



DEPARTMENT OF ECONOMIC AND SOCIAL AFFAIRS
STATISTICS DIVISION
UNITED NATIONS



System of
Environmental
Economic
Accounting

SEEA Central Framework 2028 update

Draft Clarification Note

Definition of Environmental Assets

Version for discussion at the SEEA CF Technical Committee meeting on 17-21 November 2025.

CLARIFICATION NOTE: Definition of Environmental Assets

1 Introduction

1.1 Purpose of the Clarification note

1. The aim of this clarification note is to provide guidance on the appropriate interpretation of the definition of environmental assets as defined in the SEEA Central Framework 2012 (SEEA CF).
2. The initial discussion of a number of issues within scope of Task Team D on environmental assets highlighted varying understandings of the definition of environmental assets from the SEEA CF and identified the need to clarify the appropriate measurement boundary when applying the definition in practice. The particular issues of note concerned issue D1 on the carbon stock account, issue D4 on the treatment of water as a produced asset and issue D8 on the treatment of the atmosphere as an asset. Further reflection revealed the relevance of clarifying the interpretation of environmental assets for issues D7 on the valuation of water, issue D3 on accounting for produced assets in physical terms and issue A9 on consistency with the update of the 2025 SNA.
3. At the start of the update process there was no intention to revisit or change the definition of environmental assets from the 2012 SEEA CF. This was not identified as an update issue through the process conducted through 2024 and signed off by the United Nations Statistical Commission (UNSC) in March 2025. The focus here is thus on reaching an agreed understanding of the appropriate interpretation and application of the definition. However, the discussion of the issues raised in this note indicates that at least some additional text to clarify aspects of the definition of environmental assets should be incorporated in the updated SEEA CF and it is possible that some refinements to the definition itself should also be considered.
4. The purpose of this note is thus to help establish an agreed understanding of environmental assets. This is important to build the integration between the SEEA CF, the SEEA Ecosystem Accounting (SEEA EA) and the System of National Accounts (SNA) all of which have definitions related to environmental assets. Further, since in a number of cases the discussion for the update of the SEEA CF explores the edges of measurement and conceptual development, for example concerning the atmosphere and the valuation of water, establishing a commonly understood foundation for those discussions will support greater engagement and a focus on critical issues.

1.2 Process for developing the Clarification Note

5. Although this issue was not identified in the wider process for establishing the set of issues for the SEEA CF update, it is considered sufficiently relevant to making progress across a number of update issues. This Clarification Note has been reviewed by Task Teams A and D and by the SEEA CF Technical Committee. The findings from the initial discussions and other feedback have also been incorporated into relevant Guidance Notes on specific issues that will be the subject of Global Consultation during 2026.

1.3 Structure

6. The remainder of this Guidance note covers:
 - a. The definition of environmental assets from the SEEA CF
 - b. Observations on the definition of environmental assets
 - c. Establishing the general measurement boundary for environmental assets
 - d. Establishing the measurement boundary for individual environmental assets
 - e. Establishing the measurement boundary for types of environmental assets
 - f. Considerations in relation to defining ecosystem assets

Questions for discussion

7. Concerning the definition and description of environmental assets:
 - a. Should amendments be made to the definition of environmental assets?
 - b. Should a different measurement boundary for individual environmental assets be retained in physical and monetary terms and if so, what clarifications should be made to the current text?
 - c. What is the appropriate approach to explaining that cultivated biological resources are within scope of the definition of environmental assets? The current definition and associated descriptions do not highlight this point. Options include adding/amending words to the definition (e.g. with respect to naturally occurring); adding relevant text to the discussion of the definition; and expanding the classification to better highlight the inclusion of resources such as livestock and crops.
 - d. Should the measurement boundary in monetary terms for individual environmental assets be limited to material benefits as described in paragraph 2.18? If so, what clarifications should be made to describe the connection to related terms such as economic benefits and SNA benefits?
 - e. Does the scope of benefits exclude intrinsic values and what is the intended treatment of non-use values? These questions have been considered in the SEEA EA and in the SEEA 2003 but are not discussed in the SEEA CF. Is discussion of these issues needed in the updated SEEA CF?
 - f. What changes might be incorporated in the SEEA CF to better explain the distinction between the SEEA CF coverage of individual environmental assets and the SEEA EA coverage of ecosystem assets? This issue will be considered as part of Issue A1 on the links between SEEA CF and SEEA EA. In the context of the content presented below options including better describing the overlaps and differences in asset coverage and improving the discussion of the different types of benefits.

