



DEPARTMENT OF ECONOMIC AND SOCIAL AFFAIRS  
STATISTICS DIVISION  
UNITED NATIONS



System of  
Environmental  
Economic  
Accounting

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## 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](mailto: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](mailto: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](mailto:seea@un.org)

## General comments

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

#### **Summary**

Stats NZ supports the need for ecosystem accounting, appreciating the work that has been done to date. However, we have some significant concerns regarding the valuation aspects of the current draft SEEA-EA, and the proposal to remove the experimental label.

While we agree with the sentiment that the SNA went through a development process, transitioning from accounts to accounting, we don't believe that this provides a basis for endorsing the problematic aspects of the framework described below. Rather we believe that we should seek to understand the challenges the SNA faced and how they were resolved.

Below is our preferred position on how to progress the draft SEEA-EA:

- Chapters 1-7 (reconstruct chapters 6 & 7 to focus on observable phenomena) – make them into a statistical standard, or
- Chapters 1-7 (keep as they are) - make them an interim standard

However, given that the SEEA community is significantly divided, we would see the presentation of Chapters 1-7, as is, as a statistical standard as an acceptable way forward. If the draft SEEA EA is to remain as a whole (retaining all Chapters 1-11) we would prefer that it remain experimental and look to integrate agreed upon aspects of the framework into the SEEA-CF. The rationale for this is discussed below.

#### **Detailed feedback**

Part of our concern arises due to what we perceive to be the lack of clarity as to what a statistical framework is. Work to differentiate between the different types of statistical standards (frameworks, classifications, etc.), and define them (as I am not aware of the existence of such distinctions and definitions) would be beneficial. The current draft represents that lack of clarity on this, combining what we see as aspects of accounting for observable phenomena, and assumptions, worldviews, and policy positions from analytical frameworks. If it is agreed that the SEEA-EA should be an accounting framework (given that it is in the name I assume this is the case), it is necessary to assess what the nature of accounting is (e.g. an internally consistent system of observable stocks and flows, with meaningful units of measurement). It would also be necessary to differentiate between soft and hard modelling, as it seems modelling will be increasingly needed for environmental accounting. Loosely, soft modelling is the modelling of observable phenomena because it is costly or difficult to directly measure, whereas hard modelling produces constructs that exist solely as a function of the model (i.e. modelling

constructs), having assumptions, world views, etc. embedded within them. Given one of the proposed uses of the framework is modelling, we should be very cautious of models feeding into models. This distinction has not been made in the current draft SEEA-EA creating significant problems. Overall, there is a need to clarify what the role of a statistical framework is, as many aspects of the current draft includes many aspects that seem to overstep what would usually be considered the function of a statistical framework.

The status of the framework, if it was to become a statistical standard, also makes it hard to progress with confidence. What does it mean for the SEEA to be considered an “extension”, rather than a satellite, of the SNA, and how does that relate to discussions about a “system of systems” (which we are supportive of)? The framework also seems to be at odds with the broader statistical community which sees the need for multi-dimensional measures of progress (e.g. SDGs, Stiglitz report). Understanding this broader context will possibly clarify how the measurement of ecosystem services could progress (as one way of conceptualising nature) and fit into the larger picture, without the constraints of being an accounting framework and attempting to be consistent with the SNA.

The nature of the micro unit needs to be reassessed, as it becomes increasingly abstract as the chapters of the draft SEEA-EA progress. For the SNA, while there are differences, the similarities in accounting practices compared to financial accounting are significant, and concordances between variables understood. This doesn't hold for the draft SEEA-EA, and the current treatment will deviate significantly from what an ecologist and those operating in ecosystems would observe on the ground.

It should be acknowledged that ecosystem services is a contested framing of the environment, that it represents a world view, and that the valuation chapters seem to implicitly endorse neoclassical economics. This imposes a world view on users, suggesting that this is the correct way to frame the environment, but also suggests that it is appropriate for an accounting framework (which is a separate issue). We find this extremely problematic from both perspectives. The statistical community should remain as neutral as possible. The SEEA-EA is supposed to be a neutral and interdisciplinary framework, and in comparison, the SNA is more successful in being as neutral as possible with regards to schools of thought. From an accounting perspective, we find that trying to impose an accounting logic onto an analytical framework creates significant problems (including a disconnect between the SEEA-CF and SEEA-EA). There is also no statistical basis for the assumed commensurability of economic transactions and the various aspects of the environment as currently stands with the valuation of ecosystem services. As a result, we have some concerns with chapters 6 and 7, and we have significant concerns about

the SEEA-EA becoming a statistical standard with the valuation chapters (chapters 8-11) included. We believe that the valuation chapters should be considered a separate analytical extension. Our concerns are about the very foundations of the approach and should not be seen as being just about measurement issues (although they are significant) which need refinement.

