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| DEPARTMENT OF ECONOMIC AND SOCIAL AFFAIRS  STATISTICS DIVISION  UNITED NATIONS |  |
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**Area C: Developing Global Databases for the SEEA**

Paper prepared by the Secretariat and Members of the Area C Working Group

*(for discussion)*

# Introduction

This note reports on the activities of the AREA C group over the last year. As in previous years, an updated roadmap towards 2025 and current status of work on global databases by account are provided with this report (see Annex). The annex tables contain comprehensive information on the scope of work by the Area C group. The next section covers some highlights of current activities and recent progress for the Area C work programme, followed by a summary on priority-setting during the coming years, and questions to the UNCEEA.

The objective of Area C is to establish a set of global SEEA databases to provide users with SEEA compliant data sets for integrated policy development and analysis, including the Sustainable Development Goals (SDGs). This is done by coordinating and supporting the development of such databases at international level, by facilitating the exchange of related data among international organisations, and by providing direct access to existing SEEA databases through the websites of the International Organisations (IOs). The databases development work focus under Area C is for the five priority accounts (air emissions, energy, material flows, land and water), identified at the Eleventh Meeting of UNCEEA in 2016. They build as much as possible on national data, complemented with estimates when national data are not (yet) available, so as to achieve a global coverage.

# Progress on Current Programme of Work

The procedures for developing global SEEA databases are designed to support efficient compilation, processing, and exchange of the relevant data by national and international organisations, building on the principles agreed upon by the UNCEEA.[[1]](#footnote-2) Responsibilities are distributed across the Area C group members. Continuous improvements to the existing databases are a part of the ongoing regular work of the responsible organisations. Recent activities have focused on addressing data quality issues, including international timeliness, on coherence and comparability of datasets, and on addressing needs to improve coverage for priority accounts.

During 2022, the Area C group finalised development of global questionnaires for the Air Emission Account (AEA) and the Physical Energy Flow Account (PEFA). The questionnaires were developed using the Eurostat questionnaires as a starting point and via consultations with experts and stakeholders, including via pilot testing of the two questionnaires with countries from different regions and of varying levels of experience with the two accounts. The pilot countries reported data for the two types of SEEA physical flow accounts and provided feedback on the content of the questionnaires and process. The new global questionnaires were endorsed by the UNCEEA Bureau and by the UNCEEA Technical Committee in 2022 and are currently being implemented for the first time in coordinated global collection of AEA and PEFA data in 2023. Results from the current data collections are expected to be available on the existing IO data portals (e.g. <https://stats.oecd.org/>) from the beginning of 2024.

To complement the collections of official data for AEAs, the OECD also manages a programme of work to develop international emissions estimates aimed at complementing and boosting the work on official AEAs at the national level. In some cases, several advantages can be leveraged via multi-national centralized approaches to estimation, especially when the datasets involved are inherently international in nature. For example, the OECD has developed and applied methodologies using big datasets on air and maritime transport, which have global coverage, to produce nationally aggregated emissions aligned with the national accounts. These variables are important components of AEAs and have links to other sources of information, such as greenhouse gas (GHG) emission inventory reporting, energy statistics, or analyses of international trade. The maritime carbon dioxide (CO2) emissions estimates[[2]](#footnote-3), were recently publicly released with a provisional allocation from the bottom-up (vessel-level) estimates to the national accounts (economic residence) basis. The new maritime emission estimates build on the previous database of emission from air transport.[[3]](#footnote-4)

Concerning material flow accounts (MFA), the **Global Manual on Economy Wide Material Flow Accounting** prepared by UNEP and the International Resource Panel, jointly with Eurostat and in cooperation with the OECD, has been published.[[4]](#footnote-5) The launch of the new manual helped to create momentum for developments and expansion in the compilation of MFA data from countries, led by UNEP, together with Eurostat and the OECD, for the Global Material Flows and Resource Productivity Database, which is also an input for the SDGs monitoring. Development of MFA usually starts with production-side accounting – the domestically extracted inputs, and the throughput and residuals of the domestic economy. These data are complemented in the MFA with a method for estimating demand-based material flows, which incorporates imports and exports of materials with other economies. The demand-based statistics are required for producing the footprint indicators and work is ongoing, including as part of the Area C work plan, to continue development of internationally agreed and comparable methodologies for demand-based material flow indicators.