8. Concerning the scope of environmental assets:
 - a. To what extent is a physical / tangible stock always required in order to establish an individual environmental asset in the SEEA CF? This question is relevant in answering the following two questions:
 - i. What treatment of renewable energy resources should be adopted? (To be discussed in Guidance Note A9 on the alignment with the SNA)
 - ii. Should radio spectra be included in the SEEA CF as individual environmental assets? (To be discussed in Guidance Note A9 on the alignment with the SNA)
 - b. Should carbon and similar individual elements/substances continue to be excluded from the set of individual environmental assets? (To be discussed in Guidance Note D1 on carbon stock accounts)
 - c. Should the atmosphere be considered an environmental asset? The Guidance Note for issue D8 will consider this issue including whether the atmosphere might be considered a type of ecosystem or a type of individual environmental asset; the relevant measurement boundaries; and what benefits might be supplied by the atmosphere.
 - d. Should the phrase “living and non-living components of the Earth” be extended to consider accounting for environmental systems such as the climate system? This may be considered in Guidance Note D8 on the treatment of the atmosphere as an asset.
 - e. Are there any other components of the environment that might be considered as individual environmental assets and, if so, what would be the rationale for their inclusion? Alternatively, would it be appropriate to introduce a “catch-all” category of other environmental assets?
9. Concerning the definitions of individual environmental assets:
 - a. Are any clarifications required to align the description of the measurement boundaries for each type of individual environmental asset with the general definition and description of environmental assets?
 - b. For measurement in monetary terms (setting aside water resources whose valuation will be considered in Guidance Note D7), do the measurement boundaries align with those described in the 2025 SNA and expanded in the Organisation for Economic Co-operation and Development (OECD) Guidance on Measuring Natural Capital? If not, what changes should be incorporated? (This question will be considered in Guidance Note A9 on alignment with the SNA.)
 - c. Should the SEEA CF expand the classification of environmental assets to explicitly note cultivated biological resources including livestock, orchards and crops?

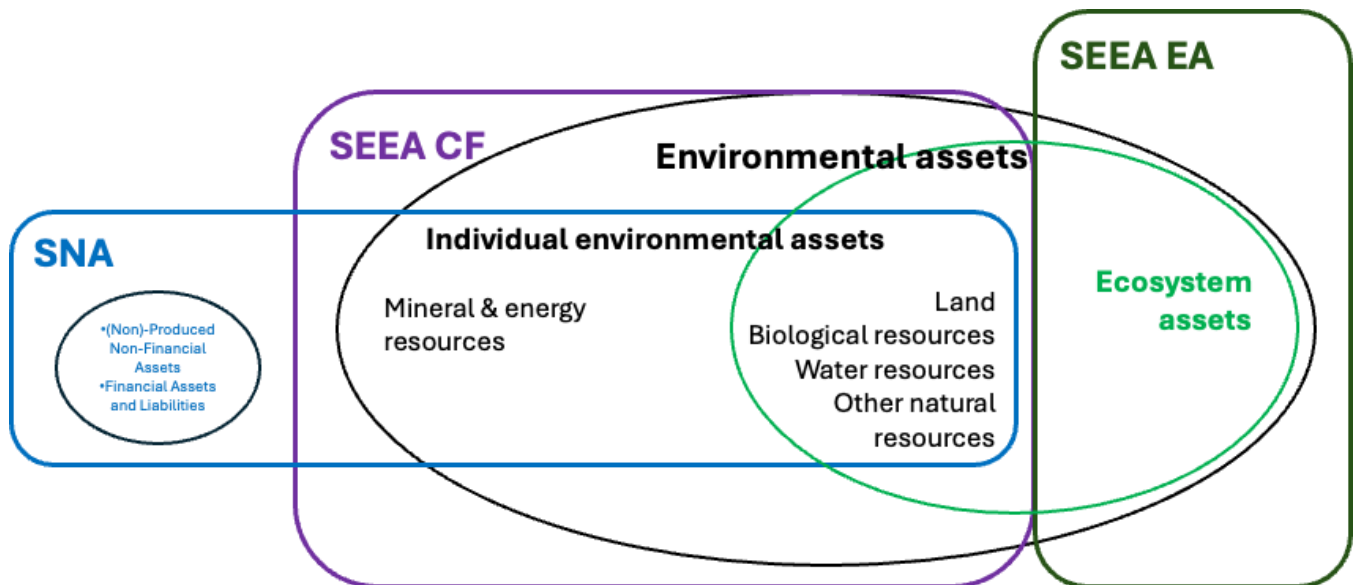
2 Review of existing definitions and associated text

