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System of
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System of Environmental-Economic Accounting— Ecosystem Accounting

***Global Consultation on the complete document:
An overview***

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Disclaimer:

This draft has been prepared under the guidance of the SEEA Experimental Ecosystem Accounting Technical Committee under the auspices of the UN Committee of Experts on Environmental Accounting (UNCEE). It is part of the work on the Revision of the System of Environmental-Economic Accounting 2012—Experimental Ecosystem Accounting being coordinated by the United Nations Statistics Division. The views expressed in this document do not necessarily represent the views of the United Nations.

Background

The process for the revision of the SEEA 2012 Experimental Ecosystem Accounting has been underway since 2018. Extensive research, discussion and testing across all of the components of ecosystem accounting has proceeded over the past three years including a first round of consultation on drafts of nine core chapters of the SEEA Ecosystem Accounting (SEEA EA). A first round of consultation took place progressively in three tranches from March to August 2020. Over 200 responses were received across the three tranches with substantive feedback received in relation to the various questions posed about the material. All of the individual responses can be accessed on the UN Statistics Division website at the following link <https://seea.un.org/content/global-consultation-individual-chapters>. A sincere thank you is expressed to all of those who contributed their time, experience and knowledge to the process.

A second round of global consultation on revised draft chapters is now commencing. This document provides a summary of the feedback received and documents the major revisions that have been made to chapters 3-11. Further, the document summarizes additional chapters that were not part of the first round of global consultation. Those chapters are chapters 1 and 2 providing an introduction and overview of the SEEA EA and chapters 12 to 14 which describe complementary accounts, thematic accounting and indicators related to the SEEA EA.

This document does not provide a complete itemization of all comments received or a description of responses to individual comments. The focus is on issues concerning definitions, concepts and treatments across the various accounts. There were a number of comments that concerned issues of implementation. Since implementation guidance per se is not a focus of the SEEA EA, no responses to these issues are provided here. However, it is noted that over recent years, and in conjunction with the revision process, there has been a significant volume of work undertaken on the testing of ecosystem accounting and the development of technical guidance which is intended to support implementation of the SEEA EA. Those comments will be taken into account in the finalization of the Guidelines on Biophysical Modelling and Guidelines on Valuation

Finally, it is noted that a number of comments provided editorial suggestions and requests for additional examples and figures. As appropriate, the editorial suggestions have been incorporated noting that in many sections text has been re-drafted to accommodate improved description of the issues. The request for additional examples has been answered to some degree however the focus of the re-drafting has largely been on conceptual matters. For the finalisation of the SEEA EA it is intended that a stylised example will be incorporated with relevant estimates to be included in the relevant accounts through the document. Further, while some effort has been placed on improving the figures included in the chapters, it is expected that further work will take place to help explain the relevant concepts and relationships.

General feedback and responses

Overall, the feedback on the chapters indicated general support for the approach and the various treatments proposed. Given the nature of the subject matter and its focus on environmental and economic issues, the feedback revealed varying perspectives on the rationale and manner in which accounting should be undertaken but there was no overall trend in the feedback to suggest that the framing was not appropriate. Also, some feedback

indicated concern as to whether this subject matter should be a focus for national statistical offices but these views were not in the majority.

Notwithstanding the general support, there were many calls for amendment and clarification of specific definitions and treatments. As should be expected given the number of responses, not all views as to what should change and what the definition or treatment should be were consistent. Responses have therefore aimed to reflect a balance of views on the various issues with guidance on the responses being provided by the SEEA EEA Technical Committee which has played the role of an editorial board through the revision process.

A general observation across all of the feedback was that, in a variety of places, the text overstated what might be possible using data from the ecosystem accounts. In particular, a number of reviewers highlighted pieces of text that seemed to suggest that ecosystem accounts could provide complete and comprehensive measures of the links between ecosystems and the economy and society. It had not been the intention to suggest this and efforts have been made to clarify throughout the chapters the potential of the ecosystem accounts and their role within the broader set of information on the economic-environment relationship, in particular with respect to the SEEA Central Framework.

