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# **SEEA Central Framework 2028 update**

## **Draft Guidance Note**

### **Issue A9.1: Consistency with the 2025 SNA update issues – Natural resources**

Version 2.0: September 2025

**GUIDANCE NOTE Issue A9.1: Consistency with the 2025 SNA update issues – Natural resources**

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## GUIDANCE NOTE Issue A9.1: Consistency with the 2025 SNA update issues – Natural resources

### 1 Introduction

#### 1.1 Purpose of the Guidance note

1. The purpose of this Guidance Note 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 natural resources.
2. The short description of issue A9 from October 2024 recognises a range of issues that concern the accounting treatment of natural resources. That description notes:

“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. In determining the appropriate scope of this Guidance Note, it was identified that the 2025 SNA provides a complete list of changes from the 2008 SNA and also describes a research agenda some of the topics listed are relevant for consideration in the update of the SEEA CF. Further, as part of the SNA update process, the OECD led the drafting of a Compilation Guide concerning Measuring natural resources in the national accounts. A draft guide was released for global consultation and subsequently updated and published in late 2025. The content of the Compilation Guide contains useful information to support the update of the SEEA CF.
5. In the development of the SEEA over the past 30 years there has been a consistent intent to align with the accounting treatments 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.
6. The SEEA CF was drafted using as its basis the treatments described in the 2008 SNA. 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).

7. 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. Whether all of the relevant changes in the 2025 SNA should be incorporated 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 Guidance Note discusses:
  - a. whether the changes to the SNA concerning natural resources are of relevance to the SEEA CF update; and if so,
  - b. what changes to the SEEA CF might be needed.
8. The Guidance Note 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 2025 SNA should also be included in the SEEA CF update. To the extent that a different treatment may be applied in the updated SEEA CF the rationale for this difference is discussed.
9. With a focus on natural resources, the Guidance Note considers the following issues and topics.
  - a. Economic ownership and the depletion of natural resources
  - b. Treatment of biological resources
  - c. Treatment of renewable energy resources as assets
  - d. Valuation of natural resources
  - e. Other issues concerning natural resources including specific issues in accounting for timber resources and aquatic/fish resources and the treatment of radio spectra.
10. There is a range of other issues concerning the consistency of the updated SEEA CF with the 2025 SNA that will be discussed in other Guidance Notes. 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 A9.3 will focus on consistency in classifications, terminology and definitions. 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.

## 1.2 Process for developing the Guidance Note

11. The following process was used to prepare and finalise the GN. (This will be drafted by UNSD for inclusion ahead of Global Consultation).

## 1.3 Structure

12. The remainder of this Guidance Note is structured as follows:

- a. Sections 2- 6 discuss each of the five topics listed above with each section providing a description of the relevant issues and proposals for discussion.
- b. Subject to further discussion of the issues and proposals, Sections 7 and 8 will be drafted providing recommendations for updates to the SEEA CF and a description of other considerations in advancing the issue.

## 2 Recording economic ownership and the depletion of natural resources

### 2.1 Discussion

13. In considering the consistency between the SEEA CF and the SNA in accounting for natural resources<sup>1</sup> a key distinction lies in the difference between environmental assets and economic assets. In the SEEA CF, natural resources are a sub-set of environmental assets and have a measurement scope that is determined by the physical presence of the natural resource. The entry point for accounting in the SEEA CF is thus the existence of a physical stock and the accounts relate to the size and value of a natural resource for a country (or other region) as a whole.
14. In the SNA, natural resources are a type of economic asset and hence must have both an economic owner and a flow of economic benefits to which the economic owner is entitled. As for all economic assets, the entry point for accounting for natural resources is thus an economic owner (an institutional unit) and their balance sheet.
15. This different entry point to accounting for natural resources allows the SEEA CF to apply a broader measurement boundary in physical terms than in monetary terms since there is no requirement to match all physical stocks to an economic owner.
16. However, in monetary terms the SEEA CF has applied the same conceptual measurement scope as the SNA – i.e. natural resources in the SEEA CF are economic assets following the SNA. Thus, if a natural resource has a value that is recorded in the SNA as an economic asset, then that same value should be recorded in the monetary accounts for that natural resource in the SEEA CF.
17. Generally speaking, the SEEA CF doesn't describe accounting for the attribution of this value to individual units – either to establishments (or industries as sum of them), or to institutional units (or institutional sectors as sum of them). The consequence is that the descriptions in the SEEA CF can be used to underpin an economy wide value for a national balance sheet in the SNA, i.e. for the total value of a natural resource for a country, but they cannot be used to

