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SEEA Central Framework Update

Draft Guidance Note

**Issue A9.3: Consistency with the 2025 SNA
update issues – Definitions, classification and
treatment of natural resources**

SEEA Perspective

Version for discussion at the SEEA CF Technical Committee March 2026

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Proposals for consideration by the SEEA CF Technical Committee

Definition of environmental assets and natural capital

1. It is proposed to retain the use of the term “environmental assets” in the updated SEEA CF as the “umbrella” term for the measurement scope and to amend the definition to include explicit reference to the inclusion of cultivated biological resources.
2. It is proposed to include in the updated SEEA CF a brief introduction to the multiple capitals/wealth accounting framework (referencing content from the 2025 SNA Chapter 2)

Coverage of the term natural resources

3. Discussion and feedback has not been conclusive in terms of the appropriate coverage of the term natural resources with some experts preferring to stay with the current SEEA CF scope of natural resources and some preferring alignment with the SNA. Advice from the SEEA CF TC would be welcome.
4. To better explain the accounting for natural resources, it is proposed to introduce the following clarifications:
 - a. A full correspondence of asset classes between the 2025 SNA and the SEEA CF
 - b. A discussion of differences in the scope of measurement in physical and monetary terms
 - c. An Explanation of the links between flows such as natural inputs and ecosystem services, particularly in the context of physical flow accounts.
 - d. A description of accounting for changes in ownership of environmental assets
 - e. A description of the continuum between environmental assets and economic assets
 - f. An explanation of the links to the derivation of indicators – e.g. those related to depletion.

Classifications of environmental assets

5. Given the similarities between the approach to classification of natural resources/environmental assets at the first level of the classification, it is tentatively proposed to retain the current SEEA CF classification noting:
 - a. The retention of the distinctive treatment of land as space in the SEEA CF
 - b. The potential for sub-classes of mineral and energy resources and biological resources to be reworked (next sections)
 - c. The potential to include a class for other natural resources pending the discussion on the treatment of radio spectra.
 6. It is therefore proposed to relabel the classification to be the “Classification of Individual Environmental Assets”.
 7. It is proposed to retain the classification approach for biological resources in the current SEEA CF.
 8. It is proposed to establish a correspondence between the SEEA CF and SNA classes of biological resources to support compilation and alignment.
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9. The more detailed set of classes in the 2025 SNA for mineral and energy resources provides a generally richer set of information compared to the SEEA CF and it is proposed that these classes also be applied in the SEEA CF
10. Advice is needed on whether to develop additional more detailed classes for mineral and energy resources, for example concerning critical minerals.

Accounting for biological resources

11. On balance, it is proposed to retain the current treatment in the SEEA CF concerning the criteria to be applied in distinguishing between cultivated and non-cultivated biological resources.
12. The text in SEEA CF 5.378-385 should be improved to make the distinction between timber resources and the underlying asset of forest land clear
13. It is proposed that a description of the relevant accounting entries to link the asset accounts and the supply and use tables is included in the updated SEEA CF.
14. It is proposed to add some limited text on accounting for agriculturally-related cultivated biological resources in the current section on other biological resources and highlight the links to other documents.

Accounting for renewable energy resources

15. Given that the value of renewable energy resources is already recognised as part of the environmental asset land in the SEEA CF 2012, it is proposed to align with the 2025 SNA and include renewable energy resources as a distinct asset class.
16. It is also proposed to incorporate an explanation of the relationship between the concept of a stock of renewable energy resources and the definitions of environmental and economic assets.

Accounting for radio spectra

17. As an interim conclusion it is proposed that the updated SEEA CF include the radio spectra as a new class of environmental asset.
18. It is proposed that the updated SEEA CF apply the general treatment of permits to use natural resources in the 2025 SNA (para 27.15-20) wherein the total value is assigned to the asset itself and no separate asset value is recorded for any associated permit or licence.

GUIDANCE NOTE Issue A9.3: Consistency with the 2025 SNA update issues – Definitions, terminology and treatment of natural resources

1 Introduction

1.1 Purpose of the Guidance note

1. The purpose of this Guidance Note (GN) is to provide guidance on the treatment of issue A9 “Consistency with the 2025 SNA update issues” in the update of the SEEA 2012 Central Framework (SEEA CF) with a focus on issues concerning terminology and classification.
2. The following short description of issue A9 from October 2024 recognises a range of issues. The final sentences note the links to classification and terminology. In addition, there are issues of terminology that relate to the substantive treatments around accounting treatment of natural resources.

“In the 2025 SNA revision, several issues have been addressed in the area of natural capital and the environment, and the updated SEEA CF must consider the implications. The issues include a) Biological resources, b) Economic ownership / depletion natural resources, c) Treatment of emission trading schemes, d) Treatment of renewable energy resources as assets, e) Valuation of natural resources, and f) Distinction between taxes and services. In addition, there is a need to understand the implications of changes to the asset classification of the 2025 SNA, as there is a need for a harmonized asset classification for the SNA/SEEA from a SEEA perspective, i.e. the inclusion of natural resources / ecosystems / renewable energy resources etc. In addition, there may be overlaps in terminology between the SEEA CF and 2025 SNA which need to be clarified.”

3. The updated 2025 SNA was subsequently adopted by the UN Statistical Commission in March 2025 and there is now a baseline version of the SNA that can be used for consideration of the issues raised above and any other issues of consistency that might be identified.
4. The broad proposal for consideration under issue A9 is determining which changes reflected in the 2025 SNA should be incorporated into the updated SEEA CF. In the development of the SEEA over the past 30 years there has been a consistent intent to align with the accounting treatments and terminologies of the SNA such that data from both systems can be readily combined to provide more comprehensive and integrated data to support analysis of the links between the environment and the economy.
5. Further, the 2012 SEEA CF was drafted using as its basis the treatments described in the 2008 SNA. Thus, as part of the update of the SEEA CF, the changes in the 2025 SNA must be considered to ensure ongoing alignment. This is particularly relevant at this time given the range of changes to the accounting for natural resources that were included in the 2025 SNA (noting that a number of these SNA changes were motivated by developments in the SEEA over the past 15 years).
6. Whether all of the relevant changes in the 2025 SNA should be incorporated in the updated SEEA CF is to be determined but there is a strong expectation that the implications of changes

to the SNA should be examined closely through the SEEA CF update process. With this objective in mind, this GN discusses:

