DEPARTMENT OF ECONOMIC AND SOCIAL AFFAIRS
STATISTICS DIVISION
UNITED NATIONS

System of Environmental Economic Accounting

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

First Global Consultation on:

Chapter 3: Spatial units for Ecosystem Accounting

Chapter 4: Accounting for Ecosystem Extent

Chapter 5: Accounting for Ecosystem Condition

Comments Form

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

Name:	
Organization & country:	The Italian response has been elaborated by Istat on the basis of own assessment of the materials provided as well as of substantial inputs from members of the Italian Natural Capital Committee, chaired by the Ministry of the Environment, National institutions and indipendent experts. We specifically acknowledged the contributions by ENEA –SSPT, Federparchi, CIRBISES-University of Rome "La Sapienza", Società Botanica Italiana and Antonia Oriani. However, Istat experts assume all responsibility for any misunderstanding of the inputs received and imperfections of this response.

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

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

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

Question 1: Do you have any comments on the definition and description of ecosystem assets and ecosystem accounting areas and the associated measurement boundaries and treatments?

1. The definition of *Ecosystem Assets* given at §3.5:
   "Ecosystem assets (EA) are contiguous spaces of a specific ecosystem type (ET) characterized by a distinct set of biotic and abiotic components."
   is different from the one given in the SEEA EEA at §2.31:
   "Ecosystem assets are spatial areas comprising a combination of biotic and abiotic components and other characteristics **that function together**" (emphasis added), while in the Central Framework, a definition of *ecosystem assets* is not present, but *ecosystems* are defined (§2.21), as :
   "Ecosystems are areas containing a dynamic complex of biotic communities (e.g., plants, animals and microorganisms) and their non-living environment interacting as a functional unit to provide environmental structures, processes and functions".
   The latter definition is based on the CBD one. This is quoted in §3.7 and in Annex 3.1, where it is acknowledged that "the most important element of this definition is the final clause **'interacting as a functional unit'**"; however, Annex 3.1 is somewhat misleading as it attributes this 'interacting' to the abiotic part of the ecosystem only, while it is a fundamental characteristic of all parts of an ecosystem.
   According to the promises of the SEEA CF, indeed, Ecosystem Accounting "encompasses the same environmental assets but **focuses on the interactions** between individual environmental assets within ecosystems" (§2.21 – emphasis added).
   These elements conjure towards a (doubtfully useful) reduction of emphasis on *ecosystems* as integrated units. A definition based on the CBD one seems more appropriate.

2. At the same time, additional emphasis is put on the notion of *ecosystem asset* which, being the "statistical representation of the general definition of ecosystems" (§3.7), plays a central role as "primary spatial units for ecosystem accounting" (§3.5). The need for assuming ecosystem *assets* instead of ecosystems *tout-court* as the key concept around which data should be organized, must be positively assessed, and the difference between the two concepts spelled out. If the difference is not significant, then there is no need to use "ecosystem assets". If the difference is significant, then the wording "ecosystem accounting" is not suitable to represent the subject of the volume, which should rather be "economic ecosystem accounting". Indeed, from a linguistic-cognitive point of view, the term "asset" supports an instrumental view, pointing to the economic property and value aspects of ecosystems, which is not granted from an official statistics point of view, where words and concepts must correspond to each other as precisely as possible.

3. No reference is made in the characterization of ecosystems to the central and controlling role that the energy flows play. The word "energy" only appears in Annex 3.1, and with no special role. A thorough treatment of energy and energy flows surely belongs to a complete set of ecosystem accounts.