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<sup>1</sup> Note that the SEEA CF and the SNA use the term “natural resources” to refer to a different but overlapping set of assets. In the SNA it covers all types of environmental assets in scope of the integrated accounts, in the SEEA CF it refers to individual environmental assets but excludes land and all cultivated biological resources. Note the SEEA CF also excludes renewable energy resources and radio spectra which are natural resources in the 2025 SNA. These issues of classification and terminology will be considered in a separate Guidance Note: A9.3. In this paper the term natural resources is used in line with its “umbrella” use in the SNA unless otherwise explained.

provide values for specific types of economic owners – by industry or institutional sector.<sup>2</sup> From this perspective the accounts of the SEEA CF and SNA for single type of natural resource can be neatly aligned at the aggregate level.

18. The 2025 SNA includes two major changes with respect to accounting for natural resources compared to the 2008 SNA. First, the 2025 SNA now applies the “split asset” approach for recording the value of natural resources (para 4.92-95). In effect, this treatment extends the approach to the valuation of natural resources described in the SEEA CF. That is, the SNA now measures the total value of a natural resource for a country (in a manner aligned with the SEEA CF) and then allocates – “splits” - that value to multiple economic units in cases where there is more than one economic unit entitled to a share of the benefits from the use of the resource. Commonly, this split in asset value will be between the legal owner of the resource (often government) and the extractor of the resource.
19. Second, the 2025 SNA recognises depletion as a cost of production and places more prominence on presenting net measures of economic activity and wealth which adjust for both depreciation (formerly known as consumption of fixed capital) and depletion.
20. These two changes are connected. Since the total asset value is split between two economic units, the change in the balance sheet of each unit as a result of extraction or harvest of the resource will also be split. Consequently, depletion will be recorded against both economic units. However, since the depletion is recorded as a cost of production, the full value of the depletion is initially recorded in the production accounts of the extractor. A series of entries in the allocation of earned income accounts and the capital accounts are then recorded to ensure that the change in the balance sheet position reflects the appropriate allocation of the depletion charge to each unit’s share of the future benefits. The complete set of accounting entries is shown in 2025 SNA Table 27.1.
21. As noted above, in describing accounting for natural resources in monetary terms, Chapter 5 of the SEEA CF focuses on the total value of the resources for a country and does not generally discuss issues of allocation of value to institutional units. The exception to this concerns accounting for mineral and energy resources where section 5.5.5 (para 5.216-5.224) discusses the allocation of income from the extraction of mineral and energy resources. This discussion includes Table 5.10 which shows a series of entries for recording depletion adjusted measures of income and saving in a case involving a government unit and an extractor. <<NB: In the next version an annex will be included to present the potential changes.>>
22. The 2025 SNA has also updated its definition of depletion. 2025 SNA paragraph 7.286 states

*Depletion (P8), in physical terms, represents the decrease in the quantity of the stock of a non-produced natural resource over an accounting period that is due to the extraction of the natural resource by economic units occurring at a level greater than that of its growth. In monetary terms, it*

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<sup>2</sup> While a disaggregation by economic unit is not described, there is increasing interest in spatial disaggregation of data, i.e., at sub-national level. Such disaggregations are not currently described in the SEEA CF but further discussion of this potential building on the spatial approach to accounting described in the SEEA Ecosystem Accounting is being examined as part of the SEEA CF update under issue A4.

*corresponds with the decline in future economic benefits, due to extraction in excess of its growth, that can be earned from a resource, the value of which is based on the physical flows of depletion using the price of the natural resource in situ.*

23. This definition is a direct adaptation, with minimal change, of the definition of depletion in physical terms in the SEEA CF 2012 para 5.76 combined with the description of the measurement of depletion in monetary terms in SEEA CF 2012 paragraph 5.80.