The work on SEEA Water and SEEA Land accounts most recently focussed on data quality, particularly alignment of currently available statistics to SEEA standards and comparability between countries. Eurostat suspended plans for the potential future collection of water accounts because of insufficient support from European countries, but Area C members continue to work to improve capacities for applying the joint OECD/Eurostat and UNEP/UNSD questionnaires on inland waters for populating simple SEEA water accounts. This joint OECD/Eurostat work was initiated in 2017-18 and benefits from regular discussions among IOs (OECD, Eurostat, UNSD, FAO, UN-Habitat, WHO). It has resulted in proposals for further aligning the terms and definitions used in the international questionnaires. FAO publishes geospatial data for land cover[[5]](#footnote-6) aligned with the SEEA and the Land Cover Classification System (LCCS). The OECD also produces compilations for land cover and land use by country based on geospatial data from Copernicus/European Space Agency and Université Catholique de Louvain Geomatics Climate Change Initiative. Discussions are ongoing at the regular Area C meetings, and with other partners at online workshops organised by the Area C group members, aimed at continuous improvements to quality and accessibility of land cover and land use statistics.

## *Coordination, Working Methods, & Governance*

Regular coordination is key to the success of the activities of the Area C group. An illustrative example during the past year is the collaboration among Area C members (IMF, OECD, IEA, Eurostat, UNSD) to develop and publish quarterly air emission accounts (AEAs). Initial aggregated estimates for quarterly AEAs were published by Eurostat and the OECD during 2022. Refinements to the temporal disaggregation methodology are ongoing to continuously improve the accuracy and granularity of these estimates.

The Area C group communicates and collaborates continuously, including via bi-monthly online meetings, so that data quality aspects may be progressively enhanced. One of the important prerequisites for increasing the use and usefulness of SEEA accounts in policy development is to expand the geographical scope of the current databases so as to reach a global or near-global coverage. More work could be done to encourage SEEA implementation in all world regions. To this end, a two-pronged strategy is deployed to (a) support countries to implement the priority accounts and (b) develop and implement estimation methodologies for filling the gaps and improving timeliness. An example for the latter is the OECD methodology to estimate AEAs for CO2, methane (CH4) and nitrous oxide (N2O), in line with the SEEA. The methodology has been validated by comparing the estimates with the official emission accounts of countries that have already implemented them. It has been endorsed by the OECD Working Party on Environmental Information (WPEI) in December 2017, and by the SEEA Technical Committee and the UNCEEA in June 2018. The current Area C strategy includes plans to expand the AEA estimation work further, building on the new joint global data collections launched this year. For all areas of data collection and international estimation or gap-filling, the Area C group aims to maintain a clear and efficient distribution of responsibilities among the IOs. Efficiency is a particularly important criterion for this coordination given the growing demands by users of global SEEA databases.

There are links between the Area C work and the other Area Groups under the UNCEEEA (see also the final column in the Road Map). Communication among the area groups is important to help ensure maximum benefits from these synergies. In practice, the international community working on the SEEA is relatively small and exchanges among these workstreams happen organically at annual events such as the London Group meetings, the OECD/UNECE Joint Seminar on SEEA Implementation, and the OECD Working Party on Environmental Information (WPEI). These fora are often incorporating similar research topics or themes as the Area group workplans into their agendas. The Area C group also organizes targeted online workshops, most notably on land cover accounts in 2022 (with another planned in 2023), to discuss strategies and address specific needs, convening experts that work on these accounts across institutions. For data collections, like the new questionnaires launched for AEA and PEFA, online workshops and seminars are used to support the work underlying the exchanges of data and information.