- a. whether the changes to the SNA concerning terminology and classification, particularly regarding natural resources, are of relevance to the SEEA CF update; and if so,
 - b. what changes to the SEEA CF might be needed.
7. The GN does not intend to open up for discussion the changes that have been adopted in the 2025 SNA. Thus, it is taken as given that the 2025 SNA is the definitive SNA treatment. The focus is therefore on the extent to which the treatment in the updated SEEA CF should be aligned with the 2025 SNA.
 8. In this context, the general intent in the GN is to provide a rationale for any deviations from the 2025 SNA that the updated SEEA CF might apply including clarifying any implications that may arise from not aligning with the 2025 SNA. Relevant considerations include ensuring internal consistency and coherence across the SEEA CF and responding to users and policy needs.
 9. A related matter concerns the role of the SEEA CF relative to the SNA, particularly in relation to accounting for natural resources. The 2012 SEEA CF provided significant additional discussion on a range of accounting issues compared to the 2008 SNA. While the 2025 SNA has expanded its discussion of certain aspects of environmental-economic accounting, there remains scope for the SEEA CF to provide additional detail and explanation of the 2025 SNA treatments, including in cases where the conceptual alignment between the SEEA CF and 2025 SNA is endorsed.
 10. In parallel to the update of the SEEA CF, the Government Finance Statistics Manual (GFSM) is also being updated. There are a number of topics under discussion in the GFSM that are similar to those being considered in the SEEA CF update process, including the accounting treatments for natural resources. For both manuals, the treatments in the 2025 SNA are the underlying starting point. Since these update processes are occurring in parallel, the Guidance Note has been drafted collaboratively. However, at this stage, due to the differences in the accounting solutions that need to be considered within the two communities, separate Guidance Notes have been prepared.
 11. A series of GNs have been prepared to cover the range of topics described in the A9 issue description above. This GN, A9.3, focuses on one aspect of the alignment with the 2025 SNA, namely the definitions, terminologies and measurement scopes applied in accounting for natural resources. Other issues concerning the consistency of the updated SEEA CF with the 2025 SNA will be discussed in other Guidance Notes. GN A9.1 will focus on accounting treatments related to natural resource, GN A9.2 will focus on accounting for environmental transactions and cover topics concerning emission trading and emission permits, sustainable finance, and climate offsets. GN A9.4 will focus on all other issues and will include discussion of the recording of catastrophes, leasing of land, stranded assets, accounting for land, the treatment of the atmosphere as an asset, SUT/IOT globalisation, household electricity and sustainability data.
 12. This GN is structured to cover the following topics:
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- a. The definition and measurement scope of environmental assets and natural capital (Section 2)
- b. The coverage of the term “natural resources” (Section 3)
- c. The classification of environmental assets (Sections 4, 5 & 6)
- d. The treatment of biological resources (Section 7)
- e. The treatment of renewable energy resources (Section 8)
- f. The treatment of radio spectra (Section 9)

2 The definition of environmental assets and natural capital

2.1 Changes in the 2025 SNA

13. At the broadest level of accounting for the link to the environment, the 2025 SNA has introduced the concept of natural capital. It is defined as *“the combination of natural resources and ecosystem assets, of which the latter are not explicitly recognized as economic assets in the integrated framework of national accounts.”* Natural capital sits alongside economic, human and social capital as part of the multiple capitals framework that the 2025 SNA describes for supporting the measurement of well-being and sustainability (see 2025 SNA Chapter 2 for details).
14. It is highlighted that the concept of natural capital in the 2025 SNA has a broader measurement scope than natural resources and, in this sense, natural capital may be seen as a general “umbrella” concept to capture all those features of the environment that provide contributions to well-being.

2.2 Implications for the SEEA CF and proposals

15. The SEEA’s most comprehensive concept regarding those features of the environment that can provide benefits is environmental assets. Following SEEA CF paragraph 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.”* In the SEEA CF the coverage of environmental assets includes all cultivated and non-cultivated (natural) biological resources, other natural resources (e.g. mineral and energy resources, water and soil), land and ecosystem assets. This definition of environmental assets is also recognised in the 2025 SNA but it is not used in the articulation of the integrated framework of the SNA.
16. The relationship between the terms environmental assets and natural capital is shown in the table below (adapted from the SNA). In effect, and setting aside some issues of measurement scope (e.g. concerning radio spectra), environmental assets and natural capital are synonymous “umbrella” terms that both include ecosystem assets and cultivated biological resources.

	Main components	Links to SNA and SEEA measurement boundaries		
		SNA	SEEA	
Natural capital	Natural resources <ul style="list-style-type: none"> • Land • Mineral and energy resources (renewable and non-renewable) • Biological resources (cultivated and non-cultivated) • Water resources • Other natural resources 	Assets in the integrated framework of the SNA	Environmental assets	Individual environmental assets (including cultivated and non-cultivated)
	Ecosystem assets			Ecosystem assets

17. In terms of alignment with the SNA, the following options can be considered for the choice of terms in the updated SEEA CF.

- a. Retain the use of the term “Environmental assets”
- b. Replace the term “Environmental assets” with “Natural capital”
- c. Retain the term “Environmental assets” and introduce the term “Natural capital” as a synonym (i.e. applying the same definition) recognising that they are complementary umbrella terms.

18. In choosing among these options the following considerations are relevant:

- While the coverage of asset types for environmental assets and natural capital is the same, the measurement boundaries will be different in physical and monetary terms to the extent that the implicit scope of natural capital in the 2025 SNA concerns measurement in monetary terms while the measurement scope of environmental assets in the SEEA CF is bounded in physical terms.
- Introduction of the term natural capital into the SEEA CF would be very useful in communication with many users particularly those outside the statistical community where the term natural capital is widely used as an umbrella term. It would also support alignment with the discussion in the national accounting community and the connection to the multiple capital / wealth accounting measurement community.
- At the same time, it is known that there are some experts who interpret the term “capital” as reflecting a specific economic and monetary concept and hence the use of the term “natural capital” in the SEEA CF could be seen as materially changing the appropriate interpretation and purpose of accounting from a statistical perspective compared to the use of the term environmental assets.

- While the 2025 SNA introduces and defines the term natural capital, accounting for natural capital is not fully explored and the concept is not applied in the integrated framework of the SNA. Natural capital is included in the SNA’s extended classification of assets alongside human capital and social capital but this may be considered more of a placeholder in the SNA framework at this stage to recognise the possibility of extending the scope of the integrated framework of national accounts and the associated scope of economic assets.
19. In discussion of the choice of terms, the current definition of environmental assets in the SEEA CF has emerged as a key issue. In particular the phrase “naturally occurring”. These words were included in the SEEA CF 2.17 in an effort to exclude from scope non-living components of the biophysical environment, such as buildings. It was accepted at the time that the scope of environmental assets was not limited to natural / non-cultivated / non-produced assets but should also include cultivated biological resources.
 20. On reflection, without changing the measurement scope, it would be possible to amend the definition of environmental assets to better reflect the inclusion of both cultivated and non-cultivated biological resources.
 21. It would also be possible to clarify the intended scope with regard to ecosystem types, particularly whether heavily anthropogenic ecosystem types should be considered environmental assets.
 22. A separate option would be to adopt the definition of natural capital from the 2025 SNA where the scope is reflected as a combination of two components – natural resources and ecosystem assets. However, it is considered that there is value in providing a definition that is not based on the components and indeed, in this case, since there is considerable overlap in the measurement scope of the two components, the definition of natural capital does not appear to be a good reflection of the inherent overarching concept.
 23. It is noted that the current description of environmental assets in SEEA CF para 2.17 recognises individual components of the environment that provide “materials and space” as benefits. Initial discussion in the context of GN D8 on treating the atmosphere as an asset and concerning the specific issue of renewable energy resources suggests that the discussion of environmental assets should explicitly recognise that energy, along with materials and space, is a benefit provided by individual environmental assets. This is discussed further in section 8 below.
 24. Overall, **it is proposed to retain the use of the term “environmental assets” in the updated SEEA CF as the “umbrella” term for the measurement scope and to amend the definition to include explicit reference to the inclusion of cultivated biological resources.**
 25. **In addition, given the wide recognition of the term natural capital, it is proposed to include in the updated SEEA CF a brief introduction to the multiple capitals/wealth accounting framework (referencing content from the 2025 SNA Chapter 2).** Describing the ways in which the accounting described across the SEEA (both CF and EA) can support measurement of this framework. This introduction could also summarise key points about the links between the accounting of the SEEA CF and related issues such as different types of value (e.g. instrumental,

intrinsic and relational values) and the relevance of distinguishing strong and weak sustainability concepts. This content could build on existing text in the SEEA EA and the 2025 SNA.

