DEPARTMENT OF ECONOMIC AND SOCIAL AFFAIRS
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System of Environmental Economic Accounting

SEEA Central Framework 2028 update

Scoping note for issue D1: "Inclusion of the Carbon stock account (in the SEEA Central Framework)"

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Note: This note is prepared in the context of the SEEA Central Framework update, mandated by the United Nations Statistical Commission in 2024, expected to finish by 2028. There are 29 update issues, and the initial task is establishing a clear scope for all of the issues. This scoping note provides a short description of a specific issue with the aim of supporting a common understanding of the work that will be needed to fully investigate and articulate the alternative approaches and recommendations for change or addition to the SEEA Central Framework. Scoping notes will be discussed by the relevant task team and inform on the further work related to the issue.

1 Background to the issue

1. The short description of issue D1 "Inclusion of the Carbon stock account (in the SEEA Central Framework)" from October 2024 is:

> "The carbon stock account has strong links to both the SEEA EA and SEEA CF. It should be investigated whether a) the carbon stock account should also be included in SEEA CF and b) if this warrants a more elaborate description (e.g., concerning carbon in the economy)."

2. The carbon stock account is introduced and described in detail in the SEEA Ecosystem Accounting (SEEA EA) (Section 13.4 and Annex 13.2). This content builds on initial descriptions presented in the SEEA Experimental Ecosystem Accounting (SEEA EEA) in 2013.

3. In short, the carbon stock account organizes data for an accounting period on the stocks of carbon (opening and closing stocks), additions to stock and reductions in stock across all carbon reservoirs, namely Geosphere, Biosphere, Atmosphere, Oceans and Accumulation in the economy (SEEA EA Fig 13.1). The structure of the carbon stock account follows the structure of an asset account as described in the SEEA Central Framework (Chapter 2).

4. There are close links between the data recorded in carbon stock accounts and other ecosystem accounts, for example in the measurement of ecosystem condition and the measurement of global climate regulation services. In the implementation of ecosystem accounting the primary focus has been on measuring the carbon stock in the biosphere.

5. Accounting for carbon stocks was also linked to the SEEA Central Framework with section 5.8.5 describing in a few paragraphs "carbon accounts for timber resources" that recognise the connection between measuring the stock of timber resources and measuring the stock of carbon in forests.

2 Motivation for considering a change to the SEEA Central Framework

6. Comprehensive and coherent measurement of carbon stocks and changes in those stocks remains of significant interest in many policy and analytical contexts, particularly in relation to climate change. More coherent measurement would also support more robust derivation of indicators.

7. From an accounting perspective, while there are clear links between the measurement of carbon and the measurement of ecosystems, the actual measurement and recording of carbon stocks using the asset account structure has quite direct parallels in terms of the types of accounting entries with the measurement of stocks and changes in stock of individual elements and substances for which accounting is described in the SEEA Central Framework. Examples include asset accounts for water resources and physical flow accounts for air emissions energy. Thus, conceptually a carbon stock may be considered a SEEA Central Framework type of account rather than a type of ecosystem account since carbon itself is not an ecosystem asset. In addition, the scope of a carbon stock account extends beyond carbon in ecosystems and conceptually includes stocks of carbon in the economy and in fossil fuel resources, that are beyond the scope of ecosystem accounting.

8. There are a number of accounting connections elsewhere in the SEEA Central Framework that could be reinforced or further examined through incorporating a full carbon stock account. These include:

    a. Air emissions accounts for GHG emissions to ensure coherence between stocks and flows of carbon

b. Energy flow accounts to ensure coherence between the supply and use of fossil fuels and stocks and flows of carbon

c. Material flow accounts and the potential to record inputs from the environment in the case of cultivated biological resources in terms of specific elements

d. Product flow accounts, for example for nitrogen and phosphorous, which in many respects may have the same rationale and structure as accounts for flows of carbon

e. Mineral and energy resources accounts to ensure coherence between the stocks and changes in stock of fossil fuels and stocks and flows of carbon

f. Timber resource accounts and Forest land accounts to ensure coherence between the stocks and changes in stock of timber resources, the area of forests and stocks and flows of carbon

g. Soil resource accounts to ensure coherence between measures of the quality of soil resources and stocks of soil organic carbon

9. Connections should also be made to the measurement of LULUCF emissions as part of the IPCC reporting of countries (as articulated in the SEEA Agriculture, Forestry and Fisheries) which requires a degree of co-ordination of measurement across different SEEA Central Framework accounts.

10. In all of these cases, the coherence across the various accounts of the SEEA Central Framework would be supported if a carbon stock account were also part of the system of accounts.

3 Nature of the proposed change and research questions

11. The broad proposal for consideration is whether the current content and description of a carbon stock account that is presented in the SEEA Ecosystem Accounting (Chapter 13) should be transferred to the SEEA Central Framework.