# Setting Objectives and Priorities for 2024-2025

Major priorities for the next two years are to improve the relevance of SEEA priority accounts under Area C by meeting policy needs, such as alignment with current sustainability priorities, appropriate granularity of information, timeliness, and expanding, as feasible, geographic coverage represented in the databases. Gaps in coverage of the current databases are addressed using the subsidiarity principle and there is a need to develop more UNCEEA-endorsed estimation methodologies where official accounts are unavailable. There are also demands for extending time series or other gaps within the available accounts. Each of the priority accounts has a tailored programme of work (see annex) and methodologies for complementing official data.

There is also a constant need to reach out to users of the global databases, beyond the broad circle of professionals already working on or familiar with the SEEA. In other words, work on the global SEEA databases requires a balancing between the supply-side (statistics production) work with continuous engagement with the demand (users of SEEA statistics). Interactions with some users during the past year suggests there are large numbers of potential users of SEEA global databases who are unaware of the currently available SEEA global databases, or are unfamiliar with their advantages for policy analyses. Communication on uses of the global databases, in collaboration with the UNCEEA Area A group on indicators, is therefore recommended as an additional priority activity for the remaining 2 years under the current Area C strategy.

Questions for UNCEEA

The committee is requested to comment on:

1. The progress and road map for the five priority accounts.
2. Objectives and priorities for the next two years, including on prioritizing improvements to the quality of priority databases, their geographic coverage, and enhancing relevance and communication with potential users