2.1 Defining Environmental assets

2.1.1 General understanding of environmental assets

10. Before providing a more thorough examination of the definition and interpretation of the SEEA CF with respect to environmental assets, it is useful to consider the figure below that provides a stylised representation of the relationships among and treatment of different types of environmental assets in the SEEA CF, SEEA EA and SNA.
11. This may be considered a general understanding of the relationships and so is intended to provide a starting point for the discussion on the details that follows. To support an understanding of the linkages presented the following points are noted:
- The overlap between ecosystem assets and individual environmental assets is intended to indicate that these assets may be co-located, not that they are the same. Thus lakes as water resources are not lakes as ecosystem assets.
 - This overlap also reflects that the supply of provisioning services by ecosystem assets will be aligned with harvests of individual environmental assets, e.g. removals of timber resources and wood provisioning services. Further, these flows related to individual environmental assets will be recorded in the SEEA CF and SNA.

Figure 1: Relationships between SEEA CF, SEEA EA and SNA concerning environmental assets



Source: Adapted from UNSD.

2.1.2 Definitions from SEEA Central Framework

12. Within this general context, the next two sections consider the text of the SEEA CF and discuss the relevant interpretations.

13. The definition of environmental assets is considered in Section 2.2 of the SEEA CF. To support discussion the relevant text is reproduced in full here.

- 2.17 ***Environmental assets are the naturally occurring living and non-living components of the Earth, together constituting the biophysical environment, which may provide benefits to humanity.*** Although they are naturally occurring, many environmental assets are transformed to varying degrees by economic activities. In the SEEA, environmental assets are considered from two perspectives. In the Central Framework, the focus is on individual components of the environment that provide materials and space to all economic activities. Examples include mineral and energy resources, timber resources, water resources and land.
- 2.18 This focus reflects the material benefits from the direct use of environmental assets as natural inputs for the economy by enterprises and households. However, this focus does not consider the non-material benefits from the indirect use of environmental assets (for example, benefits from ecosystem services such as water purification, storage of carbon and flood mitigation).
- 2.19 The coverage of individual assets does not extend to the individual elements that are embodied in the various natural and biological resources referred to above. For example, the various soil nutrients are not explicitly considered individual assets.
- 2.20 A complete description of the measurement of environmental assets in terms of the various individual environmental assets is presented in chapter V.
- 2.21 The second perspective on environmental assets, which is described in SEEA Experimental Ecosystem Accounting, encompasses the same environmental assets but instead focuses on the interactions between individual environmental assets within ecosystems, and on the broad set of material and non-material benefits that accrue to the economy and other human activity from flows of ecosystem services. ***Ecosystems are a dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit.*** (Convention on Biological Diversity (2003), Article 2, Use of Terms) Examples are terrestrial ecosystems (for example, forests and wetlands) and marine ecosystems. Often, there are interactions between different ecosystems at local and global levels.¹
- 2.22 For a given ecosystem or group of ecosystems, ecosystem accounting considers the capacity of living components within their non-living environment to work together to generate flows known as ecosystem services. ***Ecosystem services are the contributions of ecosystems to benefits used in economic and other human activity.*** Ecosystem services which are supplied in many ways and vary from ecosystem to ecosystem, may be divided into three groups (a) provisioning services (such as the provision of timber from forests); (b) regulating services (provided, for example, by forests when they act as a sink for carbon); and (c) cultural services (such as the enjoyment provided to visitors to a national park). Generally, provisioning services are related to the material benefits of environmental assets, whereas the other types of ecosystem services are related to the non-material benefits of environmental assets.