3 The coverage of the term natural resources

3.1 Changes in the 2025 SNA

26. The 2025 SNA has amended the use of the term “natural resources” compared to the 2008 SNA. The term now has a broader scope as it encompasses cultivated biological resources. Previously only non-produced (aka natural / non-cultivated) assets were included in the scope of natural resources. As well, some assets currently outside the scope of the SEEA CF, namely renewable energy resources and radio spectra, are included in the scope of natural resources in the SNA.

3.2 Implications for the SEEA CF and proposals

27. In the SEEA CF, the term natural resources covers only non-produced assets (following the 2008 SNA) but it excludes land. It thus covers non-produced mineral and energy resources, non-cultivated timber resources, non-cultivated aquatic (fish) resources, water resources, soil resources and other non-cultivated biological resources. Put differently, natural resources in the SEEA CF includes everything in scope of environmental assets (see table below) except land and cultivated biological resources.

28. Note that the SNA includes as natural resources the radio spectra and renewable energy resources with both of these being non-produced assets. The inclusion of these assets as part of environmental assets and natural resources in the updated SEEA CF is discussed further below.

Type of individual environmental asset	SNA coverage of natural resources	SEEA CF coverage of natural resources
Land		
Cultivated biological resources <ul style="list-style-type: none"> • Timber • Aquatic (aquaculture) • Other 		
Non-cultivated/Non-produced resources <ul style="list-style-type: none"> • Mineral and energy (incl. renewable energy resources in the SNA which are implicitly included in Land in the SEEA CF) • Timber • Aquatic (wild fish) 		

<ul style="list-style-type: none"> • Other biological resources • Water • Soil • Radio spectra (SNA only at this stage) 		
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29. Based on this short description of the changed use of the term natural resources, the following options can be considered for the use of the term natural resources in the updated SEEA CF
- a. Retain the use of the term natural resources following the current SEEA CF (i.e. excluding land and cultivated biological resources).
 - b. Amend the use of the term natural resources in the current SEEA CF to include land but continue to exclude cultivated biological resources.
 - c. Adopt the use of the term following the 2025 SNA (i.e. including land and cultivated biological resources).
 - d. Replace the term natural resources with the term “individual environmental assets” but continue to exclude cultivated biological resources.
30. Option c would be the relevant choice from the perspective of alignment with the 2025 SNA and consistency in communication and messaging, and consistency in interpretation of accounting outputs (across SEEA and SNA). This approach has also been applied in the World Bank’s changing wealth of nations work.
31. Option b may be of benefit in the communication of the content of the SEEA CF since it would avoid the need to add “and land” when summarising the general scope of measurement for natural resources while still differentiating natural and cultivated resources.
32. Options a, b and d all exclude cultivated biological resources and this exclusion may be considered appropriate in the sense of these resources are more commonly understood as being “non-natural”, e.g. aquaculture farms and timber plantations. Cultivated biological resources are also not subject to depletion (following the 2025 SNA and the SEEA CF) and do not provide natural inputs as defined in the physical flow accounts of the SEEA CF. Thus, the accounting treatments for natural resources as defined in the 2025 SNA vary depending on the production context.
33. Specific note is made of the distinct treatment of land in the SEEA CF where it relates only to the space in which economic activities and environmental processes take place rather than the framing in the SNA where land also encompasses additional characteristics and features – particularly soil resources. A consequence of the SEEA CF treatment is that land (as space) cannot be depleted and also it does not provide any natural inputs – i.e. physical flows from the environment to the economy. This distinct treatment may favour the use of option a since land as space is quite different in character to natural resources. Note that the question of whether the SEEA CF should retain its distinct treatment of land as space or align to the SNA framing is raised for discussion in GN A9.1.

34. Whatever scope is applied for natural resources, it should be noted that there is no possibility to measure the aggregate “natural resources” directly, i.e. estimates must be initially compiled for individual types of assets and hence the choice of scope does not affect implementation.
- 35. Discussion and feedback has not been conclusive in terms of the way forward with some experts preferring to stay with the current SEEA CF scope of natural resources and some preferring alignment with the SNA. Advice from the SEEA CF TC would be welcome.**
36. Separately from the choice of scope but as part of the discussion, there has been a general agreement on the need to introduce a number of clarifications into the updated SEEA CF concerning the accounting for environmental assets and natural resources in general terms. Thus, it is proposed to introduce the following clarifications:
- a. A full correspondence of asset classes between the 2025 SNA and the SEEA CF
 - b. A discussion of differences in the scope of measurement in physical and monetary terms
 - c. An explanation of the links between flows such as natural inputs and ecosystem services, particularly in the context of physical flow accounts.
 - d. A description of accounting for changes in ownership of environmental assets
 - e. A description of the continuum between environmental assets and economic assets
 - f. An explanation of the links to the derivation of indicators – e.g. those related to depletion.

4 Classification of environmental assets and natural resources

4.1 Changes in the 2025 SNA

37. As noted in the previous section, the 2025 SNA has applied the term natural resources in an expanded way compared to the 2008 SNA. Specifically, the term natural resources now encompasses produced assets – cultivated biological resources. The inclusion of both produced and non-produced non-financial assets within the same high-level asset class is a substantial change from past classifications of non-financial assets in the SNA. In the 2008 SNA non-financial assets were separated into four high-level classes: fixed assets, inventories, valuables and non-produced assets. Within these classes, non-produced natural resources were included within non-produced assets, while cultivated biological resources were classified as either fixed assets or inventories (work in progress) depending on the resource.
38. In the 2025 SNA, the high-level classes for non-financial assets are:
- a. Produced non-financial assets (excluding produced natural resources)
 - i. Fixed assets
 - ii. Inventories

- iii. Valuables
- b. Non-produced non-financial assets (excluding non-produced natural resources)
 - i. Contracts, leases and licences
 - ii. Crypto assets without a corresponding liability designed to act as a medium of exchange
 - iii. Purchased goodwill and marketing assets
- c. Natural resources
 - i. Land
 - ii. Mineral and energy resources
 - iii. Biological resources
 - iv. Water resources
 - v. Other natural resources

39. In this section the focus of discussion is at this higher level of the classification. The following two sections discuss in more detail the classification of mineral and energy resources and the classification of biological resources.