4. It is also important to point out a possible terminology misalignment between the definition of "habitat" given in Ch.3 of the SEEA document and the definition of habitat commonly used in the EU context. This clarification may be important since the term "habitats" refers to the typologies of spatial management units in the European Environmental Policy and, as a consequence, in EU Countries' National conservation measures: a clear understanding of Conservation and Accounting of Ecosystem/Ecosystem Services terminology, and a correct mapping between them, are crucial. Since its first formulation in the first decades of the 20th century several definitions of habitat were given, so that now there is a certain degree of ambiguity in the definition of the word "habitat" taken alone. The definition of habitat given in Ch.3 is, as stated, a species-centred definition, and, besides being the classical definition of "habitat" in Ecology, fairly corresponds to what the European Habitat Directive (92/43/EEC) defines as "habitat of a species" (art. 1, letter F), while the definition of Natural Habitat is given in Art.1 letter b: "natural habitat means terrestrial or aquatic areas distinguished by geographic, abiotic and biotic features, whether entirely natural or semi-natural". The latter definition, on the basis of which natural habitats in EU are roughly listed as plant formations in particular conditions, is much closer to the definition of "ecosystem" given in SEEA Chapter 3 (which also considers the interaction between the elements) than to the "species habitat" to which the definition given in Ch. 3 resembles. In order to define spatial units for ecosystem accounting in Europe (ecosystem assets), the "habitat" definition may be clarified and specified also for the EU context, so as to avoid confusion and to allow for a consistent use of information currently available on habitats under the European Directive.
5. Ecosystem mapping is the first step in the implementation of Target 2 of the EU Biodiversity Strategy to 2020 (Mapping and Assessment of Ecosystems and their Services). In line with the model proposed at the EU level, the Italian ecosystem types were identified and mapped by integrating, within a GIS environment, the land cover database with additional spatial datasets that focus on biophysical features of the environment, such as bioclimate and vegetation potential. The Ecosystem Map of Italy consists of 84 types, comprising forests and semi-natural areas, wetlands and water bodies, out of a total of 97, which in addition include artificial surfaces and agricultural areas (Blasi et al., 2017). Moreover, it is a starting point for the development of different national programs such as the Red List of Italian Ecosystems (work in progress), and the setting-up of the Italian Natural Capital Accounting System (INCC, 2017, 2018 and 2019).
6. Ecoregions are more or less wide portions of land with homogeneous ecological characteristics because of the distinctive interaction between species and natural communities with the physical environment. The approach adopted in Italy foresees a hierarchical classification based on a territorial division in units featuring an increasing degree of homogeneity, consistent with specific combinations of climate, bio-geographical, geomorphological and hydrographic factors that influence the presence and distribution of species, communities and ecosystems. More in detail, Ecoregions of Italy are organised in four nested hierarchical levels (2 Divisions, 7 Provinces, 12 Sections and 33 Subsections). The

National Natural Capital Committee (Law n. 221/2015) opted to perform the assessment and valuation through homogeneous ecological land units and selected the ecoregions of Italy for this purpose (i.e., the Alpine, Po Plain, Apennine, Mediterranean Tyrrhenian and Mediterranean Adriatic Province ecoregions). The same framework is being adopted by the Italian Ministry for the Environment (MATTM) to compile the Italian Red List of Ecosystems, while the Italian National Institute of Statistics (ISTAT) saw fit to classify the municipalities according to the multiple level ecoregional setting (https://www.istat.it/en/archivio/224797).

7. The interaction and energy (and genetic) flow are considered in the ecological analysis also at a landscape scale, through the assessment of the connectivity index of the eco-mosaic. The connectivity is essential for the animal and vegetal genomic displacement among functionally homogeneous elements and the useful shapes to highlight the degree of connectivity are the lines and the nodes within the unit system. Therefore, differently from what established in §3.30, the linear elements, such as ditches or hedgerows, in a pasture landscape should be separately identified since they are essential for the evaluation of the connectivity and the ecological networks and absolutely not attributed to the ET of the surrounding ecosystem. Conversely, a high diversity of landscape can be linked to a high rate of fragmentation of patch, also due to the anthropogenic linear elements as highways, so it is also important to detect these barriers since they represent a loss of the eco-mosaic's biodiversity.