*5.76 Depletion, in physical terms, is the decrease in the quantity of the stock of a natural resource over an accounting period that is due to the extraction of the natural resource by economic units occurring at a level greater than that of regeneration.*

*5.80 Depletion can also be measured in monetary terms by valuing the physical flows of depletion using the price of the natural resource in situ. This step is explained in detail in Annex A5.1. It is noted that the monetary value of depletion is equal to the change in the value of the natural resource that is due to physical depletion.*

24. Conceptually, the 2025 SNA has fully endorsed the approach to accounting for the depletion of natural resources presented in the SEEA CF 2012. The changes in the 2025 SNA reflect only (i) the merging of the definitions in physical and monetary terms; and (ii) a small change to specify at the opening of the definition that depletion refers only to non-produced natural resources. This change in wording reflects a separate change in the 2025 SNA wherein the term natural resources covers both produced (cultivated) biological resources and non-produced (non-cultivated) biological resources.

25. Separate from the conceptual aspects, the SEEA CF provides a short description of the considerations in the measurement of depletion of natural biological resources (para 5.81-5.87). This section of text should be reviewed to consider any advances in the discussion and measurement of depletion for these resources, including in the 2025 SNA (paragraphs 7.286-294, 11.236-238) and as a result of the drafting of the OECD Compilation Guide on Natural Resources.

26. <<NB: It is recognised that additional discussion is needed in future versions of this paper concerning detailed aspects of measuring depletion, in particular, recognising the content of the discussions undertaken in the drafting of the OECD Compilation Guide for Natural Resources and in other research. Relevant points to be discussed include:

- the principles of measuring depletion for non-cultivated biological resources to complement the current sustainable yield/biophysical modelling approach described in the SEEA CF
- considerations in measuring the depletion of water resources particularly in the context of research (Issue D7) underway into the valuation of water resources
- the measurement and allocation of depletion in the context of multiple extractors
- determining the appropriate accounting entries for depletion in the context of land use and land cover change (e.g. associated with deforestation)
- the distinction between depletion and degradation (also to be considered in paper A1 on the link between SEEA CF and SEEA EA)

- the inclusion of depletion in the measurement of the sum-of-costs approach for non-market producers.
- The distinction between ex-ante and ex-post depletion in the context of the description of the decomposition of the change in net present value presented in Annex A5.1.>>

## 2.2 Proposals

27. It is proposed that the updated SEEA CF endorse the split asset approach for the allocation of benefits to multiple economic owners of all natural resources since, in principle, this approach has already been embodied in the SEEA CF. At the same time, it is proposed that the SEEA CF retain its general focus on the measurement of the total, economy-wide, value of natural resources in addition to its description of accounting for natural resources in physical terms.
28. In the context of updating the content of SEEA CF Chapter 5, consideration may be given to updating the content of section 5.5.5 to align with the discussion of depletion related entries in the 2025 SNA, including updating Table 5.10. Alternatively, given the SNA has now adopted the type of recording approach initiated in the SEEA CF 2012, consideration may be given to dropping the relevant text in section 5.5.5 and referring compilers to the advice in the 2025 SNA and the OECD Compilation Guide for Natural Resources.
29. More broadly, it is proposed that the discussion of the sequence of economic accounts in SEEA CF Chapter 6 (Table 6.3) be removed given the change in the 2025 SNA wherein the sequence of economic accounts now adjusts for the depletion of natural resources. Rather, the SEEA CF should introduce the topic of the sequence of accounts and refer compilers to the accounting approach described in the 2025 SNA.
30. It is proposed that the SEEA CF update its definition of depletion in physical and monetary terms to align with the definition in the 2025 SNA. Further, it is proposed that the SEEA CF review its text on approach to the measurement of depletion of natural biological resources.
31. <<NB: Further proposals with respect to accounting for depletion will be developed pending the investigation of the additional issues listed in para 26 above.>>

## 3 Treatment of biological resources

### 3.1 Discussion

32. Biological resources encompass both cultivated and non-cultivated (natural) resources including crops, livestock, orchards and other plantations, timber and fish resources. For these resources, the asset boundary in monetary terms in the SEEA CF 2012 is the same as the boundary described in conceptual terms in the 2008 SNA but the SEEA CF provides far greater detail on the approach to clarifying and applying the conceptual boundary for selected key biological resources in practical terms, namely timber resources and aquatic (fish) resources.