4.2 Implications for the SEEA CF and proposals

40. At this higher level of the classification of assets, the changed approach in the 2025 SNA aligns well with the approach of the 2012 SEEA CF. The current classification of environmental assets (see table below) has classes reflecting different types of assets and includes both cultivated biological resources and non-produced natural 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

41. The main differences between the SEEA CF and the 2025 SNA classifications concern:

- a. The SEEA CF separates the 2025 SNA class land into land and soil resources reflecting the treatment in the SEEA CF noted above where land is conceptualised as space.
- b. The separation in the SEEA CF at the top level of biological resources into types of resources: timber, aquatic (primarily fish stocks) and other. The breakdown of the 2025 SNA class “biological resources” is discussed further in the following section.
- c. The inclusion in the 2025 SNA of a class for other natural resources. This class may be relevant in the context of the updated SEEA CF pending a decision on the inclusion of radio spectra as an environmental asset (discussed further below).

42. As well, other options for amendments to the classification may be considered. These include:

- a. Introducing a top level class “Biological resources” and then presenting the different types of biological resources (timber, aquatic, other) as sub-classes.
- b. Pending a discussion on the treatment of land in the SEEA CF (see GN A9.1), alternative classifications of land may be considered other than land use and land cover, for example using the classifications of the 2015 Eurostat-OECD Compilation Guide on Land Estimation.

43. **Given the similarities between the approach to classification of natural resources/environmental assets at the first level of the classification, it is tentatively proposed to retain the current SEEA CF classification noting:**

- a. The retention of the distinctive treatment of land as space in the SEEA CF

- b. The potential for sub-classes of mineral and energy resources and biological resources to be reworked (next sections)
 - c. The potential to include a class for other natural resources pending the discussion on the treatment of radio spectra.
44. It is noted that the classification of environmental assets in the SEEA CF does not include ecosystem assets. Since there is substantial overlap, particularly in physical terms, between ecosystem assets and the resources listed in the table above (for example land, water resources and timber resources) the inclusion of ecosystem assets would not satisfy standard classification principles. To further clarify the scope of the classification **it is therefore proposed to relabel the classification to be the “Classification of Individual Environmental Assets”**.

5 Classification of biological resources

5.1 Changes in the 2025 SNA

45. For the classification of biological resources, the 2025 SNA, like the 2008 SNA, uses an approach based on distinguishing between resources that provide repeat products (e.g. orchards, dairy cattle) and once-only outputs (e.g. timber, crops). It also distinguishes between animal and other biological resources. Unlike the 2008 SNA, the 2025 SNA now combines cultivated and non-cultivated biological resources within the same high level asset class. Thus, while still retaining the distinction between repeat and once-only products, it now also distinguishes cultivated and non-cultivated resources and separates out work-in-progress. The detailed classes of the 2025 SNA classification of biological resources are shown below in Table 2.

Table 2: 2025 SNA Classification of Biological Resources

AN33 Biological resources

AN331 Biological resources yielding repeat products

AN3311 Animal resources yielding repeat products

AN3312 Tree, crop and plant resources yielding repeat products

AN332 Biological resources yielding once-only products

AN3321 Cultivated biological resources yielding once-only products

AN3322 Non-cultivated biological resources yielding once-only products

AN333 Work-in-progress on cultivated biological resources

AN3331 Work-in-progress on cultivated biological resources yielding repeat products

AN3332 Work-in-progress on cultivated biological resources yielding once-only products

46. A key driver of the SNA approach to the classification of biological resources is that in different production contexts the same type of biological resource requires different accounting treatments and entries. For example, cattle might yield repeat products (e.g. for milk, as breeding stock) or yield once-only products (e.g. for meat) and, in some circumstances might be non-cultivated and hunted.

5.2 Implications for the SEEA CF and proposals

47. In the SEEA CF, as shown in Table 1 (above), the classification of individual environmental assets, biological resources are classified by type of resource – i.e. timber resources, aquatic resources and other biological resources. Each type of resource is then classified as either cultivated or non-cultivated (natural).
48. For the purposes of the SEEA CF where there is direct interest in each type of resource and the changing mix of cultivated and non-cultivated assets, the SNA approach to classifying these resources does not seem appropriate. Consequently, **it is proposed to retain the classification approach for biological resources in the current SEEA CF.**
49. It is highlighted that while the presentation of the data about biological resources would be different between the SEEA CF and the 2025 SNA under this proposal, the underlying measurement scope and accounting treatments for individual biological resources is not affected by the use of a different classification approach.
50. Nonetheless, **it is proposed to establish a correspondence between the SEEA CF and SNA classes of biological resources to support compilation and alignment.** As part of this work, it is also proposed that the SEEA CF expand discussion of the “Other biological resources” class to better highlight accounting for resources such as livestock, crops and orchards. In part, this expansion would also support connections to the measurement of provisioning services recorded following the SEEA EA and can build on content developed for the SEEA Agriculture, Forestry and Fisheries.
51. A closely related issue concerns the way in which the boundary between cultivated and non-cultivated resources is defined which has changed in the 2025 SNA. Since this issue does not affect the classification of biological resources it is not discussed here but it is discussed in the section below.

6 Classification of Mineral and energy resources

6.1 Changes in the 2025 SNA

52. An important change in the 2025 SNA is the inclusion of an explicit asset class for renewable energy resources. As a consequence of this change, the classification of mineral and energy

resources more generally was considered and the 2025 SNA now provides an extended set of classes as shown in the table below.

53. While the distinction between non-renewable resources and renewable energy resources is a key focus, the new classes also highlight explicitly fossil fuel resources reflecting an interest in developing statistics that support analysis of trends in their stocks.

Table 3: 2025 SNA Classification of mineral and energy resources

AN32 Mineral and energy resources

AN321 Non-renewable mineral and energy resources

AN321S1 Coal and lignite resources

AN321S2 Oil and natural gas resources

AN321S21 Oil resources

AN321S22 Natural gas resources

AN321S3 Mineral resources

AN321S9 Other non-renewable mineral and energy resources

AN322 Renewable energy resources

AN3221 Wind energy resources

AN3222 Solar energy resources

AN3223 Water energy resources

AN3224 Geothermal energy resources

AN3229 Other renewable energy resources

6.2 Implications for the SEEA CF and proposals

54. As shown in the classification of individual environmental assets (Table 1, above), the SEEA CF has five classes of mineral and energy resources: oil, natural gas, coal and peat, non-metallic minerals (excl. coal and peat) and metallic minerals. Setting aside the question of the inclusion of renewable energy resources which are not currently explicitly included in the SEEA CF, the classes of the SNA are similar to but different from those in the SEEA CF.
55. **The more detailed set of classes in the 2025 SNA for mineral and energy resources provides a generally richer set of information compared to the SEEA CF and it is proposed that these classes also be applied in the SEEA CF.** It is clarified that this proposal would also imply including the classes for renewable energy resources as listed above, pending the outcome of the discussion on the inclusion of these resources as a new class of environmental asset (see below).
56. In addition, consideration may be given to designing some supplementary classes to support specific analytical and policy uses. For example, a reference could be made to the 15 mineral

and energy resources listed in the OECD Guide as a checklist for compilers or the class of mineral resources might be broken down to show data on critical minerals. For this second purpose relevant classes might be determined using the EU Critical Raw Materials Act (CRMA, 2024) establishes a list of 34 critical raw materials of which 17 are strategic raw materials; or the 60 critical minerals identified by the USGS. Also, the range of renewable energy sources could be expanded to explicitly include wave and tidal sources as presented in the energy supply and use tables (SEEA CF Chapter 3, Table 3.5).