8. Last but not least: it is clear enough that "attributing [direct and immediate] benefits" is a requirement "for the integration of ecosystem accounting data with economic accounts", while there is no evident reason for the need of "establishing the economic ownership of ecosystem assets", nor can it be taken for granted before ch. 11 is out.

Question 2. Do you have any comments on the use of the IUCN Global Ecosystem Typology as the SEEA Ecosystem Type Reference Classification?

The IUCN Global Ecosystem Typology classification is of great interest and importance but leads to a characterization of ecosystems at a level of detail not suitable to represent and assess the conditions / features of the ecosystems (and habitats) as described in chapters 3 and 5. There are also inconsistencies between the coarse thematic definition of ecosystems of IUCN and the fine spatial resolution used in current applications[1]. This is important both to define the reference conditions and even more to, subsequently, making a correct assessment (biophysical and monetary) of the ecosystem services. Research on mapping ES has grown substantially in the past decade[2]. More detailed classification systems, including at least 4/5 levels (compared to the three levels used in the IUCN classification), should be used in other classification systems, with the necessary adaptations to be worldwide suitable, such as MAES ecosystems types, which are used under Target 2 of the EU 2020 Biodiversity Strategy, or EUNIS classification, or it may be possible to define further levels nested within the IUCN Global Ecosystem Typology ecosystem classification. This detailed characterization requires a territorial reference system to allow for the analysis of ecosystem characteristics together with socio-demographic and economic factors, which is a mandatory step to quantify the economic

1 C. Blasi et al. Environmental Science and Policy 78 (2017) 173–184
2 J. Maes et al. Ecosystem Services 1 (2012) 31–39

evaluation of the ecosystems themselves. The most suitable reference system for this purpose is the ecoregional one, also because it has been specifically designed as a reference framework for the mapping and evaluation of ecosystems and their services and for reporting on natural capital. The ecoregional system has been defined nationally, based on environmental characteristics and biological diversity. Ecoregions are organized hierarchically into four levels (divisions, provinces, sections and subsections) based on the prevailing and distinctive characteristics of the ecoregions themselves in terms of ecosystems, specific resources associated with them, complexity of the physical environment, forms of land use and cover, types and intensity of pressure factors.

It is also advisable to seek as many links and synergies as possible with established processes which have already achieved some reliable results at a more advanced experimental stage (i.e. carbon accounting). In this regard, acknowledging the policy context and the ambition of the IUCN Global Ecosystem Typology (GET), it is suggested that the GET classification is integrated with the land use categories, providing a correspondence between Corine Land Cover classes and ecosystem types. In the EU, the national identification and mapping of ecosystems is mainly based on CORINE Land Cover (CLC). The EU agricultural policy monitoring and land and ecosystem accounting, as well as the MAES process at the continental level, have considered and mapped land cover-related units combined with the EUNIS (European Nature Information System). Moreover, CLC is used in Land Use and Land Use Change and Forestry (LULUCF) and the CLC+ is expected to support the LULUCF reporting obligations (mandatory from 2021 onwards). In this respect, it would be most advantageous if the SEEA EEA fostered synergy and cooperation with the carbon accounting, that is also closely related to ecosystem condition and carbon sequestration service. Finally, the adoption of the same methodologies for the classification of landscape area and land use units would favour the overlap of the ecosystem accounting with LULUCF also to promote the mainstreaming of ecosystem and biodiversity accounting into climate and carbon accounting, as under the auspices of the CBD.

Question 3. Do you have any comments on the recording of changes in ecosystem extent and ecosystem condition, including the recording of ecosystem conversions, as described in chapters 4 and 5?

It would be advisable to organize the recording of the changes considering the frequency of the territorial surveys in force and those that can be realistically implemented on the territory.

Land use changes accounting are regularly monitored under the Land Use and Land Use Change and Forestry. In addition, with the adoption of the LULUCF Regulation 2018/841, the greenhouse gas emissions and carbon dioxide absorption from land use are part of the 2030 climate and energy targets, thus intensifying the monitoring of land use change.

