SEEA EXPERIMENTAL ECOSYSTEM ACCOUNTING REVISION 2020: RESEARCH AGENDA AND APPROACH

PAPER PREPARED FOR THE UNCEEA MEETING, JUNE 2017

Completed on 14 June, 2017

1. Background

1. At its forty-eighth session in March 2017, the United Nations Statistical Commission (UNSC) endorsed the program of work for the Committee of Experts on Environmental-Economic Accounting (UNCEEA). This work program included, as Area B.2, the methodological development for normative standards and other research for the SEEA Experimental Ecosystem Accounting (SEEA EEA). The description in the UNCEEA work program provides a basic framing of the ambitions and approach to be pursued.

2. The SEEA EEA was endorsed by the UNSC at its forty-fourth session in March 2013 and was published jointly by UN, European Commission, FAO, OECD and World Bank in 2014. The SEEA EEA proposed a research agenda within the overall spirit of the document to provide a basis for testing and experimentation in the various aspects of ecosystem accounting.

3. Primary focus since the initial drafting of the SEEA EEA in 2012 has been on seeking opportunities for such testing at sub-national, national and multi-national levels and on research into specific conceptual matters. Many studies have emerged driven largely at country level by international organisations, and by countries themselves. As part of a joint project led by UN Statistics Division, UN Environment and the Secretariat of the CBD, the findings from the testing and research on the SEEA EEA have been collated to form a set of SEEA EEA Technical Recommendations. These recommendations have been the subject of a number of rounds of consultation and are to be finalised in July 2017.

4. The development of the Technical Recommendations has revealed substantive progress in the development of concepts and methods for ecosystem accounting and, at the same time, has revealed a significant and broadening interest in the topic. It is the aim of the revision of the SEEA EEA to take advantage of these advances and broader engagement and, to the extent possible, establish a baseline set of statistical standards for ecosystem accounting.

5. This document provides a proposed approach to the revision of the SEEA EEA. It describes (i) the broad research agenda for the revision as a refinement of the research agenda

discussed at the UNCEEA meeting in June 2016; (ii) the proposed approach for co-ordinating the revision process and the roles of key stakeholders, and (iii) next steps.

2. SEEA EEA Research agenda

6. The research agenda described here takes as its starting point the research agenda discussed at the UNCEEA meeting in June 2016 and the associated prioritisation of research topics. The overall list of research topics remains unchanged. The list of topics is presented in Table 1 (below) with a more complete description of each topic in Annex 1.

7. While the research topics remain unchanged, the descriptions have been updated to reflect the main findings that have emerged over the past 12 months, including through the final round of consultation on the Technical Recommendations. Also the topics have been grouped into four broader research areas: Spatial areas, Ecosystem condition, Ecosystem services and Valuation & accounting treatments. These areas provide a useful framing for taking forward the management of the revision process and the associated need for engagement with many stakeholders.

8. In undertaking the research, it will be important that there is an alignment with the research agenda being finalized for the SEEA Central Framework and with topics being identified in other SEEA documents. This overall alignment in the research agenda is important in ensuring co-ordination of the limited resources available for research and for recognizing linkages between research topics.

9. It is noted that the research topics identified and prioritised at the UNCEEA meeting in June 2016 reflected a blend of conceptual work and specific areas for testing and experimentation. The focus for the SEEA EEA Revision process will be on concluding conceptual discussion recognising that this will need to take into account the findings and experience that continues to emerge from ongoing testing of the SEEA EEA framework. For reference, a note has been added to the title of the research topic to indicate whether the topic was given priority at the June 2016 meeting.