57. An additional consideration, in light of the work on measuring produced assets in physical terms in the SEEA CF (GN D3), is whether the stocks of minerals embodied in those assets (e.g. in buildings and cars) might be separately recorded and if so, whether the classification of mineral and energy resources listed above would be relevant in the organisation of data.
58. As far as possible, it is expected that the compilation of estimates of mineral and energy resources would be undertaken as a joint exercise between compilers of national accounts, SEEA and GFS.

7 Treatment of biological resources

7.1 Changes in the 2025 SNA

59. Biological resources encompass both cultivated and non-cultivated (natural/non-produced) resources including crops, livestock, orchards and other plantations, timber and fish resources. Accounting for biological resources is one of the more complex areas in national accounting given the variety of production contexts in which economic units manage and harvest these resources.
60. Since the 1993 SNA, it has been recognised that some biological resources, such as crops and livestock, involve far more active management of the growth of resources than others, such as fish caught on the high seas. A core distinction was thus introduced in the 1993 SNA between the accounting entries applied for cultivated biological resources and those applied for non-cultivated biological resources.
61. In making this distinction, the overall production boundary of the integrated accounts of the SNA was not affected. Thus, all harvested biological resources enter the production boundary of the SNA, including those from backyard production, subsistence harvesting and illegal activity. However, the accounting entries and the time of recording of production are substantially different. For non-cultivated biological resources production is recorded at the time of harvest. For cultivated biological resources, production is recorded on a progressive basis as the resource grows reflecting the concept that an economic unit is managing the growth of the resource over time.
62. These distinctions also have implications for the balance sheet. For cultivated biological resources a produced asset is created being either (i) a fixed asset (e.g. mature dairy cow, orchard with ongoing fruit production) which provides repeat products over a number of

years; or (ii) an inventory (e.g. plantation timber before harvest) where work in progress is recorded as the resource grows. For non-cultivated biological resources there is a non-produced resource value included on the balance sheet that represents the current value of the stock based on expectations on future harvest. Further, the distinction in asset treatment means that non-cultivated biological resources can be depleted, while cultivated biological resources that are fixed assets can be depreciated. The harvest of cultivated biological resources that are work in progress is recorded as a negative part of change in inventories.

63. Notwithstanding these differences in recording treatment, all else being equal, the value of biological resources to be recorded on the balance sheet will be the same irrespective of their classification as cultivated or non-cultivated.
64. In updating the 2025 SNA there was extensive consideration of the 2008 SNA treatment. Three key points emerged.
- a. First, there is no change to the scope of the asset boundary in monetary terms for biological resources, i.e. all biological resources in scope of the balance sheet of the integrated accounts of the SNA must have an economic owner who receives economic benefits from the harvest of the resources consistent with the definition of economic assets in the SNA.
 - b. Second, there is no change to the accounting entries required for recording cultivated or non-cultivated biological resources, noting in particular that the recording of work-in-progress and gross fixed capital formation (and associated depreciation¹) remains unchanged.
 - c. Third, the criteria to be applied for distinguishing between cultivated and non-cultivated biological resources has been changed. Thus, it is now articulated that, for a given type of biological resource (e.g. timber or fish), where there is a clear “*continuum from intensive to extensive forms of control, responsibility and management*” (para 11.208), the 2025 SNA now recommends that the output of all biological resources of that type should be recorded progressively (i.e., on an accrual basis) as the resource grows; i.e. applying the accounting entries for cultivated biological resources. This change should therefore be considered to reflect a change in the time of recording rather than a change in the scope of economic benefits to be recorded.
65. The main, and significant, effect of the third point in practice is that all harvestable timber resources should be treated as cultivated biological resources irrespective of the degree of management of the growth of the timber. The effect of this change has a number of significant implications for recording. The fundamental change is that it implies that all timber resources in areas available for wood supply and that are expected to be harvested are treated as cultivated biological resources. This means that:

¹ Formerly referred to as consumption of fixed capital

- The value of all stocks of timber resources (available for wood supply) are recorded on the balance sheet as work in progress rather than as a combination of non-cultivated and cultivated resources.
- The change in value of the stock due to removals and net increment (i.e. the change in stock assuming no other changes in volume) is recorded in the production account as a change in inventory rather than as depletion (for non-cultivated timber resources).
- There is a change in the time of recording of output such that rather than recording output when wood is harvested as would be the case for non-cultivated timber resources, the output is recorded progressively as the trees grow. In practice this may be challenging to implement since many trees have very long time period to maturity (>80 years).

7.2 Implications for the SEEA CF and proposals

66. For biological resources, the asset boundary in monetary terms in the 2012 SEEA CF is the same as the boundary described in the 2008 SNA. However, the SEEA CF provides far greater detail on the approach to applying the conceptual distinction between cultivated and non-cultivated resources, particularly for timber resources (2012 SEEA CF para 5.353-357).

67. Undoubtedly, the changed advice concerning the location of the boundary between cultivated and non-cultivated biological resources has considerable implications for measurement in practice and for the presentation of accounts. The measurement challenges are considered at length in the OECD Guide and are not discussed here. Rather the focus is placed on discussing the appropriate accounting treatment for the SEEA CF and in particular the effects on the accounts.

68. From the perspective of the SEEA CF, the change in the 2025 SNA relates primarily to the description of accounting for timber resources. Indeed, it is highlighted that the boundary between cultivated and non-cultivated aquatic (fish) resources is unchanged under the new SNA treatment, i.e. fish raised in aquaculture facilities remain treated as cultivated and wild fish are treated as non-cultivated. The following discussion considers timber resources explicitly but may be extended to other types of biological resources where a continuum of management is evident.

69. With regard to timber resources, the overall scope of measurement in physical terms is unchanged with the SEEA CF recommending the recording of both timber resources available for wood supply and not available for wood supply. As well, the scope of measurement in monetary terms is unchanged, i.e. the scope is those timber resources for which there is an expected future flow of benefits from the harvest of timber.

70. In the SEEA CF, the European Forest Accounts and the OECD Guide, the expectation of future benefits is applied in practice by limiting valuation to those areas where the timber resources are available for wood supply. The wood harvested from areas that are not available for wood supply is included in measures of production but stocks of timber resources in those areas are not valued on the assumption that there is no ongoing expectation of future

economic benefit. (The 2025 SNA, Chapter 27 provides some additional consideration of this issue in terms of when timber resources may “appear” as economic assets with the treatment that this should only occur in situations where the level of harvest is considered to be of sufficient size to be considered commercial.)