12. A fundamental framing question emerges in considering this change that concerns the application of the definition of environmental assets in the SEEA CF. Specifically, should the stock of carbon be considered an environmental asset? A response to this question is required in order to determine whether a change to the SEEA CF is appropriate. Factors to be considered include whether the stock of carbon can be valued, whether individual elements can be considered environmental assets and whether all physical stocks should be within scope. While these and other questions can be discussed in terms of the carbon stock alone, it is considered appropriate to considered them in a broader context in clarifying the agreed scope of environmental assets to be included in the SEEA CF. Thus it is proposed to prepare an initial note is proposed to discuss these questions ensuring links to other issues in TT-D, especially D7 on the valuation of water and D8 on the atmosphere but also to issue A9 on the consistency with the SNA since a key factor is the scope of environmental assets in monetary terms. One aim for this note is to determine agreed criteria by which the measurement boundary for environmental assets is applied in physical and monetary terms.

13. Based on the findings from this discussion a decision will be needed on whether new content concerning a carbon stock account should be included in the updated SEEA Central Framework or whether it is satisfactory at this stage to refer to the text in the SEEA Ecosystem Accounting.

14. If the decision is to include a description of carbon stock accounts in the updated SEEA CF then the following conceptual and measurement questions might be considered in incorporating the current content on the carbon stock account from the SEEA Ecosystem Accounting into the SEEA Central Framework:

    a. Clearly delineating the boundaries between the different carbon reservoirs (building on content in SEEA EA Annex 13.2)

    b. Considering whether all carbon reservoirs should be within scope of a carbon stock account

    c. Clarifying the scope of carbon in the economy to be considered

    d. Clarifying the scope of carbon in the biosphere to be considered, especially with respect to carbon stored in peatlands and similar ecosystem types.

    e. Clarifying the measurement boundaries with respect to environmental assets that contain/embody carbon

    f. Considering the need for spatial detail in the measurement of carbon stocks

    g. Detailing the differences in measurement scope between the SEEA's carbon stock account and IPCC based estimates and the potential to use IPCC data in SEEA accounts.

    h. Clarifying the distinctions between different types of addition and reductions in stock (as described in SEEA EA Annex 13.2)

    i. Describing the links to other SEEA CF accounts where recording stocks and/or flows of carbon is explicit or implicit including the accounts listed in paragraph 8 above.

    j. Describing the potential applications and use cases for data from carbon stock accounts including links to carbon credits and related mechanisms

15. It will also be necessary to consider more editorial questions if it agreed that new content on a carbon stock account should be included in the updated version of SEEA CF. For example, should content be added to the current Chapter 5 or included in a different chapter or section?

4 Links to other SEEA CF update issues

16. In taking forward work on the carbon stock account, links should be made to the following SEEA CF update issues

    a. Issue B3 – Treatment of carbon flows in the SEEA CF: The accounting treatments concerning the stocks and flows of carbon should be aligned.

    b. Issue D7 – Valuation of water: Water, like carbon, is present throughout the environment and hence determining the relevant measurement boundary for valuation is important.

    c. Issue D8 – Treatment of the atmosphere as an asset: An important motivation for considering the atmosphere as an asset is its relevance in understanding climate

change and hence data about the stock of carbon in the atmosphere would be a relevant input to this issue.

d. Issue C5 – Climate mitigation and climate adaptation expenditure: The outcome from these expenditures should be changes in the stocks and flows of carbon and hence coherent recording of the stocks should support interpretation of expenditure data.

e. Issue A1 – Overview of the links between SEEA CF and SEEA EA: Since the carbon stock account was developed in the context of the SEEA EA, this potential change should be recognised in considering this issue.

f. Issue A4 – How SEEA CF accounts can be made spatially explicit: There is much measurement of carbon stocks that is spatially explicit and recording of information about multiple carbon reservoirs will require some information on location of stocks.

g. Issue A9 – Consistency with the 2025 SNA: The proposed initial note on the measurement boundary for environmental assets will link directly to a range of updates in the 2025 SNA concerning the treatment of natural resources. These connections should be recognised in considering this issue.

5 Existing materials

17. Potential materials that may be considered in developing the Guidance note include (but are not limited to):

    a. Research and papers on carbon stock accounts developed for the SEEA EEA and SEEA EA processes.

    b. Research and papers on recording LULUCF emissions for the SEEA AFF

    c. Papers on measuring the global climate regulation service for the Eurostat regulation on ecosystem accounts

    d. OECD Handbook on Accounting for natural resources – especially concerning mineral and energy resources and timber resources

    e. IPCC and related documents on the measurement of carbon stocks and carbon emissions

    f. Country examples of carbon stock accounts (e.g. Australia)

    g. Considerations in measuring carbon stocks and changes in stocks in practice – e.g. the use of satellite data.

    h. Developments in climate statistics (e.g. DGI) and associated reporting requirements, including business sector reporting

18. In developing the Guidance note it will be necessary to identify the relevant experts and stakeholders for the purposes of both drafting the content of the note and also ensuring appropriately wide consultation. These experts and stakeholders have not been identified at this stage.