Table 1: Summary of SEEA EEA Research Agenda (P = Priority identified in June 2016)

Research area	Research topic	Lead author
1. Spatial areas	Spatial units and their delineation (P)	
	Treatment of the atmosphere, the connection to global systems and residual flows	
2. Ecosystem condition	Indicators of ecosystem condition (P)	
	Articulation of the links between ecosystem assets (and their condition) and the supply of ecosystem services (ecological production functions) (P)	
	Role of thematic accounts	

3. Ecosystem services	Selection and measurement of ecosystem services (P)	
	The role of the different ecosystem services classifications (P)	
	Ecosystem disservices	
	Intermediate services and dependencies between ecosystems	
4. Valuation and accounting	Valuation of ecosystem services and assets (P)	
	Relating market land values to ecosystem asset values (P)	
	Recording activity that maintains or restores ecosystem condition	
	Defining and measuring degradation	

10. Following the process described in the next section, and in line with the request from the UNCEEA meeting in June 2016, this research agenda will be further refined and specific issues for the revision of the SEEA EEA will be identified. This process will be co-ordinated by the SEEA EEA Technical Committee and will involve consultation with a broad range of stakeholders. It is noted that a particular focus will be placed on ensuring appropriate coverage of issues associated with the application of ecosystem accounting principles to coastal and marine ecosystems which have quite distinct features relative to terrestrial ecosystems and also involve engagement with a distinct group of stakeholders. This work will also be very relevant for monitoring the SDGs, especially but not exclusively goals 14 (oceans) and 15 (terrestrial ecosystems).

3. Management and governance of the SEEA EEA revision process

11. Under the auspices of the UNCEEA, it is proposed that the SEEA EEA Technical Committee, with UNSD as Secretariat, lead the management of the SEEA EEA revision process. Following the request from UNCEEA at its June 2016 meeting, UNSD is establishing the SEEA EEA Technical Committee. The list of confirmed members is provided in Annex 2.

12. The role of leading the revision process will include establishing and endorsing a detailed program of work, appropriate decision making structures and processes, securing relevant resources, identifying consultants and reviewers as required, and leading engagement with the multiple stakeholders.

13. Discussion on the revision process during the UNCEEA meeting of June 2016 highlighted the following two points are of specific relevance to the revision process:

- Work on the revision process should be co-ordinated with the ongoing testing and implementation of SEEA EEA as it is taking place at country and sub-national level and through programs being managed by international organisations including UNSD, UN Environment and World Bank. Drawing

lessons from this practical experience will be important in establishing a high-quality and relevant update to SEEA EEA.

- There is explicit support for contributing to the research agenda from several Committee members including ABS, EEA, Eurostat, FAO and Statistics Netherlands. The revision process will aim to take full advantage of this support.

14. The descriptions in this section are preliminary ahead of discussion at the SEEA EEA Technical Committee. They are intended to provide UNCEEA with an indication of the type of model for the revision that is to be considered by the SEEA EEA Technical Committee. The Technical Committee will report to UNCEEA on a regular basis.

15. A general point on the proposed approach is that it is driven by the reality that advancing the SEEA EEA will require engagement with and the broad endorsement of a number of non-statistical communities. These communities include specialists in, among other fields:

- ecology and biodiversity,
- measurement of carbon, water and biophysical processes,
- land use and land cover change (e.g. land degradation)
- marine and coastal ecology
- geospatial information, including remote sensing data
- natural resource economics and management (e.g. forestry)
- environmental economics
- ecosystem services

16. In each of these fields there are well established international groups and associated processes that are progressing measurement and conceptual development. Ecosystem accounting has sought to take advantage of the established and evolving understandings in each of these areas and integrate them using standard statistical and national accounting principles.

17. In its initial phase, the development of the SEEA EEA involved a very limited amount of engagement with these communities but, over the past five years, useful connections have been established across this spectrum. As much as the SEEA EEA has benefited from the expertise from these communities, they have also seen the potential of the SEEA framework to support their work and provide a platform for integrating relevant data.

18. Given this context, the ambition in the forthcoming revision process is to establish means by which these different communities can be most effectively engaged. This will improve the quality of the SEEA EEA itself, and, more importantly, create the opportunity for the SEEA EEA to be very widely accepted as an appropriate framework for integrating these data, i.e. beyond the statistical and national accounting communities.

Timing

19. The intention is to submit the revised SEEA EEA to the UNSC in March 2021 for its consideration. Based on this end point, the following timeframes and broad stages are proposed:

- Detailed planning, establishment of groups and review structures and members, and resource allocation (by end 2017)
- Research and consultation on research topics (by end 2019)
- Drafting revised SEEA EEA (June 2019 – November 2020)
- Global consultation on draft SEEA EEA (January 2020 – October 2020)
- Final SEEA EEA (December 2020)

20. An important consideration in the planning and staging of the revision will be co-ordination with ongoing accounting and related measurement processes, wherever possible and appropriate, taking into account processes underway within the non-statistical communities listed above. As well, connections to the ongoing work on the SEEA Central Framework research agenda will be made and there will be co-ordination in the timing of meetings and deliverables with London Group meetings and planned ecosystem accounting expert forums.