71. In terms of the effects of the SNA change on SEEA CF accounts, the structure of the timber resource asset accounts in the SEEA CF (Table 5.19: Physical asset account and Table 5.20 Monetary asset account) is unchanged, although the column for “natural timber resources available for wood supply” could be removed. The entries for opening and closing stocks and for the various additions and reductions in stock remain the same.
72. Therefore, the unresolved question does not concern the accounting entries for cultivated or non-cultivated timber resources, but rather the criteria that should be applied to distinguish between these two types of timber resources. The options are
 - a. the existing SEEA CF (and 2008 SNA) approach where judgements are made on the types of management practices applied in areas where timber resources are found; or
 - b. the 2025 SNA approach where the existence of a continuum of management practices for a given resource implies all instances of that resource are considered cultivated.
73. As part of the 2025 SNA update process GN WS8 on the treatment of biological resources had an extended discussion on the merits of these options and, on balance proposed option b which was subsequently incorporated into the text of the 2025 SNA. (Annex 1 provides an extract of GN WS8 on this issue. >
74. Since the accounting treatments are clear irrespective of the choice between option a or b, the primary consideration becomes the data that are presented in the accounting outputs and, in particular, the way in which users of SEEA CF accounts may interpret data relating to biological resources, especially concerning the loss of those resources. For example, under the 2025 SNA option it may not be apparent to users why there is no depletion of timber resources recorded since (a) any depletion is attributed to declines in the value of forest land; and (b) where there is a loss of timber resources this is shown as a part of change in inventory.
75. More generally on the issue of interpretation of accounting entries, the terms cultivated and non-cultivated may be more commonly associated with different land and ecosystem types – e.g. cultivated agricultural land and natural wetlands. Indeed, conversion of natural or semi-natural (N/SN) ecosystems to anthropogenic ecosystems is the biggest driver of biodiversity loss in the terrestrial realm. From this perspective, it may be expected that – in short hand – cultivated biological resources are found in cultivated landscapes and natural biological resources are found in natural landscapes. While this is not the correct interpretation of the use of the terms in the SNA context, it may be a common starting assumption. Of course, examples where this “simple” connection does not apply can be reasonably readily identified. They include aquaculture facilities in bays and the open ocean, livestock on rangelands, and beehives in national parks. Most may be considered cases of cultivated (i.e. managed) production in natural/semi-natural contexts rather than non-cultivated/unmanaged

production in cultivated landscapes. As a result, careful delineation and presentation of results by accountants is needed to support appropriate interpretation.

76. Given the language challenges of interpreting the word “cultivated”, one option to support better interpretation may be to use different terms for cultivated / non-cultivated in the SEEA CF – such as managed and unmanaged. This would be a relatively simple change that may support better and more consistent interpretation of the SEEA accounts although this may well conflict with the established use of those terms in, for example, the IPCC Guidelines.
77. More broadly, it is highlighted that making the distinction between cultivated and non-cultivated contexts is a common across the SEEA CF and to the extent possible the same principles should be applied. Other contexts include the treatment of landfills and carbon storage, accounting for LULUCF emissions and the treatment of water in artificial reservoirs.
78. **On balance, it is proposed to retain the current treatment in the SEEA CF concerning the criteria to be applied in distinguishing between cultivated and non-cultivated biological resources.** It is accepted that this is a difficult distinction to draw for compilers but the existence of the distinction is clear. At the same time, the current SEEA CF text that supports compilers in making this distinction for timber resources should be revisited and additional guidance provided as appropriate.
79. Pending a decision on the treatment to be applied, other sections of the SEEA CF will also need to be reviewed to ensure that a consistent description of the distinction between cultivated and non-cultivated biological resources is presented. More generally, relevant sections of the SEEA CF, particularly Chapters 2 and 5, will need to be reviewed to consider the way in which the terms cultivated and non-cultivated/natural are applied.
80. In the discussion of the change in the 2025 SNA concerning biological resources, a number of closely related topics in accounting for timber resources have been discussed and they indicate a few areas in which the text of the SEEA CF can be improved. These topics concern:
 - a. *The distinction between timber resources and forest land.* The 2025 SNA introduces an explicit distinction between biological resources and “underlying assets” which support the future growth and associated benefits – i.e. the future harvests of timber from a given location are underpinned by a separate non-produced asset – forest land. The general framing for this distinction is described in the 2012 SEEA CF, including in the description of composite assets when considering accounting for land (see SEEA CF para 3.100-110) especially considering the SEEA CF treatment of land as space. However, the distinction between the biological resource and the underlying asset is not carefully applied in describing the accounting for timber resources and hence discussion of the valuation of timber resources is “loose” in terms of clarifying the connection between these components. **The text in SEEA CF 5.378-385 should be improved to make the distinction between timber resources and the underlying asset of forest land clear.**
 - b. *The depletion of timber resources.* The SEEA CF has a short paragraph on the measurement of the depletion of timber resources (SEEA CF 5.386). The recent discussion clarifies a range of aspects which revolve to a large degree around the

distinct treatment of timber resources and forest land just noted. In short, in the 2025 SNA forest land can be depleted since it is a non-produced asset with the depletion representing a loss in future economic benefits from a given area. **The text on this issue should be improved incorporating also the conclusions from the discussion of depletion in GN A9.1.**

- c. *The links between the production, income and asset accounts.* The SEEA CF's focus in relation to accounting for timber resources is recording the stocks and changes in stock using asset accounts. In the SNA, a more integrated accounting approach is required. The recent discussion, particularly in the development of the OECD Guide and the European Forest Accounts Handbook, has seen the description of more rigorous supply and use table entries for recording the flows associated with cultivated timber resources which can be linked directly to the changes in the stock of timber resources. That is, while at one level the difference between recording as cultivated and non-cultivated is simply a time of recording issue, in fact a full accounting treatment requires more detailed consideration of the distinctions that are implicit in the change to the products and economic activities involved. **It is proposed that a description of the relevant accounting entries to link the asset accounts and the supply and use tables is included in the updated SEEA CF.**

81. Finally, a topic that the SEEA CF does not describe is accounting for cultivated biological resources such as livestock, crops, orchards, vineyards, plantations (e.g. rubber). The accounting for these resources is a focus of the SNA given the direct links to the measurement of agricultural output and GDP and from a SEEA perspective the relevant aspects of physical and monetary measurement are described in the SEEA Agriculture, Forestry and Fisheries. **It is proposed to add some limited text on accounting for agriculturally-related cultivated biological resources in the current section on other biological resources and highlight the links to other documents.**

82. Overall, the change to the 2025 SNA and the associated discussion has clarified a range of issues in terms of the application of the integrated accounting for timber resources. The accounting treatments are now much better described and the updated SEEA CF can take advantage of the developments. There are known measurement challenges but feasible implementation approaches have been identified.