¹ Note that the descriptions of the two perspectives embody a clear overlap in scope, as shown in Figure 1 above. By way of example the SEEA CF perspective will include forest land and timber resources and the SEEA EA perspective will include forest ecosystems. In physical terms this coverage is the same (for a given forest). The differences in the perspectives lie in which physical data are collated and in which benefits supplied by the assets are measured.

- 2.23 Degradation of ecosystems by economic and other human activity may mean that they are not able to generate the same range, quantity or quality of ecosystem services on an ongoing basis. A focus on ecosystems that includes both material and non-material benefits of environmental assets provides a basis for analysing the extent to which economic activity may reduce an ecosystem’s capacity to generate ecosystem services.

2.1.3 Observations on the definition of environmental assets

14. From these SEEA CF paragraphs a few general insights can be made. First, the definition of environmental assets is established in biophysical terms. Further, the scope in biophysical terms is very broad and encompassing such that individual environmental assets, including land and natural resources (timber, fish, mineral and energy resources) and ecosystems are considered within scope. This broad scope and the starting focus on biophysical components rather than economic benefits and monetary value is well-aligned with the description of environmental assets in the SEEA 2003 (see paragraphs 7.23-7.40).
15. Second, paragraph 2.19 acknowledges that the intention in the use of the word “components” does not extend to individual elements embodied in individual resources. This point is reinforced later in Chapter 2 where it is noted that individual environmental assets “*are defined by their material content (e.g., the volume of timber or soil resources) without specific reference to their constituent elements (such as the carbon in timber and nutrients in soil resources).*” (SEEA CF para 2.100).
16. Third, there is no requirement in the SEEA CF framing that benefits are provided (either currently or in the future) by environmental assets – embodied in the wording “may provide benefits”. The lack of a requirement for benefits to be provided establishes a distinction between the physical existence of environmental assets and the benefits they may provide. In turn, this allows for the measurement scope in physical terms to be broader than the scope in monetary terms.
17. This framing contrasts with the definition of economic assets from the 2025 SNA. In the SNA ***an asset is a store of value representing an economic benefit or series of economic benefits accruing to the economic owner by holding or using the item over a period of time. It is a means of carrying forward value from one accounting period to another (2025 SNA, para 4.98; 11.10)*** where economic benefits are “*gains arising from the economic activities of production, consumption or accumulation*” (2025 SNA, Glossary). This implies that in the SNA, an economic asset requires both (a) the existence of a set of economic benefits (noting that there is no requirement for a physical stock); and (b) an economic owner entitled to claim the benefits.
18. A related conclusion from this point may be that the SEEA CF should be understood as not using economic significance as a primary criterion for the determination of measurement scope in concept, although economic significance may be the main criterion in determining the measurement scopes of individual environmental assets in practice. This practical aspect emerges clearly when the SEEA CF recommendations for measurement boundaries for each environmental asset are discussed below.

19. Fourth, the scope of benefits that environmental assets may provide is not restricted to material benefits. This observation emerges from recognising that environmental assets are considered from two perspectives (paragraph 2.17). The first perspective is described in the SEEA CF and considers a limited set of (material) benefits (paragraph 2.18). The second perspective (paragraph 2.21) is described in the SEEA EA and encompasses a wider set of benefits (material and non-material) benefits. This aligns well with SEEA 2003. Put differently, the SEEA CF discussion of the definition of environmental assets recognises that in accounting for ecosystems (a type of environmental assets) a wider range of benefits would be in scope compared to accounting for individual environmental assets in the SEEA CF. This understanding continued through to the finalisation of the SEEA EA in 2021.
20. Fifth, while the scope of benefits for environmental assets as a whole may be broad, the text in paragraphs 2.17 and 2.18 indicates that the individual environmental assets that are within the scope of measurement for the SEEA CF are those where there are “*material benefits from the direct use of environmental assets as natural inputs for the economy by enterprises and households*”. This focus for the SEEA CF is reinforced in later sections – including section 2.5.3 on accounting for stocks and section 5.2.3 on the valuation of environmental assets. The text in section 5.2.3 is clear that the scope of valuation of environmental assets in the SEEA CF is consistent with the SNA and hence “*is limited to the benefits that accrue to economic owners*” (para 5.32). It is also noted that since the scope of benefits in the SEEA EA is wider, the valuation of environmental assets in scope of the SEEA EA will be larger and not restricted to benefits accruing to economic owners.