Management structure for revision process

21. A proposed structure of roles and responsibilities is shown in Figure 1. The SEEA EEA Technical Committee will play the overarching role supported by UNSD as Secretariat. Given the breadth of issues and the number of experts from different fields to be included in discussions and review, it is proposed to form 4 review groups, each covering a specific research area of ecosystem accounting – i.e. spatial areas, ecosystem condition, ecosystem services, valuation and accounting. Each review group would be chaired by a member of the Technical Committee and have around 10 experts ensuring coverage and representation from across the relevant communities of expertise in each area. Suggestions and volunteers to chair these four review groups would be welcome.

22. In a first stage, the Technical Committee would determine, from the research agenda, specific issues requiring review through the revision process. It is anticipated that approximately 10 issues would be identified. These issues would be allocated appropriately to a review group for refinement and confirmation and consultation with other relevant groups, including the London Group is envisaged. To support this process, short notes would be prepared for each issue. This process should be complete by end 2017.

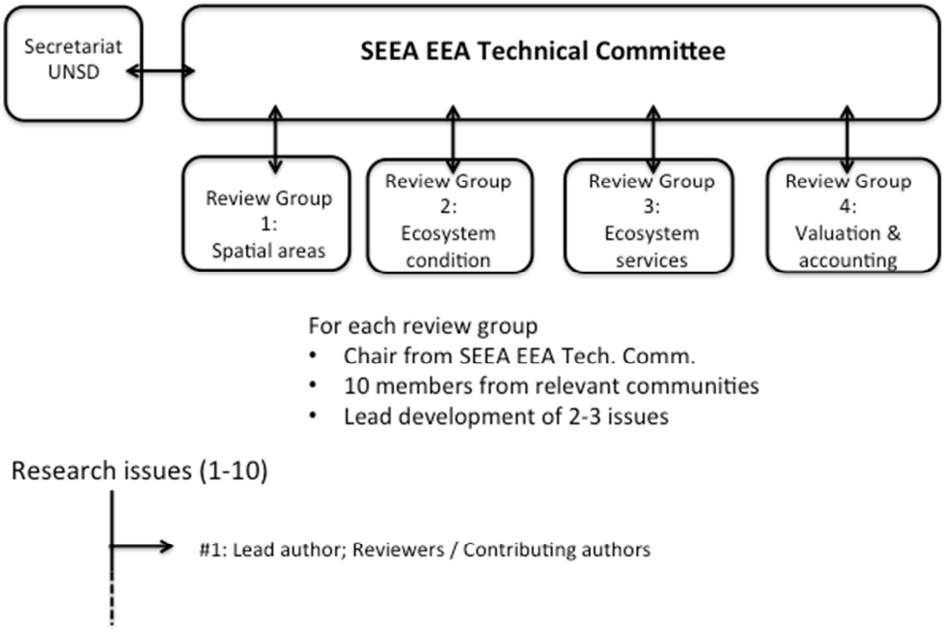
23. In a second stage, as undertaken for the SEEA 2012 revision process, a detailed discussion paper would be prepared for each issue by a lead author (most likely a consultant). This paper would provide appropriate context, description of the issue, and potential options. It is anticipated that 3 or 4 lead authors would be required to provide coverage across the issues. Depending on the issue, it is anticipated that the drafting of each

discussion paper would require 2-3 months of work. Once drafted, these discussion papers would be reviewed and discussed by the members of the relevant review group.

24. To provide an opportunity for up-front engagement of experts from different fields, and to ensure appropriate technical input in the most timely manner, it is proposed that the lead author would be supported by a small number (2-3) of reviewers/contributing authors. Suggestions and volunteers of experts to contribute in this way would be welcome.

25. A key role of the Technical Committee will be to provide ongoing review of the development of discussion papers. Timely completion of these papers will considerably improve the likelihood of successful and broad consultation.