8 Treatment of renewable energy resources as assets

8.1 Changes in the 2025 SNA

83. The asset boundary of the SNA has been extended to include the value of renewable energy resources as part of natural resources in the balance sheet of the integrated framework of the SNA. The definition of renewable energy resources is described in 2025 SNA paragraph 11.200 as follows:

“The second group of mineral and energy resources relates to *renewable energy resources (AN322) consisting of energy resources which comprise the cumulative quantities of kinetic, radiative and*

thermal energy recoverable from moving water (hydro and ocean energy), moving air (wind energy), hot underground and surface rock and water (geothermal resources) and incident solar radiation (solar resources). Although these resources as such are generally not scarce, the exploitation of these resources may be restricted to certain economic agents, for example by needing permissions to put wind turbines on land, or having ownership of particular pieces of land which are highly favourable for exploiting renewable resources.”

84. The inclusion of renewable energy resources as a class of natural resources in the SNA was subject to extensive research and discussion². While the approach in the SNA reflects a similar framing to that described in the 2012 SEEA CF, a much clearer delineation and distinction is described between the value of renewable energy resources and associated assets such as land and produced assets (for the capture of energy).

8.2 Implications for the SEEA CF and proposals

85. The 2012 SEEA CF recognises the potential to record information about energy from renewable sources in Chapter 5, Section 5.5.5 – paragraphs 5.225-234 (and also in the context of accounting for land in para 5.310). Further, a listing of renewable sources of energy is provided in SEEA CF Chapter 3, Table 3.2 in the context of accounting for physical flows of energy.

86. The treatment in the SEEA CF involves the expectation that the value of any resource rent to be earned from sources such as wind, solar and geothermal sources is embodied in the value of the associated land (or water body in the case of hydropower). The inherent logic is that the value attributable to energy from renewable sources arises due to the scarcity of the sites used for energy generation.

87. The primary implication for the SEEA CF of adopting the treatment outlined in the 2025 SNA is that the monetary value of renewable energy resources would need to be explicitly partitioned from the value of the associated land (or other areas). The creation of a new class of environmental asset would also require amendments to the classification of environmental assets and involve making an explicit distinction between renewable and non-renewable energy resources.

88. While the changed treatment may be readily applied in monetary terms, the lack of a tangible stock of renewable energy resources, may raise concerns about whether these resources satisfy the definition of environmental assets which requires that relevant assets comprise the biophysical environment. Discussion on the issue of “tangibility” indicates that there is a potential to quantify the stock of renewable energy resources in terms of the cumulative quantity of energy harvestable by viable renewable energy projects. The OECD Guide has a good explanation of this issue building on the content of SNA GN WS.11.

² SNA Update (2023e). WS.11 Guidance note on the treatment of renewable energy resources as assets. Available at: <https://unstats.un.org/unsd/nationalaccount/SNAUpdate/GuidanceNotes.asp>

89. In addition, initial research in the development of GN D8 on the treatment of the atmosphere as an asset has articulated the rationale for considering a number of renewable energy resources as being generated by and through the atmosphere and the associated space. This research, pending further discussion, would support the recognition of renewable energy resources as environmental assets in physical terms.
90. At the same time, given the lack of a physical stock of resources (aside from the water associated with hydro-electric dams and perhaps geo-thermal sources), the precise rationale for using measures of flows of energy to recognize a stock of renewable energy resources requires careful consideration and explanation. In particular, explanation is needed of the links to the standard definitions of environmental and economic assets.
91. **Given that the value of renewable energy resources is already recognised as part of the environmental asset land in the SEEA CF 2012, it is proposed to align with the 2025 SNA and include renewable energy resources as a distinct asset class.** To support general understanding of the treatment, **it is also proposed to incorporate an explanation of the relationship between the concept of a stock of renewable energy resources and the definitions of environmental and economic assets.** In implementing this proposal the current content in the SEEA Central Framework (primarily in section 5.5.5) will be reviewed and updated to align with the discussion in the 2025 SNA. As appropriate, content from the 2025 SNA research papers and the OECD Guide should be incorporated to clarify key aspects of the approach to measurement.
92. Particular measurement topics that should be clarified are:
- a. The treatment of specific taxes and subsidies related to the development and capture of renewable energy resources, including permits for access to land or other areas (e.g. for offshore wind) for capturing renewable energy.
 - b. The separation of the value of the renewable energy resource from the value of produced assets used in the capture of energy (e.g. wind turbines, solar panels) and from the value of land where the produced assets are situated.
 - c. The calculation of resource rent for renewable energy resources and the associated allocation of value among economic owners in the case of split ownership.
 - d. Approaches to measuring the stock of renewable energy resources in physical terms.

9 Treatment of radio spectra

9.1 Changes in the 2025 SNA

93. In the 2025 SNA, as in the 2008 SNA, the radio spectra is considered a natural resource. In the 2008 SNA, the treatment of the radio spectra was to separate the value of the radio spectra itself from the rights to use the spectrum (e.g. in the form of a mobile phone licence). Thus, it

was possible for two assets to be recorded with the rights/licence itself also being treated as a separate non-produced asset “permits to use natural resources”.

94. In the 2025 SNA, the general treatment of permits to use natural resources was changed such that all value should be attributed to the resource itself with the total value allocated to multiple economic owners using the split ownership approach as appropriate.
95. However, the need to apply this general treatment in the case of radio spectra to ensure consistency across all natural resources was only identified at the end of the update process. Subsequently, it was determined to leave the 2008 SNA treatment of radio spectra unchanged and to place the potential to change the treatment on the SNA research agenda.

9.2 Implications for the SEEA CF and proposals

96. The radio spectra is not included as an environmental asset in the 2012 SEEA CF. Although the treatment of radio spectra was a large issue for discussion during the 2008 SNA update process, there was no consideration given to including radio spectra as an environmental asset in the 2012 SEEA CF. This may have been because of the agreed treatment at the time wherein most, if not all, of the value of the radio spectra was treated as a licence (and hence not an environmental asset) and perhaps also considering that there is no depletion of the radio spectra in physical terms to be recorded.
97. In terms of alignment with the 2025 SNA two issues arise in the context of the SEEA CF update. The first is whether the radio spectra should be included in the SEEA CF as a type of individual environmental asset. On this issue, the general conclusion at this time, reflected also in the initial research for GN D8 on the treatment of the atmosphere as an asset, is that the radio spectrum is not a characteristic of the atmosphere or the biophysical environment. At the same time, members of the GN A9 drafting team and GN D8 have proposed that the value associated with the radio spectrum can be linked to the use of space (air space or vertical-space) and hence there is a meaningful asset that can be recorded with payments generally being a permit to use the space. Further discussion of this approach and rationale is required however.
98. Treating the radio spectra as a type of environmental asset would mean that the scope of individual environmental assets in the SEEA CF aligns with the scope of natural resources in the SNA. It is noted that the 2025 SNA does not provide a discussion on the conceptualisation or measurement of the radio spectra in physical terms. As noted, this is being considered in research for GN D8 and a specific proposal on this issue will be presented in that GN.
However, as an interim conclusion it is proposed that the updated SEEA CF include the radio spectra as a new class of environmental asset.
99. The second issue is what accounting treatment should be applied to record the value of the radio spectra. There is a choice of treatments described in the 2025 SNA that, following the 2008 SNA, involve making a distinction between the radio spectra itself and the licence, often established via auction, to use the radio spectra. Pending further discussion on the appropriate conceptualisation of the radio spectrum and the links to the treatment in the

2025 SNA, it is proposed that the updated SEEA CF apply the general treatment of permits to use natural resources in the 2025 SNA (para 27.15-20) wherein the total value is assigned to the asset itself and no separate asset value is recorded for any associated permit or licence. Then, depending on the nature of the arrangements between the legal owner of the radio spectra (generally government) and the user of the radio spectra, payments associated with the use of the radio spectra would be treated the sale of an asset or as rent. It is noted that this treatment is also evident in the current draft of the updated European System of Accounts paragraph 4.177

“The electromagnetic spectrum of electromagnetic radiation, which can be divided up into wavelengths, is often leased by government for communication purposes. This is usually recorded as rent of the natural resource. The exception is where use is available for an indefinite time and government is not able to contractually reclaim the asset, which is recorded as a sale of the natural resource (AN.391).