Another important point is that language matters. It is often stated that the draft SEEA-EA is consistent with the SNA. However, this seems to only be superficial in the use of terminology and account structures. It is important to note that when working with frameworks, terminology refers to concepts, and in the case of SNA there is often an institutional reality underpinning it. The use of the terms “assets”, “production”, “services”, “supply”, “use”, “exchange”, “transactions”, and “capital services”, all deviate in important ways to the SNA definitions, resulting in significant abstractions from the observed physical and institutional reality. Despite giving the impressions of neutrality and coherence, we find that there are significant issues with abstractions, worldviews, and measurement issues as a result.

The feedback given for the following questions should be considered within the above framing in mind.

If only chapters 1-7 are to be progressed as a statistical standard, we are concerned, however, that it may not be as simple as separating physical and monetary accounts. The whole framework seems to be centred around building up to degradation adjusted GDP and values for natural capital, which permeates through all the other chapters, so if these chapters are removed the coherence of the remaining chapters may be compromised to some extent. Therefore, it is not clear what the implications are of dropping the valuation chapters. If there is no need for the “join” with the SNA it brings into question the current treatment of ecosystem services where they are considered to already be within the SNA boundary. If this was to change it brings into the question the need to identify “anthropocentric” ecosystem types as per the IUCN classification. Also, chapters 1, 2, and 12-14 will need to be reconsidered.

### **Comments by sets of chapters**

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

In general, see question 1 above. Chapters 1 and 2 would need to be adjusted based on any change in scope resulting from the global consultation.

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

Overall, we are happy with chapters 3-5, and the form a good basis for future development. Below are some specific comments.

Spatial units

We are generally happy with the work done of spatial units, providing a good basis for building statistical infrastructure. We are interested in how this works in practice though and look forward to hearing about the experience of other countries as they start to try to track change over time. A discussion on whether it is necessary to build a register of synthetic units would be fruitful, as that would require significant investment and require a significant amount of work to maintain. Guidance on best practice would also be of interest.

We have reservations regarding the use of the term “asset” to refer to ecosystems. It seems the first significant deviation from the SNA, as property rights (the right to use, exclude, and alienate from oneself) don’t tend to exist for ecosystems, being a system, but rather for components of it, such as land, timber, etc., (items subject to commodification) which in turn has implications for ecosystem condition and who benefits from it. Using the term “asset” here, also creates some confusion about the relationship between ecosystem assets in the SEEA-EEA and the SEEA-CF. If the end goal is to have one SEEA, then this would need to be resolved. Ideally the manual should observe institutional reality.

Ecosystem type classification

We have some concerns regarding the identification of “anthropocentric” ecosystems, unless they are considered to be a distinct ecosystem type. We are uncomfortable with what seems to be the mixing of land use with ecosystem type, both from a statistical point of view and a policy perspective. From a statistical point of view it is better to use two classifications in conjunction to identify the combination of land use and ecosystem type. From a policy

perspective, the classification seems to align with a conceptualisation of landscapes that partitions them into “productive” land (pasture and commercial forestry), and conservation estate/wilderness. This framing of landscapes is increasingly being challenged (See Georgina Mace’s “Whose coverservation”), as the limits of fortress conservation for meeting biodiversity goals, and issues with intensive agricultural, are being recognised. Ideally the ecosystem type classification should not limit the framework’s ability to recognise different land use approaches. The inclusion of anthropocentric ecosystem types seems to be driven by the “join” between the SEEA-EEA and the SNA, which we find problematic. Lastly, what are the implications of using another institution’s classification? Does it become a statistical standard? Do we have the ability to update it?

### Ecosystem condition

For ecosystem condition we see the first stage as being important from a data infrastructure perspective but we have some concerns with the second and third stages in deriving ecosystem condition.

For the second step we have issues with both the normalisation process, and the lack of ecological reality to the scaling. The reference point will often represent a value position/worldview and could make the production of statistics either contradictory to environmental policy, creating confusion or subject to capture to interest groups, as what should be the reference point can be seen as subjective. There is also the issue of a lot of ecosystems won’t have a historical or “natural” reference point resulting in the use of a different basis for different ecosystem types. There is also little chance of international comparability. From an ecological point of view there are a lot of processes which have satiation points with the extremes on both sides of this being problematic (e.g. droughts and floods). Also, the extent to which a deviation from the optimal point is problematic is likely to be non-linear.

For the third step, there appears to be no scientific basis for aggregation in the construction of the composite indices. Issues with composite indices are well known, so will not elaborate.