2.2 Establishing the measurement boundary for environmental assets in the SEEA Central Framework

21. The delimitation of environmental assets has a number of aspects that are described in different parts of the SEEA CF.
22. The starting point for the discussion here are the observations above that the SEEA CF is focused on accounting for individual environmental assets “*that provide material benefits from the direct use of environmental assets as natural inputs for the economy by enterprises and households*” (paragraph 2.18). The issues discussed here are directed at determining which individual environmental assets satisfy this requirement. One point that is discussed further below is that the text in paragraph 2.18 concerning individual environmental assets does not include the word “may” in relation to the provision of benefits.
23. First, it is noted that the potential geographic scope of environmental assets to be recorded following the SEEA CF at national level is limited to the economic territory of a country defined consistently with the SNA. This geographical scope is described in paragraph 5.13 and the concept of economic territory is described in paragraph 2.121. The issue of geographical scope is not discussed further.
24. Also concerning overall scope of measurement, SEEA CF Chapter 2 (paragraph 2.102) and Chapter 5 (paragraph 5.16) explain the measurement scope with respect to accounting for the

ocean and the atmosphere. Paragraph 5.16 explains the treatment (see below). The issue of accounting for the ocean and the atmosphere is not discussed further here.²

5.16 The volume of water in the sea is not considered in scope of water resources in the Central Framework because the stock of water is too large to be meaningful for analytical purposes. The exclusion of the sea in terms of a volume of water resources does not in any way limit the measurement of sea-related individual components such as aquatic resources (including fish stocks on the high seas over which a country has harvesting rights) and mineral and energy resources on or under the seabed. The volume of air in the atmosphere is also not in scope of environmental assets in the Central Framework.

25. Within these two general measurement boundaries, the set of individual environmental assets accounted for in the SEEA CF has essentially been determined by general agreement and past measurement practice on which environmental assets provide material benefits in the form of natural inputs as explained in paragraph 2.17. SEEA CF Table 5.1 (see Table 1 below) sets out the classification of environmental assets for the SEEA CF. It presents seven types of environmental assets: mineral and energy resources, land, soil resources, timber resources, aquatic resources (largely fish), other biological resources and water resources.

Table 1: Classification of Environmental Assets in the SEEA CF

1	Mineral and energy resources
1.1	Oil resources
1.2	Natural gas resources
1.3	Coal and peat resources
1.4	Non-metallic mineral resources (excluding coal and peat resources)
1.5	Metallic mineral resources
2	Land
3	Soil resources
4	Timber resources
4.1	Cultivated timber resources
4.2	Natural timber resources
5	Aquatic resources
5.1	Cultivated aquatic resources
5.2	Natural aquatic resources
6	Other biological resources (excluding timber resources and aquatic resources)
7	Water resources
7.1	Surface water
7.2	Groundwater
7.3	Soil water

26. Within biological resources the focus on timber and fish resources reflects that these are the primary forms of non-cultivated (natural) biological resources which are subject to economic activity, excluding those biological resources which are predominantly cultivated. This focus could be revisited although it would be unlikely for the SEEA CF to expand significantly to discuss accounting for cultivated biological resources such as livestock, orchards and crops. A

² Accounting for the atmosphere will be discussed in GN D8.

discussion on accounting for these resources is provided in the SEEA Agriculture, Forestry and Fisheries building on the core text from the SNA.