# Area C Road Map (2023 Version)

| Area A: climate indicators **Work elements/ topics** | **Lead agencies** (partner agencies) | **Objectives for 2021-2025** | **Steps toward the 2025 target** | **Timelines** | **Links to other areas** | **Links to work in other areas** |
| --- | --- | --- | --- | --- | --- | --- |
| **PRIORITY ACCOUNTS** |  |  |  |  |  |  |
| **Air emissions**  (GHG, air pollutants) | **OECD**  (with Eurostat and UNSD) | Improve timeliness & frequency:  *Develop a methodology for quarterly estimation to meet the demand from policy makers.* | * Develop methodology for quarterly AEAs (aiming ultimately at t-2 months’ time lag after the end of the reference quarter). Would also lead to early annual emission estimates (collaboration between IMF, OECD, Eurostat, IEA, UNSD) | 2021-22  Ongoing | Area A: climate indicators | Area A: climate indicators |
| Expand geographical coverage:  *Ensure that (i) all official AEAs are included in the OECD’s database / global database; (ii) all AEA related national data are compiled or estimated.* | * Develop methodology for estimating annual AEAs for non-Annex I countries of UNFCCC. | 2022-23 |  |  |
| * Develop tiered questionnaire with minimum set of information to be compiled by countries without SDMX transmission. * Establish regular data collection | completed  2023 |  |  |
| Improve coverage of emission sources | * Develop methodology for estimating emissions from international maritime transport, residence basis. | Q2 2023 |  |  |
| Maintain global OECD database | * Maintain annual updates of global compilation and estimation. | Ongoing |  |  |
| Carry out further research | * Potential further research areas: LULUCF, road transport | 2023-24(?) |  |  |
| **Energy** | **UNSD** (with Eurostat and OECD) | Finalise the estimation methodology | Estimation methodology:   * Further exploration of estimation methodologies for accounts derived from energy balances | Medium term | Area A: climate indicators | Area A: climate indicators |
| Establish and maintain global database | SEEA database |  |  |
| * Develop common data questionnaire for national reporting | Completed |  |
| * Establish regular data collection | 2023 |  |
|  |  |  |
| **Economy-wide material flows (EW-MFA)** | **UNEP**  (with Eurostat and OECD) | Maintain and further develop the global database | UNEP/IRP global material flow database (updated Dec. 2021, frequency every two years) |  | Area A: CE indicators | Area A: CE indicators  Area D1: capacity building |
| * Progressively integrate national data using a common data template (a pre-filled EW-MFA questionnaire for SDGs, UNEP) * Reconcile national data with international estimates (UNEP-IRP) | Ongoing  Medium term |  |
| * Continue capacity building in countries (UNEP) | Ongoing | Area D1: capacity building |
|  |  |  |
| Refine the methodology for demand-based material flows (input-output based approach for use in international work) | Material footprints   * Further develop and test the harmonised estimation method for demand-based material flows (OECD with Eurostat & UNEP) * Update the roadmap for required developments & research (OECD with Eurostat & UNEP) | 2021-22  Ongoing | Area B1: indicators from I-O analysis | Area B1: indicators from I-O analysis |
| Implement automatic data transfer among IOs | Put in place an automatic data transfer and exchange mechanism (using SDMX) between UNEP and other IOs (UNSD, OECD, *Eurostat*) | Completed &  Ongoing |  |  |
| Carry out further research and improve relevance for circular economy policies | * Integrate MF data/accounts with waste statistics/accounts. * Explore links with product statistics, and EGGS and tax revenue accounts. | TBD | Area A: CE indicators  Area B1: classifications | Area A: CE indicators  Area B1: classifications |
| **Land (cover)** | **UNSD and FAO** (with OECD, UNCCD and others) | Develop international consensus on estimation methodology to use | Estimation methodology:   * Integrate LCML into ARIES for SEEA |  | Area B2: ecosystem accounts | Area B2: ecosystem accounts |
| Maintain global database with regular updates, agree on practical co-operation arrangements among IOs, and implement an automatic data exchange between IOs | Next steps: | Long-term |  |
| * Review coherence between existing data databases and collection – FAO, OECD, UNCCD: structure and content, data sources, methodology * Develop an agreed hierarchy and ontology of LC classes that meet various information needs, while promoting harmonization. | Ongoing |  |
| * Develop a common data template for national reporting on land accounts: expert review meeting | Q3-Q4 2022 |  |
| * Establish regular data collection [validation by countries] | TBD |  |
| **Water (resources; use)** | **OECD** (with Eurostat)  *in cooperation with UNSD-UNEP , FAO* | Populate simple SEEA water accounts (pilot) | * Develop and agree on tiered reporting templates for water accounts building on the SEEA Technical Note (OECD, Eurostat) | 2022-23 |  | Area B2: ecosystem accounts  Area A: CE indicators |
| * Test the use of country replies to the OECD/Eurostat questionnaire on inland waters for populating the standard template (OECD, Eurostat) | 2022-23 | Area A: CE indicators |
| * Establish a database on SEEA water accounts (starting with EU countries and OECD member and partner countries) | TBD |  |
| **OTHER DEVELOPMENTS** |  |  |  |  |  |  |
| **Additional priority accounts** | All involved | Identify a small set of future priority accounts | * Discuss the potential of other accounts to become priority accounts at UNCEEA meeting | TBD, as of 2023 |  |  |
| * Review the status of the selected accounts, identify the developments required and related arrangements among IOs | Ongoing |  |  |
| * Decide upon future priority accounts and roadmap at UNCEEA meeting | TBD |  |  |
| **Integrated database** | **OECD, Eurostat** (tbc) | Work towards combining SEEA accounts (integrated db) | *For discussion:*  Integrated environment-economy db*(could start with air emissions, including GHG, energy and tax revenue-not yet a priority account).*  *Integrated circular economy db (feasibility to be assessed)* | Ongoing |  | Area A: CE, climate, … |
| **Overall coordination and governance** | **OECD** (all involved) | (pending tasks) |  |  |  |  |
| Responsibilities for quality assurance and validation |  | Reach a consensus and agreement on the sharing of responsibilities | Sharing of responsibilities for data collection from national sources, and for data quality assurance and validation (subsidiarity principle). *to be discussed; arrangements will differ depending on the account considered* | Ongoing |  |  |
| Dissemination of priority accounts | UNSD (all involved) | Establish a SEEA dissemination portal | Establish a portal providing access to SEEA databases and links to accounts hosted by lead (and partner) agencies. | 2023-4 |  |  |
| Data ownership and copyright |  |  | *For discussion* | TBD |  |  |