33. In the process of drafting the 2025 SNA, the additional detail in the SEEA CF was considered. Two key points emerged. First, there was no change conceptually to the scope of the asset boundary in monetary terms for biological resources, i.e. all biological resources in scope of the SNA balance sheet 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. On this issue therefore the 2025 SNA and the SEEA CF remain aligned.
34. Second, the distinction between cultivated and non-cultivated resources has been changed in certain contexts. This change has no effect on the accounting entries required for recording cultivated biological resources, noting in particular that the recording of work-in-progress and gross fixed capital formation (and associated depreciation<sup>3</sup>) remains unchanged.
35. However, for certain non-cultivated biological resources, in particular timber, 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 these biological resources is recorded progressively (i.e., on an accrual basis) as the resource grows (i.e. as for cultivated biological resources) rather than being recorded at the time of harvest. This change can 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.
36. From a balance sheet perspective, the change encourages the more consistent recognition of the asset value (and associated depletion) of biological resources even in cases where direct and active management of the resource is less evident – see 2025 SNA para 11.208.
37. Undoubtedly, this change has considerable implications for measurement in practice in some contexts, especially if the monetary value of non-cultivated biological resources has not previously been recognised. The measurement challenges are considered at length in the OECD Compilation Guide for Natural Resources.
38. From the perspective of the SEEA CF, these changes in the 2025 SNA relate primarily to the description of accounting for timber resources. Indeed, it is highlighted that the accounting for aquatic (fish) resources is unchanged under this new SNA treatment. With regard to timber resources, the 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 focus remains on valuing those timber resources that are available for wood supply.
39. While the measurement boundaries are unchanged, there is currently considerable text in the SEEA CF devoted to describing the boundary between cultivated and non-cultivated timber resources (para 5.353-357) as well as some text describing the recording of output following the SNA (para 5.376-377). Further, Table 5.19 and 5.20 distinguish between cultivated and natural timber resources. The relevance of maintaining these distinctions in light of the changes in the 2025 SNA should be revisited. A longer discussion on specific issues associated with accounting for timber resources is presented below in section 6.

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<sup>3</sup> Formerly referred to as consumption of fixed capital

40. 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.
41. The proposed change in the time of recording of output in the 2025 SNA also has connections to the proposals for a more complete description of Economy-Wide Material Flow Accounts and PSUT. The time of recording of output and the associated flows of natural inputs (primarily for timber resources) will be affected by the SNA change and will need to be considered in those descriptions. This topic should be considered further in Guidance Note B1.
42. <<NB: Additional text may be required on this issue. A question may be to consider in more detail the implications for the SEEA CF if the current SEEA CF treatment (i.e. the treatment in the 2008 SNA) for biological resources is retained. >>

## 3.2 Proposals

43. Since there is no change in the conceptual boundary for the measurement of biological resources in monetary terms in the 2025 SNA, it is proposed that the SEEA CF retain its current treatment concerning the scope of measurement of biological resources.
44. At the same time, the text concerning accounting for timber resources should be reviewed to consider removing the distinction between cultivated and non-cultivated biological resources in the physical and monetary accounts and associated text and ensure that the description of the measurement of output and related entries (such as changes in inventories) are aligned with the 2025 SNA. Other sections of the SEEA CF should also be reviewed to ensure that a consistent description of the distinction between cultivated and non-cultivated biological resources is presented.
45. A separate issue that will be discussed in Guidance Note A9.3 on Alignment with SNA terminology, concerns the changed use of the term natural resources in the 2025 SNA to refer to both cultivated and non-cultivated resources, noting also that the term natural resources in the SNA includes land and other assets such as radio spectra. Adopting this change would have a range of effects on descriptions of accounting treatments across the SEEA CF.