Figure 1: Proposed structure for SEEA EEA Revision process



26. In a third stage, the recommendations of the review group would be considered by the Technical Committee ahead of broader consultation, including with the London Group meetings, ecosystem accounting expert forums and potentially, meetings of other relevant groups. The precise order and timing of these consultations will need to be considered further in developing the program of work.

27. The findings from these broader discussions will form the basis for drafting the revised SEEA EEA and subsequent consultation on draft chapters and the complete document. Drafting of the revised SEEA EEA itself will build directly on the existing SEEA EEA and the SEEA EEA Technical Recommendations.

Budgetary and funding considerations

28. An estimate of the required budget amounts to 500 000 US dollars. This budget will be needed to cover the costs of consultants to draft discussion papers and an editor to draft initial and revised versions of the new SEEA EEA. Following the request from UNCEEA at its June 2016 meeting, UNSD on 20 April 2017 wrote to the members of the UNCEEA, asking for contributions to a UN trust fund to help finance the revision.

29. At the time of writing this report, commitments to contribute financially are on the table from Eurostat and from the UK ONS amounting to 25% of the required funds. UNCEEA members are requested to commit contributing to the UN trust fund. Not all of the funding will be needed up-front so that contributions do not have to be made in budget year 2017. Contributions to the UN trust fund in budget years 2018 and 2019 will be much appreciated as well.

4. Issues for decision / discussion

30. The intention to establish a revision process for the SEEA EEA was endorsed by UNCEEA at its June 2016 meeting as part of adoption of the broader work program for the SEEA. This note provides a re-presentation of the research agenda taking into account developments since that time; and a description of the proposed approach to co-ordinating the required research, discussion, drafting and consultation activities required through the consultation process.

31. Accepting that much further detail will need to be developed concerning both the research topics and the specifics of the revision process, including timing and identification of all relevant stakeholders, UNCEEA is requested to:

- Endorse the management proposal contained here, including that the overall revision process of the SEEA EEA will be managed by the SEEA EEA Technical Committee.
- Indicate interest in contributing to specific issues through volunteering to be a lead or contributing author or providing suggestions of relevant experts to contact
- Consider providing offers of finance and in kind resources to support the revision process

Annex 1: SEEA EEA Research agenda

Research area 1: Spatial areas

Spatial units and their delineation (Priority)

1. Spatial units are at the heart of ecosystem accounting. The focus to date has been the development of a measurement approach that enables relatively broad scale terrestrial ecosystems to be accounted for. The general approach for delineating these areas has become relatively well established although there are still important matters requiring testing.

2. The key focus in this research topic is establishing classifications for land use, land cover and ecosystem types. The land use and land cover classifications of the SEEA Central Framework retain a status of "interim" and given the importance of ecosystem types (which reflect a combination of land cover and land use considerations) in underpinning ecosystem accounting, it is essential that substantial progress is made in this area. This will involve significant engagement with a variety of stakeholders since the range of approaches and applications of land classifications is large.

3. At a conceptual level, it is recognised that measurement in relation to a range of other spatial areas and features needs to be elaborated. A particular focus will be on freshwater, coastal and marine areas – each of which will require consideration in terms of both area and depth. In addition, research should be extended to consider how linear features (e.g. roads, railways, hedgerows), connective phenomena (e.g. airsheds, hydrological networks), and subterranean ecosystems (e.g. caves, groundwater systems); should be incorporated within the delineation of ecosystem assets.

Treatment of the atmosphere, the connection to global systems and residual flows

4. The scope of the SEEA EEA asset boundary has been limited to the biosphere, and largely terrestrial ecosystems. The reality is that the biosphere is one component of the Earth's systems. A particularly important system in the context of climate change is the atmosphere and, outside of ecosystem accounting, much work in the space of natural capital accounting has been devoted to accounting for carbon and related GHG emissions.

5. Ecosystem accounting in the SEEA EEA does not explicitly account for residual flows, including GHG emissions. This is, on face value, a limitation of the approach. Although ecosystem accounting does report on changes in condition due to residual flows, this does not extend to the atmosphere and, more generally, the concept of ecosystem services does not reference residual flows directly. A topic of interest therefore is how residual flows should be considered within ecosystem accounting and, in this context, how to incorporate human interactions beyond the biosphere.