At this point Stats NZ is unlikely to produce any statistics resulting from stages 2 and 3, but it gives us a basis for moving forward.

We encourage further discussion in this area. Focusing on ecological reality, using optimal productivity as a basis for reference points and weights (which would be different for each ecosystem type) could be an option for moving forward. This is likely to be complicated and face significant issues as well. The upside would be a link being created between condition and biomass production, which may have less issues with aggregation (the interpretation of

condition would be the capacity of an ecosystem to produce biomass). There would be an open question as to whether this is a sufficient criterion (being one dimensional) for determining condition.

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

Overall, we support the need for physical measures, but have some concerns about the current framing.

The recognition of ecosystem services results in ecosystems being recognised as both an asset and producing unit. This seems inconsistent with the SNA use of these terms. In a way, an ecosystem becomes a commodity (asset) that produces commodities (ecosystem services) and is attributed independent decision-making capacity and intent. This is very abstract, and highlights that the language may be consistent with the SNA, but the concepts may not be. The reality is that we use/extract from ecosystems (with regards to most provisioning services) or are passive beneficiaries.

It is essential that we recognise that ecosystem services framing is just one way of conceptualising the environmental, and there will be limits to which this information produced based on ecosystem services can be used in other analytical frameworks. There are two overarching issues that result from this from an accounting perspective.

The first is that there is no observable total, as is the case in the SNA, through the use of the production boundary, which is then broken down by industrial classifications. The ecosystem services classification in contrast attempts to both define the total and the breakdown. This is problematic given ecosystem services commodify different aspects of the ecosystem (stocks and flows, and ecosystem dynamics), or peoples' experience or perception of it, which all have very different attributes. An issue associated with this is that what is considered beneficial will change over time with context (would we consider carbon sequestration an ecosystem service if it wasn't for climate change?). As a result, there is no way to get a sense of what might be full coverage of all the ways we benefit from the environmental, which has enormous implications for estimates the value of non-SNA benefits. This is why it is important to get some agreement on the nature of statistical frameworks, with one possible prerequisite being that the concepts are required to be context neutral.

The second issue is that the different ecosystem services have very different features. Those that focus on stocks and flows tend to have observable units fitting nicely with accounting concepts (although the requirement to exclude that which is already included in the SNA in monetary units disrupts this coherence, and creates uncertainty regarding how some ecosystem services, align with SEEA-CF accounts). Ecosystem services which focus on regulating the system try to capture system dynamics. These ecosystem services are often emergent properties so there isn't a natural observable unit of measurement, and they won't be mutually exclusive, which is problematic. Additionally, the level at which analysis is done is hugely important as there are significant non-linearities with scale, making these services non-additive. For ecosystem services that are based on the experience or the perception of nature, there is again no natural unit of measurement. The majority of the discussion on these ecosystem services revolves around recreation, for which the indicators used amount to creating an account of information of interest, not accounting. The other ecosystem services, such as spiritual services, are far more problematic. Firstly, there is no natural unit of measurement, and there is uncertainty as to what to do if the spiritual position is that the environment has intrinsic value.

The recording of these services in a supply and use framing leads to some significant abstractions. Firstly, ecosystems do not "supply" ecosystem services as such, and where there is a more passive "use" of ecosystem services (some regulating services, see para 6.9), this will not be recognised by the economic unit. This means that supply and use analysis will not always be through the confrontation of two independent, observable, estimates. The allocation to users will often be an extension of the modelling construct and will have an uncertain relationship with actual institutions. This deviates from the SNA, where willing parties is considered an important attribute of transactions. This is because ecosystem services are metaphorical in nature, which has implications for our understanding of sustainability. Businesses only engage in activities that they believe will be beneficial, or they would very quickly discontinue those activities. The suggestion that ecosystems would "supply" services, that may lead to the collapse of the ecosystem (over extraction), seems to impose a problematic psychology on the ecosystem.

The lack of full coverage of intermediate ecosystem services is understandable based on a feasibility basis, but when it comes to valuation, this would be the equivalent to attributing the majority of the value added to the retailer, etc. It fails to recognise that ecosystems are themselves embedded in larger systems.

In summary ESS completely oversimplifies some aspects of very complex systems dynamics (e.g. global climate system), yet completely overcomplicates accounting. To our mind this ecosystem service represents an analytical framework (as



discussed in question 1), which involves a significant amount of hard modelling. We believe that the emphasis should shift to observable stocks and flows of physical phenomena that is based on our physical, chemical, and ecological understanding of the environment. Part of this, if establishing a better understanding of the role of statistical frameworks, and the role of modellers and policy analysts.