An important aim in preparing the complete draft of the SEEA Ecosystem Accounting has been to work towards high levels of alignment among the chapters. The series of ecosystem accounts are envisaged as providing a coherent set of information on ecosystems and thus, even though the development of concepts and accounts has been conducted in separate streams of work, the document itself is intended to reflect a coherent conceptual framework. It is likely that further work on alignment will be needed and reviewers are encouraged to consider this issue during this round of global consultation.

In the first round of global consultation, many chapters had one or more annexes that provided additional background and detail on the definitions and treatments described in the chapters. In this set of draft chapters, the number of annexes has been reduced by incorporating relevant text into the chapters or using references to relevant supporting material. Finally, a glossary has been drafted and added at the end of the chapters building on earlier versions of a glossary that were circulated during the first global consultation rounds.

The referencing of material in support of the SEEA EA has not yet been finalised. The set of references included provides a reasonable summary of the core material on which the content is based but a more thorough review of the references will be required. It is also intended to develop lists of additional references, including to published ecosystem accounts, to support the understanding and implementation of SEEA EA.

The remainder of this document provides a summary of feedback and the responses for three groups of chapters – chapters 3-5; chapters 6-7; and chapters 8-11. For chapters 1-2 and chapters 12-14, the material provides a short summary of the content since these chapters have not previously been the subject of global consultation.

Reviewers are encouraged to read this material when reading the revised chapter drafts. It is possible that some reviewers of the earlier drafts will consider that their comments have not been effectively taken into account. As noted above, given the variety of views on some issues, satisfying all requests for change was not possible. Nonetheless, reviewers are welcome to represent their perspectives should their concerns not have been suitably addressed in this version.

Chapters 1 and 2: Introduction and overview

Chapters 1 and 2 have not been circulated for global consultation previously. Chapter 1 provides a general introduction to the SEEA EA covering topics including its general motivation and intent, the history and process for its drafting, the connection to other measurement frameworks and initiatives and considerations in its implementation and application.

Chapter 2 provides an overview of the conceptual framework of the SEEA EA. A particular focus is on introducing the approach taken to the integration of ecological and economic perspectives on ecosystems using statistical and accounting principles. The chapter also introduces the set of ecosystem accounts and related accounts, such as thematic accounts, discusses the perspective of value applied in the SEEA EA, and summarises the main national accounting principles that are used. Since this chapter brings together all of the components of the ecosystem accounting framework and introduces relevant definitions and concepts, it is a key chapter for many audiences in placing the components in context and seeing the whole picture.

Chapters 3, 4 and 5: Spatial units, Ecosystem extent accounts and Ecosystem condition accounts

Summary of feedback

The round of Global Consultation on Chapters 3, 4 and 5 was conducted earlier in 2020 from late March to the end of April. Over 80 responses were provided to nine discussion questions and many reviewers provided extended comments. Overall, the core framing provided in the chapters was supported. Thus, the general approach of delineating ecosystem assets spatially, classifying them by ecosystem types, measuring changes in their extent over time and collating information on various ecosystem characteristics to understand their condition relative to a reference condition was endorsed.

Nonetheless, as might be expected, there were many elements of this core framing about which reviewers sought clarification or proposed alternative terms, definitions and framings. Six key groups of comments emerged from the feedback:

1. Delineation of ecosystem assets: This group of comments encompassed the role of characteristics of condition in delineating ecosystem assets, the potential to use ecosystem services to delineate ecosystem assets, the treatment of linear features, the treatment of subterranean ecosystems, the treatment of complex mosaics, and the treatment of marine ecosystem assets.
2. Establishing classes in the IUCN Global Ecosystem Typology reference classification: This group of comments encompassed the need for further clarification on particular ecosystem types within the IUCN Global Ecosystem Typology, for correspondences with many existing related classifications and indicators, for additional classes within urban and agricultural settings, and for better explanation of the links to national level classifications.
3. Setting reference levels and conditions: This group of comments encompassed the definition and role of natural and anthropogenic reference conditions, the approach to setting upper and lower bounds, considering links to concepts such as resilience and vulnerability, and clarifying the criteria of normativity described in the measurement of ecosystem condition.