Research area 2: Ecosystem condition

Indicators of ecosystem condition (Priority)

6. The measurement of ecosystem asset condition is a fundamental aspect of ecosystem accounting since it is the regular monitoring of asset condition that lies at the heart of assessing the changing capacity of ecosystems to supply ecosystem services.

7. The SEEA EEA outlines the conceptual basis for measuring condition. There are two key areas that require further research and discussion. First, developing a generalised model/structure of indicators of condition for different ecosystem types, taking into account different ecological characteristics and patterns of use. Second, establishing a clear conceptual basis for defining reference conditions for the purposes of ecosystem accounting.

Articulation of the links between ecosystem assets (and their condition) and the supply of ecosystem services (ecological production functions) (Priority)

8. The development of ecosystem accounting has been dependent on ongoing engagement between economists, accountants and ecologists. This discussion continues to grow and must continue such that the most appropriate insights from each discipline can be brought to bear on the measurement challenge. In this space, of particular interest for accounting is understanding the nature of the linkages between different ecosystem services and hence between different ecosystem types. For accountants these are similar to the representations of production functions that sit within an input-output table. Ongoing research to document these linkages will be important to ensure that the ecological underpinning of ecosystem accounting is as relevant as possible.

Role of thematic accounts

9. The SEEA EEA Technical Recommendations develop a distinction between ecosystem accounts - pertaining to ecosystem assets and ecosystem services - and thematic accounts – pertaining to individual stocks and flows, such as carbon, water, land and biodiversity. Often these accounts may be presented as all being ecosystem accounts but they have different roles to play. On the one hand thematic accounts will organize information of direct relevance for the compilation of ecosystem accounts; and on the other, thematic accounts will have much information of value in their own right for tracking important policy issues – GHG emissions, biodiversity loss, water scarcity, deforestation, etc.

10. Through testing it would be positive to demonstrate the relationship between these types of accounts and the best ways in which information may be integrated among them. Of particular interest are the different spatial scales at which different accounts might be compiled, both from the perspective of users of accounts and from the perspective of compilers.

Research area 3: Ecosystem services

Selection and measurement of ecosystem services (Priority)

11. Measuring ecosystem service flows in physical terms is important to enable a broad mapping of the role of ecosystem assets and the relevant beneficiaries; and to facilitate the valuation of ecosystem services. Development of guidance concerning the measurement of ecosystem services will require explanation of the links to biophysical modelling and issues of scaling and aggregation of data.

The role of the different ecosystem services classifications (Priority)

12. At the time of drafting the SEEA EEA, the ecosystem service classification known to the drafters was the CICES (Common International Classification of Ecosystem Services). Immediately following its public release, the existence of other classification systems developed by the US EPA, FEGS (Final Ecosystem Goods and Services) and NESCS (National Ecosystem Services Classification System) became known to the SEEA project. These approaches to ecosystem services classification are distinct but there is an ongoing discussion on the potential overlaps, differences and complementarities. A resolution of the discussion on a classification for ecosystem accounting purposes is required.

Ecosystem disservices

13. The production boundary in accounting deals explicitly with flows of mutual benefit between units. This assumption underpins the notion of a transaction. In cases where something "bad" or "unwanted" is transferred between units accounting is less able to recognize the flows directly. This issue affects the incorporation of flows of so-called ecosystem disservices. In accounting terms, the Technical Recommendations clarify that these flows are not recorded directly in ecosystem accounting. However, it would be appropriate to describe how information in the ecosystem accounts that are related to these flows (e.g. changes in ecosystem condition) is relevant to users interested in assessing the extent of ecosystem disservices.

Intermediate services and dependencies between ecosystems

14. In assessing ecosystem services, the focus of ecosystem accounting has been on final ecosystem services – i.e. those services where there is a direct connection between the ecosystem and economic units (including households). In assessing ecosystem condition, the coverage of the accounts is all ecosystems but, generally speaking, each ecosystem asset is considered a distinct asset.