## 4 Treatment of renewable energy resources as assets

### 4.1 Discussion

46. 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 sequence of economic accounts. This addition is intended to complement the long-standing inclusion of the value of non-renewable mineral and energy resources.
47. 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.”

48. The SEEA CF 2012 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 Chapter 3, Table 3.2 in the context of accounting for physical flows of energy. 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 will be embodied in the price 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.
49. The inclusion of renewable energy resources as a class of natural resources in the SNA was subject to extensive research and discussion. While the approach in the SNA reflects a similar framing to that described in the 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).

## 4.2 Proposal

50. Given that the value of renewable energy resources is already recognised in the SEEA CF 2012, it is proposed that the current content in the SEEA Central Framework (primarily in section 5.5.5) is reviewed and updated to align with the discussion in the 2025 SNA. As appropriate, content from the 2025 SNA research papers and the OECD Compilation Guide for Natural Resources may also be incorporated. <<NB: Subject to discussion of this proposal, additional content can be developed to present the detail of the proposed changes to the SEEA CF.>>
51. As part of this alignment, it is also proposed that renewable energy resources be treated as a distinct class of environmental assets, in particular one that is separate from land or other underlying assets where the capture of energy from renewable sources occurs, such as water bodies or oceans. This topic is discussed in GN A9.3 on Alignment of terminology and classifications with the 2025 SNA.

## 5 Valuation of natural resources

### 5.1 Discussion

52. The valuation of natural resources and environmental assets has been a long-standing area of discussion in the SEEA community. The SEEA CF 2012 provides a statement on the agreed understanding of the appropriate valuation approaches for natural resources and land, in particular aiming to add detail to the discussion of the topic as presented in the 2008 SNA. In this regard, SEEA CF 2012 Chapter 5, Section 5.4 provides an extensive discussion of the principles and approaches to the valuation of natural resources in the context of the SEEA CF.
53. Since the finalisation of the SEEA CF 2012, there has been a rich ongoing discussion on the valuation of environmental assets particularly as it concerns the valuation of ecosystem assets and the recognition of monetary values for non-market ecosystem services. This discussion has involved many experts from national accounting and environmental economics and many aspects of valuation have been discussed. From a conceptual perspective, a particular area of discussion has been clarifying the distinction between exchange and welfare values.
54. The ongoing discussion of monetary valuation in the context of ecosystem accounting revealed that the expression of national accounts valuation principles in the SNA could be improved to resonate with a wider audience than national accountants. Thus, for this reason and with other revision issues in mind, the 2025 SNA clarifies a range of valuation aspects including the definition of exchange values, the inclusion of an estimate for the return to capital for non-market producers in applying the sum-of-costs approach and the measurement of depreciation and capital services on produced assets. Also, the OECD Compilation Guide on Natural Resources contains more detailed guidance on the use of the net present value (NPV) of future resource rents for valuing natural resources including the choice of discount rate and the rate of return to produced assets to be applied in deriving estimates of resource rent.
55. Notwithstanding the rich discussions on the valuation of ecosystems, there have in fact been no changes in concept to the valuation approach to be applied in an SNA context for natural resources. Since monetary valuation of individual environmental assets in the context of the SEEA CF is intended to align fully with the SNA, then it is not expected that there should be any revision to the SEEA CF valuation principles or concepts.
56. At the same time, the nature of the clarifications in the 2025 SNA on the description of valuation of natural resources in the SEEA CF will need to be assessed. Some specific issues are:
- Clarifying the definition of resource rent in relation to the inclusion/exclusion of specific taxes and subsidies. As context, the SEEA CF 2012 (Table 5.5) recommends that, in the derivation of resource rent, specific subsidies on extraction should be deducted from gross operating surplus (GOS) and specific taxes on extraction should be added to GOS before the user costs of produced assets used in extraction are deducted. This approach was also included in the 2025 SNA, Chapter 4, paragraph A32 which repeats the content of SEEA CF Table 5.5. However, during the drafting of the OECD Compilation Guide for Natural Resources it became clear that there was a lack of clarity about the definition of specific taxes and subsidies in the context of resource extraction. This included the need to consider

the implications of a separate change in the 2025 SNA wherein certain taxes are to be treated as payments of rent. The treatment of concessional loans and tax abatements also needs to be clarified in this context. (NB: There are likely links to Issues C6 and C7 on PEDS and tax abatements to be considered in elaborating appropriate treatments.)