4. Aggregation: This group of comments encompassed a wide range of topics including the relevance of aggregate measures of condition, whether all three stages of the condition accounts needed to be labelled 'accounts', the degree of homogeneity within an ecosystem asset, the links between basic spatial units, ecosystem assets and ecosystem types, the role of ecosystem condition typology (ECT) classes, the use of landscape scale information, approaches to weighting, whether multi-dimensional indexes (aggregating data across characteristics) are appropriate, the potential to aggregate across ecosystem assets of the same ecosystem type, and the potential to aggregate across ecosystem types or across countries.
5. Biodiversity: This group of comments encompassed the need for clarification on the links to ECT classes, the links to approaches to scaling and aggregation, the relationship between extent and condition accounts, and the potential to use current measures of biodiversity.
6. Linking extent and condition to economics, accounting and ecosystem services: This group of comments encompassed the discussion of capacity, the role of non-ecological indicators in condition accounts, and the links between ecosystem assets and other data on the characteristics of spatial areas (e.g. land use, land ownership).

Summary of major changes

In Chapter 3, the general structure of the chapter has remained but the content and flow of the sections has been tightened with a particular focus on consistent use of the terms ecosystem asset and ecosystem type. After much discussion, the label 'ecosystem asset' has been retained for use throughout the SEEA EA as the statistical unit that is the focus of measurement in the accounts. (The rationale for this is now described in Chapter 2.)

The description of the IUCN Global Ecosystem Typology (GET) and its role in implementation have been refined highlighting in particular the expectation that countries will use national/local classifications for national compilation and that the IUCN GET will (i) provide a means for comparing data and (ii) provide a conceptual baseline for classifications of ecosystem types for accounting purposes.

A range of refinements and clarifications have been made concerning various ecosystem types, for marine and subterranean ecosystems and concerning the treatment of small ecosystems and linear features. Finer detail is being developed with respect to anthropogenic ecosystems (such as agricultural areas and urban areas) and the development of correspondences between the IUCN GET and other classifications is underway.

In Chapter 4, the main changes have related to the description of changes in ecosystem extent over the accounting period and consequently to the structure and description of changes in the ecosystem extent account. Of particular note is that the definitions of accounting entries have been aligned with those of the monetary ecosystem asset account described in Chapter 10 with respect to recording ecosystem conversions, the treatment of catastrophic events and the recording of revisions. Additional text has been incorporated to discuss complementary extent accounts for linear features and subterranean ecosystems and to link to data about economic units such as on land use and land ownership.

In Chapter 5, the three-stage approach has been retained wherein the process builds from gathering data on relevant variables, normalising the data relative to reference levels and conditions to derive condition indicators, and finally, aggregating across indicators and ecosystem types. However, a change in the structure of the chapter has aimed to highlight

that the focus of condition accounting should be on stages 1 and 2 and that the aggregation to generate composite indicators of condition is considered optional given the range of alternative aggregation possibilities. Indeed, there is additional text considering the various aggregation options that may be pursued depending on the context.

To support a better understanding of the conceptual basis for the measurement of ecosystem condition, additional text has been included at the start of the chapter to describe links among various ecosystem concepts. This text is supported by introductory text in section 2.2, text on the links to biodiversity in section 5.5, text on the definition of ecosystem capacity in section 6.5, and text providing an introduction to ecological concepts in Annex 3.1.

The focus for the measurement of ecosystem condition remains on ecological integrity and through this concept an improved description of the reference condition and reference level concepts has been developed. A distinction has been retained between natural and anthropogenic reference conditions and the need for reference conditions to be scientifically established has been made clear. A proposal to focus on ecosystem resilience has not been adopted but it is evident that the information gathered through the compilation of ecosystem condition accounts (i.e. stages 1 and 2) will support analysis of this concept.

The ecosystem condition typology (ECT) has been retained as it has provided a strong structure for the compilation of accounts and the organisation of relevant data. The selection criteria for choosing characteristics and variables has been substantially refined. In particular there had been some concern over the criteria of “normativity”. In fact, this label was inappropriate and the intention has been clarified to recognise the need for selected variables to be able to inform on the direction of change in a characteristic, not on whether this change is good or bad.

Aside from the restructuring of text around the three stages of accounting for ecosystem condition, the other structural changes concern (i) the removal of most of the six annexes with text either introduced into the chapter itself (in summarised form) or referred to in other documents; and (ii) the inclusion of a table of indicative condition variables and indicators structured by broad biome types and ECT classes.