27. The implicit assumption at the time of drafting was that this was a relatively exhaustive set covering all components of the biophysical environment that could be extracted, harvested or provide natural inputs. At the same time, there was no explicit consideration of this question.
28. In terms of other potential biophysical components, the SEEA CF explicitly excludes the carbon stock, where SEEA CF paragraphs 2.19 and 2.100 explain that carbon itself (and other individual elements, such as nitrogen, should not be considered an individual environmental asset. The implications of this treatment and whether it should change are introduced further below and in more detailed in GN D1: Inclusion of the carbon stock account in the SEEA CF.
29. Another entry point to assess the scope of individual environmental assets included in the SEEA CF is the scope of natural resources in the 2025 SNA. Like the SEEA CF, the 2025 SNA does not include ecosystem assets within its asset boundary for the integrated sequence of economic accounts. Further, all of the various types of individual environmental assets in the SEEA CF (as listed in the table above) are included in the SNA's scope of natural resources with the note that in the SNA land and soil resources are not separated.
30. However, at this moment two differences in scope exist between these standards. First, the 2025 SNA now explicitly includes renewable energy resources whose treatment in a SEEA CF context needs to be re-considered (to be discussed in Issue A9 on the alignment with the SNA). Second, the SNA includes a category for other natural resources as somewhat of a catch-all but with explicit reference only to radio spectra. Certainly, radio spectra provide economic benefits. However, some discussion is needed to clarify whether they should be included in the set of environmental assets in the SEEA CF. If they were to be included then a longer discussion will be needed on the appropriate accounting treatment since, as revealed at the end of the 2025 SNA update process, the documented treatment of radio spectra in Chapter 27 is now inconsistent with the general accounting for natural resources which has changed compared to the 2008 SNA.

2.3 Establishing the measurement boundary for individual environmental assets in the SEEA Central Framework

31. A general conclusion from the discussion above is that the set of individual environmental assets included in the SEEA CF is quite comprehensive and also quite consistent in coverage with the 2025 SNA. However, for each type of individual environmental asset, a key difference that is generally understood between the SEEA CF and the SNA in terms of measurement boundary is that the SEEA CF allows for the measurement in physical terms to be greater than in monetary terms.
32. SEEA CF chapter 5, paragraphs 5.39 and 5.40 explain this difference in the following way:
 - 5.39 In physical terms, the scope of environmental assets measured in the Central Framework may be greater than the scope of environmental assets measured in monetary terms following the SNA definition of economic

assets. This is because there is no requirement in physical terms that environmental assets must deliver economic benefits to an economic owner. For example, remote land and timber resources should be included within the scope of the environmental assets of a country even if they do not currently or are not expected to deliver benefits to an economic owner.

5.40 Consequently, there may be environmental assets that are recorded in the Central Framework in physical terms which have no measured monetary value and are therefore excluded from environmental assets measured in monetary terms. Where such assets are recorded in physical terms, the quantities should be recorded separately from quantities of environmental assets that do deliver economic benefits to economic owners.

33. At the same time, this commonly understood difference does not quite align with the text in paragraph 2.17 of the SEEA CF which can readily be interpreted as implying that, to qualify as an individual environmental asset in the SEEA CF, it is necessary that material benefits are provided – see highlighted text just below. Specifically, this phrasing does not include the word “may” that is included earlier in the sentence in the definition of environmental assets more generally.

“In the Central Framework, the focus is on individual components of the environment **that provide** materials and space to all economic activities. Examples include mineral and energy resources, timber resources, water resources and land.

34. In the update of the SEEA CF it will be necessary to reach a conclusion on whether the text in paragraph 2.17 should be changed to include the wording “...that **may** provide materials and space...” and hence align better with the general definition of environmental assets. Alternatively, the text in paragraph 2.17 could remain the same. In this case, the measurement boundary for individual environmental assets in both physical and monetary terms would, to all intents and purposes, be identical to the SNA and the distinction between the measurement boundary in physical and monetary terms as described in paragraphs 5.39 and 5.40 (above) would need to be dropped or re-considered. This would be quite a significant change in current understanding of the measurement scope of the SEEA CF and the application in practice.

