



DEPARTMENT OF ECONOMIC AND SOCIAL AFFAIRS
STATISTICS DIVISION
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System of
Environmental
Economic
Accounting

SEEA Central Framework update

Scoping note for issue B3: “Treatment of carbon flows in the SEEA CF”

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Note: This Scoping Note has been prepared in the context of the SEEA Central Framework update, mandated by the United Nations Statistical Commission in 2024. A set of [29 issues](#) was identified for the update process and endorsed by the United Nations Statistical Commission in 2025. As an initial step, Scoping Notes were developed for each issue to elaborate on its description and provide a common understanding of the work required to fully investigate and formulate recommendations for the updated SEEA Central Framework. Each Scoping Note was prepared by a lead author and discussed in the relevant Task Team. They were subsequently reviewed by the SEEA CF Technical Committee and the UNCEEA, and approved by the SEEA CF Technical Committee.

1 Context

1. The United Nations Statistical Commission has endorsed the update of the SEEA 2012 Central Framework and work is underway on the update process. An initial task is establishing a clear scope for the issues that have been identified to be the focus for the update. This scoping note provides a short description of **Issue B3 – Treatment of carbon flows in the SEEA CF** (in the SEEA Central Framework) to support 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.
2. The short description of the issue from October 2024 is:
This topic covers multiple subtopics, in particular:
 - 1) *Emissions related to land use, land use change and forestry (LULUCF) are not part of the SEEA CF air emission accounts. However, these emissions may be (partly) included in the accounts. In addition, consideration may be given to including carbon sequestration in the accounts (by extending the use table).*
 - 2) *It is possible that more detailed flows of carbon could be included in the SEEA CF. For instance, carbon capture and storage is the end-of-pipe solution to reduce or stabilize carbon emissions from economic processes, but removal of carbon emission through such economic process by industry is currently not recorded in the SEEA CF (e.g., air emission accounts).*
3. This scoping note covers
 - a. The current accounting treatment for carbon stock in the SEEA
 - b. The relevance and motivation for changing the treatment
 - c. Specific research questions that should be considered in finalising recommendations for change to the SEEA Central Framework
 - d. Links to other issues in the SEEA CF update process
 - e. Existing materials to be considered and relevant experts and stakeholders

2 Current accounting treatment

4. A key principle of physical flow accounting as described in chapter 4 SEEA CF is to record (only) flows of materials and energy that enter and leave the economy and flows of materials and energy within the economy itself. Conceptually, flows solely within the environment are out of scope of physical supply and use tables.
5. The air emissions accounts (AEA) are a subset of the material flow accounts and record the generation of air emissions by resident economic units, by type of substance. The air emissions recorded in the AEA align with the general principles of material flow accounting (chapter 4) to record only emissions from economic activities. For this reason, emissions that originate from the environment are excluded from the scope.
6. Basically, the air emissions account consists only of a supply table. Since the focus is on the generation and release of residuals, there is no requirement that a complete PSUT be constructed. Rather, emphasis is on determining an appropriate scope for the measurement of air emissions which aligns with the scope and boundaries used in the compilation of the economic accounts. The possibility of including a use table is mentioned in the SEEA CF 2012, but this is not further elaborated.

7. The current SEEA CF does not include bridge tables to describe the differences between the AEA and other frameworks such as the IPCC.

3 Motivation for the issue

2. Data on carbon emissions to the atmosphere play a key role in climate policies with regard to monitoring, policy evaluation and policy making for climate mitigation. The air emission account provides data to monitor the relation between emissions and economic development, but also provides data for all kinds of environmental-economic analyses, such as footprint calculations.
3. Land use, land-use change and forestry (LULUCF) is a sector defined by IPCC, that looks at both carbon emissions and carbon sequestration related to land use and land use changes. There is growing policy interest in this sector as the management of terrestrial ecosystems (mainly forests) provides several climate change mitigation options. LULUCF carbon removals and emissions are part of national and international climate mitigation targets, for example, as set for the Paris Climate Agreement in 2015.
4. The SEEA CF does not provide clear guidance how to treat emissions and uptake of CO₂ that result from land use and land use change. As a result, LULUCF emissions and uptake are not included in SEEA air emission accounts (AEA). This creates a mismatch between SEEA and IPCC data, which both in principle record 'anthropogenic emissions'.
5. This issue was first addressed by FAO some years ago for the compilation of SEEA AFF and also discussed in the London group (Tubiello F., 2016; Vtrella G. et al., 2017). For the SEEA AFF it was concluded that all LULUCF emissions and uptake should be included, but acknowledged that this interpretation was 'at the edge of current SEEA understanding and applications' (FAO, 2016).
6. Flows related to LULUCF are a key example of flows that are human induced and that are currently not included in scope of the physical flow accounts that are recorded in the SEEA CF. Other examples include Transboundary Pollutant Flows and Secondary Fine Particle Air Pollution (see also Chambers et al, 2024). These flows are all policy relevant. This warrants efforts to investigate if these flows can conceptually be included in the scope of the SEEA CF.
7. The scope of the AEA includes both biogenic and non-biogenic carbon emissions. It is highly policy relevant to distinguish between the two. The text of the SEEA CF should further clarify this and recommend how to record this in the AEA.
8. Finally, climate policies do not only focus on the supply side of air emissions, but also look at where the emissions end up (i.e. the use side). Carbon uptake in vegetation (LULUCF) is just one example how CO₂ can be captured and/or removed from the atmosphere. Carbon Capture and Storage (CCS), Carbon Capture and Utilisation (CCU) and Direct Air Carbon Capture and Sequestration (DACCS) are (new) technologies that need to be adequately accounted for in the AEA. Carbon can nowadays also be captured and transported abroad by pipelines or shipping, which should be recorded as exports. All these new developments warrant inclusion and description of a use table in the AEA.