The LULUCF Regulation requires a 'net no debit' in all land use accounting categories during the period 2021-2030 and a land-based accounting framework has been already established so that it would be synergic to maintain a link with the carbon accounting data through a correspondence table[3] between CLC and IUCN GET for sharing data and methods widely agreed within the scientific community.

[3] https://biodiversity.europa.eu/maes/correspondence-between-corine-land-cover-classes-and-ecosystem-types

With regard to the assessment of ecosystem conditions, we highlight the usefulness of:
1) Potential Natural Vegetation map as a reliable baseline to assess the distance between current and potential ecosystems in terms of occurrence, coverage, composition, structure and spatial configuration (Natural reference conditions). The PNV is relatively stable in time and, therefore, facilitates the interpretation of complex patterns resulting from human land uses and secondary successional processes;
2) Estimation of degree of naturalness/hemeroby for each ecosystem type, as well as of the weight of artificialization (cover of impervious surfaces) within natural and semi-natural ecosystems;
3) Recognition of mature ecosystems, i.e. types that represent the mature stages of vegetation series within their respective pertinence sectors;
4) Assessment of the landscape conservation status;
5) Assessment of spatial configuration in terms of ecosystem fragmentation, quantity and contrast of edges between different ecosystem types;
6) Definition of critical thresholds for each of the aforementioned parameters and comprehensive assessment of ecosystem conservation status based on the integration between the potential extent of ecosystems, actual cover of ecosystem types, diachronic change trend of ecosystem extent, landscape conservation status, artificialization and ecosystem fragmentation.

Question 4. Do you have any comments on the three-stage approach to accounting for ecosystem condition, including the aggregation of condition variables and indicators?

While the SEEA EEA 2012 clearly distinguished between ecosystem characteristics and metrics, the three-stage approach puts together ecological data and indicators as two hierarchical levels, to become a science-policy interface tool that is handier for decision maker.

It is an approach that leaves countries a great deal of room for manoeuvre as appropriate and *as much as possible* (points 5.20 and 5.21). For example, point 5.16 reports that "*data on the ecosystem characteristics may be of particular interest from scientific or policy perspectives … and in some situations may be considered appropriate proxies for the measurement of condition*", but there are no unique parameters to assess appropriateness on a case-by-case basis.

The decision is open (except for the principles and criteria for the selection of variables as outlined in point 5.2), so that whatever national initiative can fall under the umbrella if the SEEA EEA if it complies with the three-stage approach to accounting for ecosystem condition. All that is thanks to *the nested hierarchical structure of the SEEA ecosystem condition accounts that offers the possibility to perform thematic aggregation in several ways (e.g. across indicators, ECT classes, or ETs)* (point 5.38).

One of the issues raised for the variables (point 5.20) is that *the most appropriate breadth and detail of variables selected to characterize ecosystem condition is difficult to standardize given the range of ET and differences across countries*. This statement is not entirely accurate since an attempt at standardization can instead be made by creating the link to the land use classification CLC, which at least up to level 3 is homogeneous for all countries (see comment above) and also incorporating point 5.74, it should be borne in mind that each land use category corresponds to one set of anthropogenic pressures.

The three-stage approach responds to the requirement of evaluating the ecosystem condition to deal with the post-2020 process, but it remains confined to a national scale

because probably the adopted selection will not be comparable and maybe not yet consolidated.

In conclusion, on the one hand if the three-stage approach fosters the evaluations at national level which could be an excellent tool for politicians and stakeholders, on the other it doesn't help to support the process at a global level, especially on the assumption of the adoption at the COP 15 of legally binding commitment including the protection of Natural Capital and ecosystem services (UE draft position[4]).

Question 5. Do you have any comments on the description and application of the concept of reference condition and the use of both natural and anthropogenic reference conditions in accounting for ecosystem condition?

Annex 5.5 lists the Options for establishing natural reference conditions and anthropocentric reference conditions. The choice of the appropriate "reference condition" for each variable and ET is particularly important, since it affects the subsequent calculation of ecosystem condition indicators and indexes.