35. An interesting aside to this discussion is that the SEEA CF uses explicitly the term “material benefits” when considering the measurement scope of individual environmental assets and explains this term in paragraph 2.18 noting that material benefits arise *“from the direct use of environmental assets as natural inputs for the economy by enterprises and households.”* Further, it contrasts material benefits with non-material benefits which arise *“from the indirect use of environmental assets (e.g. benefits from ecosystem services such as water purification, storage of carbon and flood mitigation.)”*

36. Discussion since 2012 on issues of measurement boundaries for ecosystem services indicate that further clarification of terminology and intended concepts and scope may be required. By way of example, the SNA refers to economic and non-economic benefits where economic is determined by the production boundary of the integrated set of economic accounts. The SEEA EA refers to SNA and non-SNA benefits again with the same conceptual boundary as the SNA. The challenge for the SEEA CF is that the term “material benefits” is applied such that it relates to benefits from direct use and largely in relation to extraction/harvest. Thus it is narrower in

concept than economic benefits to the extent that a specific individual environmental asset supplies other goods and services within scope of the SNA production boundary that do not arise as a result of harvesting. One example is where fish resources might support tourism activities such as snorkelling.

2.4 Measurement boundaries for specific types of environmental asset

37. On the assumption that a different measurement boundary will be applied in physical and monetary terms for individual environmental assets, the SEEA CF paragraph 2.103 further notes that *“in practice, a specific measurement boundary is defined for each environmental asset.”*
38. Thus, the measurement boundary for each type of individual environmental asset is reflected throughout the sections of SEEA CF Chapter 5. The following content is relevant:
- a. **For mineral and energy resources**, the measurement scope is based on the concept of “known deposits” (paragraph 5.173) which is applied using the UN Framework Classification for Fossil Energy and Mineral Reserves and Resources (UNFC). Known deposits are separated into three classes A, B and C. Monetary valuation is recommended only for class A deposits – commercially recoverable (paragraph 5.193). *“Known deposits exclude potential deposits where there is no expectation of the deposits’ becoming economically viable and there is a lack of information needed to determine the feasibility of extraction or to have confidence in the geologic knowledge.”* (paragraph 5.179).
 - b. **For land**, the measurement boundary in physical terms is extended to a country’s exclusive economic zone and other national borders (paragraph 5.240). The measurement boundary in monetary terms is not explicitly described but paragraph 2.106 notes that *“all land within a country is within scope ... but in monetary terms some land may be considered to have zero value”*.
 - c. **For soil resources**, the focus in physical terms is on the top layers (horizons) of soil that form a biological system (paragraph 5.320) and hence measurement is generally restricted to *“land used for agriculture and forestry and also volumes of soil extracted to be used as a biological system.”* (paragraph 5.330). The implicit framing here is that only soil resources linked to economic production should be included. Note there is no discussion in the SEEA CF on the potential to value soil resources separately from the associated land uses.
 - d. **For timber resources**, the key distinction is between timber resources available for wood supply (i.e. to produce timber products or for use as fuelwood) and those not available for wood supply. The measurement scope in physical terms is all timber resources but in monetary terms the scope is limited to resources available for wood supply (paragraph 5.347). It is noted that most commonly timber resources are found in areas of forest land or other wooded land but other areas of land (e.g. agro-forestry, orchards, city parks, etc) may be relevant (paragraphs 5.348 & 5.349). Depending on the

context the distinction between available for wood supply and not available for wood supply will be important.

- e. **For fish/aquatic resources**, the geographic scope is of high relevance and this is described as relating to all aquatic resources “*within a country’s EEZ or on the high seas over which the country holds ownership rights*” (paragraph 5.395). Within this scope of stocks, the measurement scope is further restricted to “*those aquatic resources that are subject to commercial activity*” (paragraph 5.395). Both cultivated and natural aquatic resources are included. Given that only aquatic resources that are subject to commercial activity (i.e. harvest) are included, the measurement scope is the same in physical and monetary terms. However, consideration might be given to broadening the physical measurement boundary to include fish in no-take marine protected areas or other areas not accessible for fishing.
 - f. **For water resources**, the measurement boundary in physical terms consists of “*fresh and brackish water in inland water bodies, including groundwater and soil water*” (paragraph 5.474). The definition of inland water bodies should be consistent with the definitions in the land use and land cover classifications noting challenges will often arise in delineating water bodies from other land use and land cover types. Excluded is “*water in oceans, seas and the atmosphere.*” (paragraph 5.476). There is only limited discussion of the valuation of water resources and no mention of the appropriate measurement boundary.
39. One general observation in the way that these practical measurement boundaries have been set is that they tend to consider the existence of economic benefits following the SNA but the boundaries are not consistently described. In the drafting of the SEEA CF 2012, all of the boundaries emerged based on the standard or common measurement practice applied in each specific topic area rather than based on a consistent application of criteria across different environmental assets.