- In cases where there are multiple extractors or the legal owner of a natural resource is not the government, clarity is needed on the appropriate treatment of taxes in deriving resource rent and resource rent shares in order to implement the split asset approach.
- There have been advances in discussion on the application of the net present value method, including concerning discount rates and rates of return to produced and non-produced assets used as inputs to extraction of natural resources, that should be considered in updating the SEEA CF.
- Alternatives to the use of the net present value approach to value natural resources have been further investigated, particularly given concerns about the challenges of applying the residual value method in estimating resource rent. The SEEA CF describes alternative approaches to measuring resource rent but does not focus more widely on describing other methods which could be used to measure the value of natural resources without using resource rent and NPV methods. One approach in this context, is the potential to use a more externality focused/shadow pricing based method with links to using or adjusting observed market values.

<<NB: It is planned that the next version of this paper will discuss these topics in more detail building on discussions and content from the OECD Compilation Guide for Natural Resources. >>

57. A separate valuation issue concerns the potential effects in the SEEA CF of applying the new sum-of-costs approach for non-market producers from the 2025 SNA. It is expected that this would have an impact on the measurement of environmental expenditures including environmental protection and resources management expenditure, given that many of these expenditures will be undertaken by non-market producers including general government and NPISH. This will need to be investigated further.

## 5.2 Proposals

58. For the valuation of individual environmental assets, since in principle there have been no changes to the recommendations in the 2025 SNA then no changes to the principles of valuation in the SEEA CF for the valuation of these assets is proposed.

59. At the same time, it is clear that the discussion of implementing these valuation principles in an SNA context has raised issues that are not discussed in the SEEA CF. Consequently, it is proposed that a more detailed review is undertaken of the associated descriptions and explanation of valuation of natural resources comparing the SEEA CF text and the content developed in the preparation of the 2025 SNA and the OECD Compilation Guide for Natural Resources.

## 6 Other issues related to natural resources

### 6.1 Accounting for timber resources

60. As noted above, the 2025 SNA introduces some changes to accounting for timber resources. While the conceptual scope of measurement remains unchanged and is aligned with the scope of the SEEA CF, there are a number of aspects of the accounting that have been refined, in particular the removal of the distinction between cultivated and natural timber resources as introduced above.

61. The following points are noted:

- a. The 2025 SNA explicitly distinguishes the timber resource asset from the underlying forest land asset. This distinction is also present in the framing of the SEEA CF and hence as a general point no change is needed in the SEEA CF.
- b. However, making this distinction in combination with the removal of the distinction between cultivated and natural timber resources, implies that there is no longer the need to record depletion of natural timber resources (SEEA CF 5.368-370) since “normal” changes in the stock of timber resources are included as changes in inventories. Instead, focus in the 2025 SNA is on the measurement of depletion of forest land – i.e. the loss in the potential future harvest of timber from a given area of forest land due to declines in its productive capacity. It is proposed to update the content of the SEEA CF to explain the approach to recording the depletion of forest land in relation to the value of timber resources and clarifying the way in which the two asset values (together comprising the value of the forest estate) should be distinguished.
- c. Building on work undertaken to develop the European Forest Accounts (EFA) Handbook, it is also proposed to describe the series of entries required in a supply and use table presentation such that the entries for the changes in stock in the timber resources asset account can be fully reconciled with the entries for output, changes in inventories and intermediate consumption that are required for the measurement of value added. This reconciliation should be presented in both physical and monetary terms and be based on the 2025 SNA time of recording for the output of timber resources.
- d. Work on the EFA Handbook and on the OECD Compilation Guide for Natural Resources on methods for measuring the value of timber resources has revealed that the discussion of prices for valuing the stock (SEEA CF 5.378-385) needs to be updated. In short, the description in the SEEA CF 2012 of the relationship between resource rent and stumpage prices is incomplete and a better explanation is needed of the connections between output prices, production costs, and rents associated with valuing timber resources. Content from both of the documents noted above can be used to provide revised text. The EFA Handbook and OECD work has also provided a more comprehensive description of different methods and hence it is proposed that the description of methods for valuation of timber resources is also revisited noting that it is