While the natural reference options are convincing, the anthropogenic options may not be reliable considering that the impressive anthropic action of modifying ecosystems has never stopped since the conversion of the most ancient populations from nomadic to sedentary due to agriculture.

In the case of natural options that develop only when the anthropic pressure is lessened, a single reference variable can be considered as a proxy for many others about the health of the ecosystem. For example, the potential natural vegetation (PNV) mentioned at point 3 of the Annex, is the expected vegetation given environmental constraints (climate, geomorphology, geology), without human intervention or hazardous events. Hence, PNV includes many information as climatic, geological, geomorphological, soil and bioclimatic characteristics as well as presence/absence of human activities.

It should be better highlighted in the text that reference levels should be selected on the basis of the reliability criterion described in Table 5.2 for the ecosystem characteristics and their metrics. In other words, reference levels should be chosen by preferring a data-driven approach, and modelled reference conditions should be avoided as much as possible, in order to ensure robustness to the derived ecosystem condition indicators.
A methodological approach aimed at achieving a detailed spatial representation of ecosystem types agreed upon with the Italian Ministry for the Environment, is based on the rationale that current and potential vegetation cover are valuable operational proxies for outlining ecosystems at a given scale[5].

This approach, which focuses on the spatial and successional relationship between current land cover and potential natural vegetation (as in the European Environment Agency Technical Report 1/2014), has been recently adopted in Italy but it may be applied to any national context. Indeed, the map obtained is currently being used in Italy as a basic source

4 https://www.europarl.europa.eu/doceo/document/B-9-2020-0035_EN.pdf
5 C. Blasi et al. Environmental Science and Policy 78 (2017) 173–184

of information to assess ecosystem conservation status (both in the country as a whole and in each administrative region) and to evaluate significant ecosystem services[6].

Moreover, it is a starting point for the development of several national programs, such as the Red List of Ecosystems, the implementation of the EU Strategy on Green Infrastructure and the setting-up of a natural capital accounting system[7].
Furthermore, the methods for defining reference conditions for anthropogenic ecosystems (e.g. urban ecosystems) should be better illustrated by including some examples in the text.

Question 6. Do you have any comments on Ecosystem Condition Typology for organising characteristics, data and indicators about ecosystem condition?

It is very important to pay more attention to the actual availability of the data to be identified and to the identification of the indicators which best represent and quantify the conditions of the ecosystems.

Question 7. Do you have any other comments on Chapter 3?

On page 3, section 3.10 it is stated that: "Several important ecological processes are based on the interaction with the atmosphere, including respiration, nitrogen fixation...". We suggest to include photosynthesis among these processes, hence the new sentence could be: "Several important ecological processes are based on the interaction with the atmosphere, including **photosynthesis**, respiration, nitrogen fixation...".

Question 8. Do you have any other comments on Chapter 4?

No

6 C. Blasi et al. Environmental Science and Policy 78 (2017) 173–184

7 INCC (Italian Natural Capital Committee), 2017. 1st Report on the State of Natural Capital in Italy. Synthesis. (Available from).
http://www.minambiente.it/sites/default/files/archivio/allegati/sviluppo_sostenibile/sintesi_raccomandazioni_primo_rapporto_capitale_naturale_english_version.pdf.

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

Table 5.1 mentions soil structure, which is actually a geological abiotic characteristic, among the abiotic characteristics of the physical type (physical factors are i.e. light, temperature, air pressure, gravity. Chemical factors are i.e. water, air and mineral substances. Geological factors are i.e. type of rocks, soil and the morphology of the territory).

§5.33 states that *"for those ecosystems in which humans have been influencing the environment for long periods a 'natural' state will no longer represent a meaningful reference for condition accounts"* instead these areas are representative of the desertification in terms of productive land loss and land degradation and consumption (UNCCD reference) and therefore, compared with a high reference level, this reference level and its Ecosystem Services will be close to zero.