2.5 Considerations relating to ecosystem assets

40. Guidance Note A1 on the links between the SEEA CF and the SEEA EA discusses the issues of the relationship between the definition of environmental assets in the SEEA CF and the definition of ecosystem assets in the SEEA EA. Nonetheless, to complement the text above and close the loop on the opening of this note the following observations are made.
- a. The definition of environmental assets encompasses both individual environmental assets and ecosystems with the SEEA CF describing accounting for individual environmental assets and the SEEA EA describing accounting for ecosystems. To the extent that individual environmental assets are physically located within ecosystem assets (e.g. timber resources in forests) then there will be an overlap in measurement (across the SEEA CF and SEEA EA) but since the information is in separate accounts there is no double counting. Special note is made concerning land. Accounting for land use and land cover will have similar a measurement scope to accounting for ecosystem

extent but the delineation of ecosystem assets is conceptually distinct from the delineation of land use and land cover. Overall, care will be needed in compiling aggregated accounts that encompass both individual environmental assets and ecosystem assets.

- b. With respect to ecosystems, the SEEA CF does not provide any specific guidance on the measurement boundary to be applied. SEEA EA Chapter 3 considers the scope of measurement for ecosystem assets. The general concept of an ecosystem accounting area (EAA) is described (paragraph 3.22). When accounting at national level, the geographic scope is the same as the land accounts of the SEEA CF, i.e. to the boundary of a country's exclusive economic zone (EEZ) (paragraph 3.27). SEEA EA Chapter 3 also describes other scoping issues with respect to ecosystem assets for marine ecosystems, the atmospheric boundary, the subsoil boundary, aquifers, subterranean ecosystems and subsoil abiotic resources (paragraphs 3.11-3.19). Should additional text summarising these aspects be included in the SEEA CF?
- c. Concerning the carbon stock, it is noted that while the SEEA EA describes the carbon stock accounts, it does not consider the carbon stock to be an ecosystem asset and does not describe or envisage the valuation of the carbon stock as a stand-alone environmental asset. The valuation of the carbon stock and associated flows is part of the measurement of global climate regulation services but that is a separate aspect of accounting. The Guidance Note for issue D1 will consider these issues further.
- d. Concerning the atmosphere, as for carbon SEEA CF paragraphs 2.19 and 2.100 imply that the constituent gases and other substances in the atmosphere would not be considered individual environmental assets although it may be relevant to record the stocks and changes in stocks of these substances. The Guidance Note for issue D8 will consider these issues further including whether the atmosphere might be considered a type of ecosystem or a type of individual environmental asset; the relevant measurement boundaries; and what benefits might be supplied by the atmosphere.
- e. Should the phrase "living and non-living components of the Earth" be extended to consider accounting for environmental systems such as the climate system? This question is relevant in considering responses to proposals for the climate system to be treated as a type of natural capital which may incorporate discussion of the extent to which accounting for physical stocks of relevant substances (e.g. carbon in the case of the climate system) may provide relevant information to support analysis. This may be considered in Guidance Note D8 on the treatment of the atmosphere as an asset.
- f. Does the scope of benefits exclude intrinsic values and what is the intended treatment of non-use values? These questions have been considered in the SEEA EA and in the SEEA 2003 but are not discussed in the SEEA CF. Is discussion of these issues needed in the updated SEEA CF?

3 Proposals for clarification to the SEEA Central Framework

TO BE DEVELOPED

4 References

SEEA CF

SEEA EA

SEEA 2003

2025 SNA