Chapters 6 and 7: Accounting for ecosystem services in physical terms

Summary of feedback

The round of Global Consultation on Chapters 6 and 7 was conducted from late July to late August. Over 60 responses were provided to six discussion questions and many reviewers provided extended comments. Overall, the core framing provided in the chapters was supported. Thus, the general approach of recording ecosystem services as contributions to benefits that are supplied by ecosystem assets was supported. There was general support also for the proposals to allow for the recording of both final and intermediate services, for the reference list of ecosystem services, and for the treatments of various ecosystem services (e.g. biomass provisioning, global climate regulation and water supply). The approach to describing the supply and use recordings in Chapter 7 was also encouraged.

At the same time, additional clarification and refinements were sought on the definition of benefits and the link to well-being, the definition and recording of intermediate services, the links to flows recorded in the SEEA Central Framework, the definitions of ecosystem services in the reference list, in particular concerning cultural services, the treatment of exports and

imports of ecosystem services, the definition and boundary concerning abiotic flows, and the treatments proposed for specific ecosystem services.

Summary of major changes

Given the general support for the direction taken and treatments proposed in the two chapters, no major conceptual changes have been made in the revised drafts. In terms of content, the major addition is the inclusion of text on ecosystem capacity, inclusion of text on ecosystem disservices, extended text on abiotic flows, and the removal of text on the links to the SEEA Central Framework. Text on the links to the SEEA Central Framework has now been included either in relevant places in the chapter (e.g. concerning biomass provisioning services) or in Annex 1.2 that provides a general summary of the links between the SEEA EA and the SEEA Central Framework.

Further, based on specific requests for clarification, in Chapter 6 changes have been made to the discussion of benefits and the link to well-being, the description of intermediate services, the definitions of individual ecosystem types in the reference list, and the treatments of biomass provisioning services, water supply and global climate regulation. Text has also been introduced to describe the boundary of measurement with respect to non-use values.

In Chapter 7, additional text has been included to more fully describe the supply and use tables (note also that the label supply and use tables rather than accounts has been adopted), the entries related to exports and imports of ecosystem services and the recording of cultural services where there is a flow involving both households and businesses.

Chapters 8 to 11: Valuation of ecosystem services and ecosystem assets and extending SNA accounts

Summary of feedback

The round of Global Consultation on Chapters 8 to 11 was conducted from late May to early July. Over 60 responses were provided to twelve discussion questions and many reviewers provided extended comments. Generally speaking, there was quite broad support for the central approach described across the chapters in terms of using the exchange value concept to provide monetary values of ecosystem services which in turn could underpin the estimation of the net present value of ecosystem assets and associated changes in ecosystem assets such as degradation. Further, the idea that these monetary values could be integrated with the SNA to establish extended balance sheets, supply and use tables and institutional sector accounts was generally supported. Indeed, quite a number of reviewers expressed explicit support for the approach described and appreciated the clarity of the exposition. The numerical examples in chapters 10 and 11 were widely appreciated.

Notwithstanding the general support for the central approach, there were a large number of requests for clarification of the definitions and concepts, requests for additional detail, concerns raised about alignment across chapters, and other technical points. The nature of the responses to these areas of feedback is described below.

More broadly, and as was to be expected in the discussion of monetary valuation, there were some more fundamental concerns raised by a limited number of reviewers. These concerns may be grouped under three broad headings: concerns about the purpose and scope of

monetary valuation, concerns about the framing of monetary valuation described in the chapter, and concerns about the feasibility of monetary valuation.

With regard to the purpose and scope of monetary valuation, the issues related to whether monetary valuation was relevant or sufficient for policy purposes; whether monetary values, in particular those based on the exchange value concept, could only be relevant in marginal contexts and hence not suitable for analysis of the main systemic environmental challenges such as climate change; whether monetary values could say anything meaningful about sustainability; and whether alternative approaches to monetary valuation, e.g. using restoration costs, would be more useful for policy purposes.

With regard to the framing of monetary valuation, there was concern over the way in which the chapters described the link between ecosystem assets and flows of ecosystem services, especially as it related to transactions; there was concern around the framing of the role of economic units in the generation of benefits (i.e. in relation to a joint production process); and finally concern about the nature of the links to concepts of ownership by economic units.