10 References

SEEA CF

2025 SNA

OECD Guide

SNA GN WS.11

SNA GN WS.14

GFSM NoD 1.24

Annex 1: SNA GN WS8: Discussion on drawing the boundary between cultivated and non-cultivated biological resources (selected paragraphs)

39. For the non-migrating resources, ownership rights over the assets are usually in place. The relevant assets may not be owned by individual economic agents, but in those cases the government typically exerts one or another form of collective ownership. For the issue regarding the distinction between cultivated and non-cultivated, however, as noted before, control and management over the growth of the resources is relevant. When taking the 2008 SNA as a starting point, one can basically distinguish two options for the delineation between cultivated and non-cultivated biological resources, depending on how to interpret the significance of management practices, i.e. when to consider the level of these types of activity as being significant relative to the value of the resources:

- Option 1: A strict application of the significance of management practices, in which case the biological resources are only considered as cultivated if they are more or less fully managed. In this case, very intensive human intervention would qualify the relevant resources as produced assets. In the case of timber resources, only plantations would then be considered as produced assets, while in the case of aquatic resources only fish farming would qualify as such. All other biological resources, for which management levels are relatively minor, would be recorded as non-produced assets.
- Option 2: The alternative is to record all (non-migrating) biological resources as being cultivated. Here it is assumed that the relevant resources do provide some benefits and that the growth process is, implicitly or explicitly, under some form of control and management by economic agents, either individually or collectively, i.e. that they qualify as produced assets.

40. In evaluating both options, one could argue that considerations around the recording of output are probably much more relevant than the exact classification of assets, as being produced or non-produced. There seems to be hardly any reason to not apply an accrual recording of output in both cases, i.e. for produced as well as non-produced assets. One of the most important assets used in the production of agricultural goods concerns agricultural land, which is considered as a non-produced asset. Yet no-one disputes the accrual recording of agricultural output, as the level of control and management over the growth of the agricultural products is the decisive criterion, not the classification of the assets used in production. Such a reasoning would also make the various options less controversial in cases where the value of the biological resources may be captured in the value of land, such as the case for forest land.

41. Whatever the case, both options have their advantages and disadvantages. One important point concerns the clarity of the guidance. Using option 1, one definitely needs adequate phrasing which avoids issues of delineation where one can observe a continuum from intensely managed to totally undisturbed, such as the example of European forests. This clarity can only be achieved in the case of a very strict interpretation, such as the one explained in the above.

42. An advantage of option 2 is that it aligns much better to the notion of ecosystem services, for which natural growth is the logical starting point. On the other hand, it is quite problematic to look upon growth of timber in natural forests as a human-induced activity. It is first and foremost nature that provides the input into the process of growth. Interpreted in this way, one could argue that (the growth of) all biological resources contain(s) a non-produced element.

43. In respect of option 2, one could also take the continuum from intensely managed to totally undisturbed as a starting point for the recording of biological resources. From this perspective, the most straightforward interpretation would be that the distinction between cultivated and non-cultivated ceases to exist, as

ecologically speaking all biological resources are impacted by human activity (directly or indirectly). It would however be meaningful to distinguish the degree of human input versus natural inputs. The latter could be materialised by measuring output, and – in the case of resources yielding once-only products which is most relevant in this discussion – the growth in inventories, as the percentage of natural growth that is expected to be exploited in the foreseeable future. This would come down to an accrual accounting of production which currently is recorded at the time of removing the biological resources from nature.

44. Yet another option would be to use ownership as the distinguishing feature, rather than fully managed versus marginally managed. If a corporation owns land and essentially just lets the trees grow over time without any intervention, the fact remains that the company is still managing the resource, although not necessarily its growth. One could nevertheless consider treating these resources as cultivated. Biological resources which are collectively owned would then qualify as non-cultivated assets.

45. From a conceptual point of view, the option to take the continuum from intensively managed to totally undisturbed as a starting point, as presented in paragraph 43 in the above, looks most appropriate. It reflects economic reality, and leads to an accrual accounting of all natural growth that at some stage will result in output of products derived from biological resources. It also acknowledges the fact that these products are the results of a combination of human activity and natural inputs. It would also result in a better alignment with the accounting for ecosystem services and ecosystem assets. On the other hand, as mentioned before, one has to realise that such a treatment may also have a significant impact on the distribution of output over time, and the recording of natural growth and extraction, regeneration en depletion as well as leasing of these resources.

46. From a measurement perspective, option 1 seems to be the most straightforward one. Although this may be less relevant for very cultivated regions like Europe, measurement of natural growth in other regions of the world would probably be much more problematic when applying option 2. All in all, the conceptually preferable option holds the middle ground. It however requires an estimate of the expected future exploitation, which then needs to be allocated to the years in which the natural growth has contributed to this exploitation.

47. The above discussion shows the complexity of making a clear distinction between produced and non-produced assets. Yet this distinction is quite critical in the 2008 SNA, as it does not only affect the recording of the relevant assets, but also the recording of output, capital accumulation and run-down, and leasing of these assets. The actual practice shows to be far more ambiguous than the implied dichotomy recommended in the current SNA. To get away from the current black and white approach, one could also opt for a more radical proposal by considering natural resources as a separate class of assets, different from the traditional assets, as currently recommended in the SNA. Treating natural resources as a separate class would open the door for not having to make a distinction between produced and non-produced assets.

48. Such a proposal is actually quite attractive, as – most certainly in the case of biological resources – the asset in question always contains an element of natural growth, not induced by human intervention. Moreover, it would provide the opportunity to classify the various flows related to natural resources in a way which is considered most relevant for these resources. The time of recording of output, i.e. accrual recording versus recording at the time of felling trees or catching, could then be relaxed, and based on practical circumstances and the feasibility of measurement. Finally, it would give the accounting for natural resources the prominence it deserves, in a time and age where environmental sustainability is considered as one of the most important policy challenges. Table A.2 in Annex 1 provides a first proposal for such a new classification of assets, including the recording of the most relevant flows. Table A.1 shows the recording in line with the current guidance in the 2008 SNA.