15. This framing works to cover many situations, particularly those relating to the use of ecosystems as inputs to economic activities such as agriculture and forestry. However, it leaves untouched the measurement of dependencies between ecosystems that may be of particular interest. These dependencies may be reflected in measures of condition (e.g. in terms of measures of fragmentation and connectivity) but, in an accounting setting, could be

more directly measured as intermediate services – essentially the exchange of services between ecosystems. Further work is required to develop the relevant concepts and to articulate measurement approaches.

Research area 4: Valuation and accounting treatments

Valuation of ecosystem services and assets (Priority)

16. The valuation of ecosystem services and assets is an ongoing field of research and investigation. While it will be important to test methods in practice and gain experience from their application, it is also important to continue the dialogue between economists and accounts on the appropriate and relevant methods, assumptions and applications of valuation for accounting purposes. Some particular aspects that will require focus include the assumptions concerning underlying institutional arrangements for non-market transactions, the selection of discount rates and the estimation of the pattern of future flows of ecosystem services relative to the capacity of an ecosystem asset.

Relating market land values to ecosystem asset values (Priority)

17. The SEEA EEA provides a conceptual model for the valuation of ecosystem assets through the NPV of ecosystem services. Putting aside the associated measurement challenges of this, an important issue that arises is the comparison of these ecosystem asset values with existing values for areas of land that might be present in standard national accounts balance sheets. Two related research issues emerge. The first is to understand further the extent to which there is an overlap in the valuations of these assets from different perspectives. The second is to consider how market values of land assets might be used to estimate the prices of ecosystem services.

Recording activity that maintains or restores ecosystem condition

18. One of the key drivers for ecosystem accounting has been the general trend of ecosystem degradation across most of the world. The ecosystem accounting focus on ecosystem asset condition and flows of ecosystem services supports a fairly comprehensive recording of ecosystem degradation in line with accounting concepts of depreciation and depletion of natural resources.

19. However, there is less clarity on the treatment of activity that maintains or restores ecosystem condition. In particular, the accounting question is whether the expenditure on that activity represents a good measure of the level of investment in the ecosystem asset, or whether the more appropriate measure would be the increase in the NPV of the ecosystem service flows that arises as a result of the expenditure. A related challenge occurs in the standard SNA in the treatment of land improvement and the reconciliation of entries for capital formation and associated balance sheet entries. Given the extent of focus on developing policies to restore ecosystem condition, determining the appropriate accounting treatment for any expenditure would be a very useful development.

Defining and measuring degradation

20. The challenges in the measurement of degradation are many. The SEEA EEA makes a good step in taking the discussion further than in previous SEEA based approaches but a range of aspects require further discussion. Two are mentioned here. The first concerns the concept of ecosystem capacity. This was introduced in the SEEA EEA but not developed to the point of a definition amenable to measurement. This reflected a lack of consensus on the basket of goods and services that would underpin the measurement of capacity in practice. Since the drafting of the SEEA EEA, the concept of ecosystem capacity has been further discussed and some measurement has been undertaken. These developments have been reflected in the SEEA EEA Technical Recommendations but further discussion and research is required.

21. The second aspect is the means by which measures of ecosystem degradation can be attributed to economic units. This is not straightforward since unlike produced assets, ecosystem assets may have multiple users thus implying that the degradation will affect a range of income flows. There are a number of considerations, including ownership and regulatory requirements, that should feature in a discussion. Also, the accounting entries related to allocating degradation estimates to multiple economic units need to be considered.

22. A final area included in the research agenda in the UNCEEA June 2016 paper concerned the presentation of accounts in the form of tables and maps. This was envisaged as an area for communications research to consider alternative means by which the results of ecosystem accounting could be best conveyed. This issue will not be considered directly in the SEEA EEA Revision process but advances in this area would be able to be incorporated in the drafting of the revised SEEA EEA.

Annex 2: SEEA EEA Technical Committee – List of confirmed members (as of 14 June 2017)

Country	Representative
Canada	Francois Soulard
Eurostat	Anton Steurer
Netherlands	Sjoerd Schenau (till 30 Aug 2017), Rixt de Jong (from 1 Sep)
United Kingdom	Rocky Harris
EEA	Jan-Erik Petersen
South Africa	Gerhardt Bouwer