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

As discussed in the response to question 1, we have significant concerns about the proposal to remove the experimental label from these chapters. Our reasons can be broken down into three main issues: issues with promoting a particular world view (both from a neutrality and statistical perspective); issues with the degree of abstractions required to produce these estimates; and, the significant measurement issues, which relate to both difficulties and value positions implicit in methodologies.

World view issues

The overarching issue here is the assumption of commensurability. From a statistical perspective we see no basis for the commensurability of the ecosystem services, which have different, or no, units of measurements, and capture very different aspects of an ecosystem. Also, the position that a monetary valuation is needed for an economic signal is a particular policy perspective.

A lot of the valuation approaches borrow heavily from neoclassical economics. We have concerns about this both from a world view perspective and the limitations of marginal approaches when applied to systems, which is a significant concern when attempting to value nested systems, with the largest being the earth system, to which we are ultimately dependent. These approaches seem more appropriate for project-based analysis, than national level time series. Additionally, these approaches may be theoretically consistent with the SNA, but as noted above there doesn't appear to be a statistical basis to these approaches. This is why, in our view, it is very important we understand the nature of statistical frameworks, and how they fit into the larger picture.

Another significant issue that could be clarified is the extent to which valuation is tied to income/GDP. This has huge implications for the meaningfulness of aggregation and the interpretation of results.

Abstractions

It should also be noted that the basis of valuation is an asset that produces capital services (para 8.23). This involves some significant abstractions, and deviations from the SNA, some of which have already been mentioned. The ecosystem is considered an asset, without ownership, but also a separate unit with decision-making capacity, which supplies ecosystem services which are considered to be like capital services. Firstly, it should be noted that capital services are not recorded in supply and use, or to external parties (being an internal to the unit). Secondly, the nature of ecosystem services are very different to capital services, being interdependent and often non-linear. As a result the comparison with the PIM is problematic, making the distinction between hard and soft modelling important. The PIM is arguably soft modelling, as the phenomena it tries to measure is in concept observable, but difficult and expensive to do, whereas the valuation approach for ecosystem assets is largely a modelling construct.

In terms of the resulting supply and use tables, costs are being attributed to industries, which they did not face, and therefore an abstraction from institutional reality (not paying for common goods) and creates a disconnect from observable micro data. This results in accounts that appear to be more analytical in nature, answering the question (for the contribution to SNA benefits) of how much the ecosystems contribute to GDP. Also, ecosystems are considered to be an extension of supply chains (para 6.4), without full coverage of intermediate ecosystem services, will we inappropriately over-attribute the value added to the ecosystem supplying the final ecosystem service? We haven't had time to work through all the implications of this, but a lot more clarity is needed around how this works in practice. Would it also be necessary to adjust the value of houses (as per the hedonic pricing discussion, part of the value represents contributions by ecosystems), land (agricultural land values vary by productivity, which relates to ecosystem services received), and equity (to account for the lower value added leading to lower operating surplus/profit, which should reduce the market value of equity)? Is the contribution of ecosystem services to SNA benefits, just a rearrangement of the current SNA accounts? The boundary between the draft SEEA-EA and SNA still needs some clarifying.

#### Measurement issues

Over and above the issue that these estimates are not based on observable phenomena, we have some general concerns about valuation. Systems are generally greater than the sum of the parts, and when we consider nested systems this become more problematic. The level at which an assessment is undertaken will affect the value of ESS, and this make aggregation problematic. The lack of full coverage in ecosystem services in acknowledged (para 6.6), as is the inability to provide prices (para 9.6). Issues of separability should not be assumed away. Do we only consider the positive aspects of ecosystems?

There are significant issues with value transfers. For asset valuation the estimation of future ecosystem services seems extremely problematic, full of assumptions, and discounting has a significant value position, and significantly affects the resulting value.

For these reasons we are concerned about any resulting estimate of ecosystem value (we would suggest dropping the use of “total value of ecosystem assets” in para 10.43), and any resulting degradation-adjusted estimates of income.

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

Aspects of these chapters may need to change in response to any change in scope resulting the global consultation.

As a more specific comment we believe that carbon stock accounting is a good example of how an accounting framework can relate to a subject matter, by focusing on stock and flow measurement, and leaving the systems dynamics to modellers. It has meaningful units of measurement, and a defined scope, resulting in an internally consistent and coherent system of accounting. As a result, it is also a good example of where additivity between scales works and shows what can be done when the abstractions utilised in chapters 6-11 are dropped. By focusing on observable phenomena like this, and avoiding attempting to define assets, where they don't exist, we believe that it would be feasible to work towards a SEEA that integrates National estimates into global accounts like these global carbon accounts. We would like to see this work progressed beyond being a thematic account.