With regard to feasibility, there was concern about the potential to estimate values for individual ecosystem services, in particular separating out the monetary values from a bundle of services; there was concern about the potential of projecting future flows of ecosystem services in the measurement of net present values; and concern about the ways in which discount rates might be selected and applied.

Summary of responses

With regard to the three areas of more fundamental concern, while the central approach to monetary valuation has been retained in the revised chapters, additional text has been incorporated, primarily in Chapter 8, that aims to recognise the types of challenges of concepts and measurement practice that were identified. In particular, the description of the potential for monetary valuation to support policy is now more cautious and it is made clearer that accounting values do not provide a “value of nature”; the need to consider physical measures has been reinforced; the scope of the SEEA EA estimates in terms of the coverage of ecosystem services and the use of the exchange value concept has been better highlighted; additional consideration has been given to the discussion of ownership and the links to economic units; and additional text has been included to clarify expectations with respect to measurement and implementation, especially concerning future price changes and discount rates.

Additionally, it is noted that text on the framing of values has been included in section 2.4, discussing how data from the SEEA EA may support discussion of varying value perspectives and Chapter 12 includes a discussion on complementary approaches to valuation including a discussion on the links to the measurement of externalities and the restoration cost approach to the valuation of degradation. Another inclusion is Annex 12.1 concerning the link between exchange and welfare values. It is intended that this text can support improved understanding of the ways in which the various valuation methods described in Chapter 9 may be applied in a SEEA EA context.

In Chapter 9, section 9.3 on the description of valuation methods has been substantially reworked to provide a much clearer narrative on those methods that are preferred for SEEA EA monetary valuation purposes. The logic now follows the general narrative of the SNA in this area starting from observed transactions as being the primary method. A range of clarifications have been incorporated on the valuation methods described in particular aiming to clarify the connections to the measurement of the exchange value concept. While a range

of additional methods were proposed for inclusion, most of these alternatives have not been incorporated into the preferred suite of valuation methods. Chapter 9 now also includes a summary of the key points on value transfer where primary data for individual services in certain locations is applied in other contexts.

In Chapter 10, a range of refinements have been made to the definition of the various accounting entries, such as ecosystem degradation, to better describe the links to condition and the relationship between future flows of ecosystem services and the definition of an ecosystem asset. There have also been refinements in the discussion of discounting and asset lives to better align with the net present value theory.

In Chapter 11, a refinement and clarification of the extended balance sheet has been undertaken to better explain the links between the monetary valuation of the SNA and those emerging from the SEEA EA. Of particular note here is the treatment of energy from renewable sources and land in urban areas. Also, additional text has been included to explain the rationale for the choice of ownership approach applied in the institutional sector accounts recognizing that while there were some concerns raised, the approach described was generally supported.

Chapters 12, 13 and 14: Complementary accounts, Thematic accounting and Indicators

Chapters 12 to 14 have not been circulated for Global Consultation previously. In broad terms, they provide an introduction to a range of topics that complement and build on the ecosystem accounts described in Chapters 3 to 11. In providing this material, the focus has been to highlight the potential connections and applications of the ecosystem accounts rather than fully elaborate the various complementary and related measures.

Chapter 12 presents alternative approaches and applications of the monetary accounts. In particular, it describes a set of complementary tables that can be obtained when taking a welfare-based approach to valuation and explains the links between these approaches and the ecosystem accounts. It further describes alternative measures of income, wealth and degradation that can be derived when making different assumptions on attribution of costs or the institutional arrangements underlying valuation.

Chapter 13 focuses on thematic accounting showing how for various themes ecosystem accounts can be complemented by other accounts, including accounts from the SEEA Central Framework and the SNA, to provide more complete information sets to underpin discussion of specific themes. Four themes are highlighted, namely biodiversity, climate change, oceans and urban areas.

Chapter 14 presents the use of combined presentations to support the communication of ecosystem accounting data building on the approach described in the SEEA Central Framework; the derivation of indicators from ecosystem accounts that can support monitoring and reporting and a general overview of how the SEEA Ecosystem Accounting can support existing initiatives and indicators frameworks.