§ 5.83 states that "*Ecosystem conversions occur when part or all of an ecosystem asset changes from one ET to another between the beginning and end of an accounting period. Examples of ecosystem conversions include clearing a natural forest for use by grazing animals; converting a natural grassland to cropland; urban sprawl into agricultural land; wetland restoration through in a conservation program; creation of a new hydropower reservoir; natural encroachment following permafrost melt; or the potential future flooding of coastal areas due to sea level rise*". The examples are confusing as they put hierarchically different ecological topics such as the ecological successions and the anthropogenic soil sealing on the same level.

§5.84 states "*other examples have less clear thresholds and hence it may be more difficult to define a distinct change in ecosystem type. For example, a change in canopy cover below a certain threshold (but not zero) could result in conversion from an ecosystem type of 'forest' to 'woodland' but this may be due to land use change that removed trees or due to the partial loss of leaves during drought which is reversible*" .
Two different indices may be used jointly in this case: the canopy cover as a function of the LEAF Area Index (LAI) in m2/m2 and the density of trees expressed in number of trees/hectare.
Minor comments on Annex 5.2:
- Page 21: "The SEEA ECT has seven classes as listed in Table 5.1". Table 5.1, page 3 lists only 6 classes, and the description on Annex 5.2 refers to 6 classes only.
- Page 22, "functional state characteristics", there is a reference to a selection criterion reported in Annex 5.x. This should be Annex 5.3.

Question 10 (added): Do you have any comments on the global consultation process and the cover note?

1. An outline of the volume along with the chapters would have been appreciated. The meaning and function of the chapters out for comments do not emerge clearly from seeing them out of context. Reference is also made to chapters other that these three.
2. Annex 1 to the Cover note seems to anticipate some contents of introductory chapters yet to be drafted. The following comments are intended to help a smoother process towards the adoption of the revised volume 2 of the SEEA.
3. Right from the start, "economic contributions provided by this natural capital" are put at the center of the stage. This instrumental view of ecosystems is not granted in an official statistics perspective, nor does it necessarily follow from the (shared) idea that "Humanity can no longer afford to ignore its dependence on a thriving environment rich in life" (on the contrary, an instrumental perspective on ecosystem components and services may lead to their overexploitation).
4. Normative statements such as "The calculations that guide crucial decisions must be changed so that nature and its benefits appear on the ledger" are not an appropriate support in an official statistics perspective. Even more so as the inclusion of natural resources values in the ledger is controversial also in other relevant accounting circles, like e.g. in the Public Accounting Sector.
5. Sentences like "The approach best suited for this is natural capital accounting", "The underlying premise of natural capital accounting is that …", "natural capital accounting provides essential information…", "The System of Environmental-Economic Accounting (SEEA), adopted by the United Nations Statistical Commission in 2012, is the official international framework for natural capital accounting" promote the wrong idea that SEEA Ecosystem Accounting and NCA are synonyms. Besides, the last one suggests that the SEEA (all of it!) serves NCA and even that it has been designed for this "official" purpose.
6. "In recent years, ecosystem accounting [h]as emerged as an innovative and exciting component of natural capital accounting". This statement even makes ecosystem accounting "a component" of NCA.
7. Ecosystems and capital have one feature in common: being stocks able to provide repeated benefits, ; yet "capital" in the SNA points to a subset of man-made assets. The two concepts are disjoint from a technical, classificatory point of view, as the most important **economic** feature of ecosystems is precisely that of not being man-made. The expression "natural capital" is misleading from a technical-classificatory point of view. The association of man-made and non-man-made assets is misleading for economic analysis as it assumes a "weak sustainability" perspective and may even result in policies that contradict the very premise that "Humanity can no longer afford to ignore its dependence on a thriving environment rich in life".
8. In conclusion, the primary subject of ecosystem accounting should be ecosystems themselves, not nature seen as capital, which is a wholly different thing or at best captures a double-edged *aspect* of ecosystems' relationship with mankind.