likely appropriate that a longer description of methods is retained in these other documents rather than incorporated into the updated SEEA CF.

- e. In the final stages of updating the 2025 SNA, a tricky national accounting issue arose concerning the appropriate recording in cases where the extractor/harvester of resource is not the legal owner of the resource. In the context of timber resources, if a specific area of forest land is already on the balance sheet (i.e. there is an economic owner), then additional value may be assigned to the resource to reflect the additional economic benefits being captured by other economic units – for example in cases of illegal logging or subsistence harvesting. However, such additional value should only be recorded when the activity is considered of sufficient scale (see 2025 SNA 27.36). Separately, if such activity occurs in relation to timber resources not available for wood supply (e.g. in a national park) and there is no existing economic owner, then any additional value will need to be incorporated in the accounts by recording the economic appearance of the timber resources and associated forest land (see 2025 SNA 27.36). The full accounting implications of these entries (e.g. wrt depletion) was not articulated in the 2025 SNA and hence the issue was placed on the research agenda. For the SEEA CF update, it is proposed that, subject to closer review, the limited text in the 2025 SNA may be incorporated. However, the full accounting implications of the treatment has a low priority from a SEEA CF update perspective.

## 6.2 Accounting for aquatic (fish) resources

62. As noted above, the changes to the 2025 SNA in respect of cultivated and non-cultivated biological resources do not affect the general approach to accounting for fish resources. That is, wild fish resources continue to be treated as non-cultivated biological resources that are subject to depletion.
63. At the same time, building on the 2025 SNA's delineation of the boundary between economic and legal ownership, the 2025 SNA Chapter 27 (27.37-47) outlines in considerable detail the recommended treatment of various ownership and fishing rights situations including the treatment under different types of quota arrangements. The SEEA CF also describes the valuation of fish resources using licence and quota information (SEEA CF 5.444-452). It is recommended that this text is reviewed to align with the discussion in the 2025 SNA. Of specific note are the following points:
  - a. Licence payments for commercial fishing should be recorded as rent rather than as taxes. Payments for licences for recreational fishing should continue to be recorded as a payment of a tax.
  - b. The value of a quota should not be recorded as a separate asset (in 2008 SNA it was treated as a permit to use a natural resource) but rather it should be embodied in the value of the fish stock with appropriate application of the split asset approach to reflect the different share of benefits from the harvest of the fish stock accruing to different economic owners.

