biomass) are very simple and require no modelling (at least as they are proposed in the annex). The success of the decomposition analysis applied to reconcile 10.2 and 10.3 should be stated only after tested on services where ecological and economic modelling was applied to generate an estimate (examples provided by INCA applications).

What about no fast-track applications? Without validated results, the contradiction between 10.2 and 10.3 remains unsolved.

Chapter 11

Concrete proposals:

Chapter 11, paragraph 11.61

"Two alternative ownership allocation assumptions might be applied where either all ecosystem assets are assigned to an ecosystem trustee or where all ecosystem assets are assigned to relevant economic units. While accounting entries and sequences of accounts can be developed under either of these assumptions, the partitioned asset approach present the advantage of aligning most closely to the accounting principles inherent in the SNA. On the other hand, the partitioned asset approach presents the drawback of assigning a reduced role and value to ecosystems in indicators such as the Gross Value Added and the Degradation Adjusted Net Value Added. Alternative approaches that consider ecosystems working as a satellite sector are possible (e.g. La Notte and Marques, 2019)."

Please retrieve the suggested article at https://www.tandfonline.com/doi/full/10.1080/20964129.2019.1634979

Rationale to justify the proposed addition

Although chapter 11 starts with the statement "The compilation of the ecosystem accounts in physical and monetary terms does not require a statement or assumption concerning the ownership of ecosystem assets (…) the perspective of ecosystems being distinct ecological entities. This neutrality with respect to ownership enables the set of ecosystem accounts to support a wide range of decision-making contexts (paragraph 11.50)", in practice it assigns all ecosystem services (ES) generating an SNA benefit to an owner. **You can own land, but you cannot own ecosystems**. In Chapter 11 these concepts are continuously mixed. Land ownership (and thus management responsibilities) is another layer of information that can be "assigned" ex post depending where ecosystems operate. **Degradation and enhancement affect ecosystems working as a "sector";** in a second step, you can consider where the "ecosystem" sector operates in terms of spatial area (and attribute the land ownership).

To understand the implication of the ownership issue, you need to consider two models.

Model (1)

			Partitioned ownership			
			farmer	household	ecosystem	total
Production and generation of income account						
	Output	Products	200			200
		ES crop provision	80			80
		ES recreation			30	30
	Total output		280	0	30	310
	Intermediate consumption	products	0			0
		ES crop provision	80			80
	Gross Value Added		200	0	30	230
	less consumption of fixed capital		10			10
	less ecosystem degradation		10		5	15
	Degradation-adjusted Net Value Added		180	0	25	205
	less compensation of employees		50			50
	Degradation adjusted Net Operating Surplus		130	0	25	155
Allocation/ Use of income accounts						
	Degradation adjusted Net Operating Surplus		130	0	25	155
	compensation of employees			50		50
	ecosystem transfer in kind payable				-30	-30
	ecosystem transfer in kind receivable			30		30
	Degradation adjusted disposable income		130	80	-5	205

Model (2)

			No onwership			
			farmer	household	ecosystem	total
Production and generation of income account						
	Output	Products	200			200
		ES crop provision			80	80
		ES recreation			30	30
	Total output		200	0	110	310
	Intermediate consumption	products	0			0
		ES crop provision	80			80
	Gross Value Added		120	0	110	230
	less consumption of fixed capital		10			10
	less ecosystem degradation				15	15
	Degradation-adjusted Net Value Added		110	0	95	205
	less compensation of employees		50			50
	Degradation adjusted Net Operating Surplus		60	0	95	155
Allocation/ Use of income accounts						
	Degradation adjusted Net Operating Surplus		60	0	95	155
	compensation of employees			50		50
	ecosystem transfer in kind payable				-110	-110
	ecosystem transfer in kind receivable		80	30		110
	Degradation adjusted disposable income		140	80	-15	205

Model (1) is what proposed in chapter 11: the partitioned ownership. Model (1) attributes a major role to standard economic agents, and only a marginal role to “ecosystem trustees”, in fact ecosystem services are treated as a co-output rather than an input. This is not in line with the logic of the production function (very popular for many provisioning services).

In Model (2) ecosystems are considered as a sector itself, that owns all the services that provides. Ecosystems maintain here a major role.

In the extended balance sheets reported in the xls file, there are two important items to be looked at:

- Degradation-adjusted Net value added
- Degradation-adjusted disposable income

When comparing the examples in Model (1) and Model (2):
-for degradation adjusted Net value added, Model (2) shows a high contribution from "Ecosystem", and Model (1) shows a poor contribution from "Ecosystem" (because part of the ecosystem contribution is attributed to "farmer")
-for degradation adjusted disposable income Model (1) shows a lower income for "farmer" if compared to Model (2), but the -10 for the farmer in disposable income weight differently from the -80 for the ecosystem in net value added.
For the purpose of allocating over-extraction of the resource to the farmer, the role of the ecosystem is downplayed.

The ownership of land can be combined with Model (2), where ecosystem is a sector on its own. In fact, once the actual flow is spatially mapped (based on the supply side), to understand ownership of specific geographical areas is an additional information layer that can be added by inserting sub-group categories (such as "private" and "public" in the accounting tables (as it is already done in the SEEA CF). This is the information that matters in terms of identifying those who could be entitled for PES.
The question "who owns the ecosystem?" is different from the question "who owns the land?"
On the use side it is not a matter of ownership, but a matter of management practices. This is of course a crucial element to be measured and reported, but its assessment takes place in the interaction potential supply -> actual use (i.e. when you assess the -10 and -5 of the example): there you allocate responsibilities.
The question "who owns the ecosystem?" is different from the question "who is responsible for ecosystem degradation?"

The approach proposed in Chapter 11 could bring dangerous consequences because:
- A wrong message on the role and importance of ecosystem contribution (that becomes minor compared to economic agents) is provided to policy makers;
- This approach (proposed with fake numbers) seems to be not applicable in practice (it does not work for all ecosystem services) e.g. consider ecosystem services (ES) that have a providing area different from the benefiting area, consider ES provided by many ecosystem types that benefit many users (many-to-many relationship);
- The role of the ecosystem needs to be consistent and clear: does it «own» what it offers? In some cases is an «owner» in other cases is not…this may create confusion and it opens room for manipulation.

Most of all: the transfers from ecosystems to economic activities and the resulting responsibilities can and should be un-hidden, but this should happen when confronting the supply (where the flow comes from [and belong to]) and use (where the flow is allocated), and especially by confronting the potential flow (that is considered as complementary information) with the actual flow (La Notte and Marques, 2019).

Question 6. Do you have comments on Chapters 12-14 of the draft SEEA Ecosystem Accounting?

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