4 Research questions

9. In considering the extension of certain carbon flows in the air emission accounts in the SEEA Central Framework, the following questions might be considered:
 - a. Can LULUCF related carbon emissions and carbon uptake flows be included in SEEA CF, and more particularly in the air emission accounts? Is this also relevant for other types

- and emissions and uptake? Are there conceptual issues to be considered (including the link to SEEA EA) ?
- b. If they are to be included, to what industries these emissions / uptake should be allocated or are there other options to record this in the AEA? How does this relate to the treatment of emissions from the cultivation of soil already included in the SEEA CF?
 - c. How do we treat other carbon capture and storage in the SEEA CF ? How should in this regard the use table for air emissions look like, what are the particular issues that should be addressed and described in the SEEA CF?
 - d. What other human induced flows should be included in the SEEA CF? Can we provide a general definition for this? How should these be recorded in the PSUTs?
 - e. Should a bridge tables be added to the text of the SEEA CF to describe the difference between the AEA and other monitoring frameworks such as the IPCC?
 - f. How can we further clarify the related links to the carbon stock accounts (issue D1) and SEEA EA (carbon sequestration, carbon retention) ? Are there any additional conceptual issues to be taken into account here ?

5 Links to other SEEA CF update issues

10. In taking forward work on the carbon stock account, links should be made to the following SEEA CF update issues
 - a. Issue A1 - Providing a broad overview of links between SEEA CF and SEEA EA
 - b. Issue A4 - How SEEA CF accounts can be made spatially explicit
 - c. Issue B1 - Description of PSUTs
 - d. Issue B4 - Inclusion of text on quarterly accounts
 - e. Issue D1 – Inclusion of the Carbon stock account (in the SEEA Central Framework)
 - f. Issue D8 - Treatment of the atmosphere as an asset

In addition, there is a clear link to the SEEA EA (carbon sequestration, carbon retention).

6 Existing materials and relevant experts

11. Potential sources of material and expertise to be considered are:
 - a. Schenau, S. (2023). LULUCF and SEEA CF. Pretoria, South Africa: London Group 29th Meeting. <https://seea.un.org/events/london-group-environmental-accounting-29th-meeting>
 - b. Matthew Chambers , Nils Brown , Kaia Oras , Aldo Femia , and Sjoerd Schenau (2024). Accounting for Human Induced Flows in Nature. Washington: London Group 30th meeting. <https://seea.un.org/events/london-group-environmental-accounting-30th-meeting>
 - c. Eurostat, 2022. AEA questionnaire: adding road transport tables and LULUCF as a bridging item.
 - d. FAO, 2016. SEEA Air Emissions Accounts: from Central Framework to Agriculture, Forestry and Fisheries. Paper prepared for the UNCEAA meeting.
 - e. FAO, 2020. System of Environmental-Economic Accounting for Agriculture, Forestry and Fisheries (SEEA AFF). <https://seea.un.org/content/agriculture-forestry-and-fisheries>

- f. Tubiello, F., 2016. AIR EMISSIONS, GHGs and Land Use/Land Cover: Relations between SEEA CF and the IPCC. Presentation at the London group meeting 2016. Microsoft PowerPoint - SEEA AFF_Oslo_FNT_FINAL (un.org) <https://seea.un.org/events/22nd-meeting-london-group-environmental-accounting>
- g. Vetrella, G., Femia, A., & Tubiello, F. (2017). Completing the links between UNFCCC reporting categories and SEEA. San José, Costa Rica: London Group 23rd Meeting. <https://seea.un.org/events/london-group-environmental-accounting-29th-meeting>