64. An outstanding accounting issue from the 2025 SNA update process concerned the appropriate measurement boundary and allocation of economic ownership for fish stocks located within a country's exclusive economic zone (EEZ). As noted in the 2025 SNA (para 27.46) by convention the output (and hence economic benefits) from harvesting of fish in the EEZ is allocated to the country of residence of the operator of the vessel undertaking the fishing. In an extreme case, if all of Country A's EEZ fish stock was harvested by Country B, then economic ownership of the fish stock should be attributed to Country B. By construction this should mean that any depletion of the fish stock due to the activity of Country B should also be attributed to them. While it will be common for country A's fish stocks to be the subject of some management or quota arrangement and hence it is likely that some of the asset value will be attributable to country A (i.e. based on their share of the resource rent), there will usually remain some share of the total value that should, in principle, be allocated to the balance sheet of Country B. However, as recognised in the 2025 SNA, there is currently no agreed treatment for the recording of flows of depletion between residents and non-residents in the SNA or balance of payments and hence no depletion is recorded in the accounts of the non-resident extractor (noting that the precise entries in the sequence of accounts require clarification). Further, there is no standard practice in which country B would include on its balance sheet the value of its share of the fish stock located in country A.
65. In the context of the SEEA CF, since the entry point to measurement is the fish stock itself rather than the associated economic units, one way forward is to record the value of all fish stocks within a country's EEZ as being on the balance sheet of that country, irrespective of who harvests the fish. The current structure of the monetary asset account for aquatic resources (Table 5.23) shows only the total stock and changes in the total stock, i.e. it does not allocate the total value to economic units. Consequently, this attribution of fish stocks to their "reference" country would be possible without a change in the account itself. The treatment would also align with the general recommendation in the SEEA CF that the geographic boundary for the asset accounts includes resources within a country's EEZ. For the monetary asset account, it would also be possible to incorporate additional rows to record separately the flows of gross catch, depletion and other changes that are attributable to residents and non-residents as part of recording the total changes in stocks.
66. This approach to recording would not resolve the challenge facing the integrated accounts of the SNA and the balance of payments, and it would also generate a different balance sheet value for fish resources in the SEEA CF compared to the SNA. However, it would provide relevant information for decision makers. <<NB: Subject to general agreement this approach could be further developed.>>
67. Further investigation in the context of the SEEA CF could be undertaken concerning a resolution introduced in the 2025 SNA Chapter 5 involving the establishment of a notional unit to record the activity of non-resident fishing vessels operating in a country's EEZ. However, it is proposed that this work be given a low priority in the context of the SEEA CF update as the full sequence of economic accounts is not a focus and implementing any solution, even conceptually, would establish a difference between the SNA and the SEEA CF that is not considered warranted. It is also note that the approach of establishing a notional unit would imply clear changes to the

country attribution of output, exports and imports and raises a wide range of measurement challenges, particularly in cases where one fishing vessel operated in multiple countries' EEZs.

### 6.3 Treatment of radio spectra

68. In the 2025 SNA, the treatment of the radio spectra was unchanged from the 2008 SNA and the value of the radio spectra continues to be classified as a natural resource. In the 2008 SNA, the treatment 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 being subsumed into natural resource.
69. Changes to the treatments of leases and licences related to natural resources in the 2025 SNA should have meant that the rights to use the spectrum were no longer treated as a separate asset and the value of a licence would be embodied in the value of the radio spectra itself (i.e. as applied in the context of fishing quotas described above). However, the need to make this change to the treatment of radio spectra for consistency purposes was only recognised at the end of the update process and hence the 2008 SNA treatment of radio spectra was left unchanged and the potential to change the treatment is on the SNA research agenda.
70. The radio spectra has not been included as an environmental asset in the 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 SEEA CF 2012. 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.
71. Two issues arise in the context of the SEEA CF update. First, should the radio spectra be included in the SEEA CF as a type of individual environmental asset? On this issue, since the radio spectrum can be considered to represent a component or characteristic of the biophysical environment, consistent with the definition of environmental assets, and since there is no overlap in value with any other environmental assets, it is proposed to include the radio spectra as a type of environmental asset in the SEEA CF such that the scope of individual environmental assets in the SEEA CF aligns with the scope of natural resources in the SNA.
72. Second, what accounting treatment should be applied to record the value of the radio spectra? Beyond the choice of treatments embodied in the 2025 SNA, a further challenge for the SEEA CF is that the SNA treatment does not provide a discussion on the conceptualisation or measurement of the radio spectra in physical terms. This issue will be examined further pending a conclusion on whether the radio spectra should be included as an environmental asset in the SEEA CF.

## 7 Recommendations on conceptual treatments

<<NB: This section has not yet been drafted pending discussion of the issues described in the preceding sections. It is intended that draft recommendations are developed ahead of the November meeting of the SEEA CF Technical Committee and further refined ahead of Global Consultation.>>

## 8 Other considerations in advancing the issue

<<NB: This section has not yet been drafted. It is not expected that many additional considerations, for example in terms of indicators and compilation guidance, will be identified. However, connections to the GFS revision process items and the development of the SEEA CF research agenda will be incorporated. >>

## 9 References

SEEA CF

2025 SNA