# Area C Status of Accounts (2023 version)

**Table 1 Priority Accounts**

| **Accounts** | **Agencies involved** | **Country coverage** | **Time coverage** | **Classifications used** | **Data sources** | **Available databases/datasets** | **Status of methodology (compilation, estimation)** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Air emissions** | Eurostat, OECD | Reported data: EU, AUS, CAN, CHE, COL, IDN, ISL, KOR, NOR, NZL, SRB, TUR,UKR  Estimated by IO: JPN, KAZ, RUS, USA | Reported:  2000-2021\*  Estimated:  2008-2021\* (CO2, CH4, N2O)  *\*Annual updates:*  *2021 update expected by Dec.2023* | ISIC Rev4  Households | Country reporting and OECD methodology to estimate accounts using UNFCCC data | Eurostat: <http://ec.europa.eu/eurostat/data/database> , tables env\_ac\_ainah\_r2, env\_ac\_aibrid\_r2, env\_ac\_aeint\_r2, env\_ac\_io10  OECD: <https://doi.org/10.1787/data-00735-en> | **Mature**  Based on  [Eurostat Manual](https://seea.un.org/sites/seea.un.org/files/airemissions_ks-gq-15-009-en-n.pdf) and  [OECD Methodology](https://www.oecd-ilibrary.org/economics/towards-global-seea-air-emission-accounts_7d88dfdd-en)  (endorsed by SEEA-CF TC) |
| **Energy** | Eurostat,  IEA,  UNSD | EU, AUS, BHU, BWA, CAN, COL, CRI, FJI, GEO, JAM, KEN, MYS, MUS MEX, FSM, PLW, PRY, RSA, TUR | 2008-2021 | ISIC Rev4  Households | Country reporting, IEA estimates and UNSD methodology to estimate accounts | Eurostat: <http://ec.europa.eu/eurostat/data/database> , tables env\_ac\_pefasu, env\_ac\_pefa04, env\_ac\_pefa05 | **Mature**  Based on Eurostat and IEA manuals, and UNSD conversion methodology (to be submitted to SEEA-CF TC) |
| **Economy-wide material flows** | Eurostat,  OECD,  UN Env. (and IRP) | Global | 1970-2020  Annual updates | Material groups  (no ISIC breakdown) | Country reporting and international databases from Eurostat, UN Environment, (*and OECD*\*) | UN Environment/IRP: <http://uneplive.unep.org/material>  OECD: [https://stats.oecd.org/Index.aspx?DataSetCode=MATERIAL\_RESOURCES](https://doi.org/10.1787/data-00695-en)  Eurostat: <http://ec.europa.eu/eurostat/data/database> , tables  env\_ac\_mfa, env\_ac\_mfadpo, env\_ac\_mfabi, env\_ac\_mfain, env\_ac\_rme, env\_ac\_rmefd & others for derived indicators | Production-based: Mature  Based on [UN Environment global manual](https://wedocs.unep.org/bitstream/handle/20.500.11822/36253/UNRE.pdf) (released in June 2021) and [Eurostat manual](https://ec.europa.eu/eurostat/web/products-manuals-and-guidelines/-/ks-34-00-536) (2001)  Demand-based:  Refined methodology under development  (OECD with Eurostat and UN Environment-IRP)  Eurostat estimating material foortprints for all EU countries |
| **Land (cover)** | FAO,  OECD  UNSD ARIES  (EEA, JRC) | Global  (countries, macro-regions, metropolitan areas) | 1992-2019 | Land cover classes (SEEA-CF) | ESA and Université Catholique de Louvain Geomatics – Climate Change Initiative - Land Cover (via FAO and OECD) | FAO: <http://www.fao.org/faostat/en/#home> :Land Cover Domain: <http://www.fao.org/faostat/en/#data/LC>  OECD: <http://stats.oecd.org/Index.aspx?DataSetCode=LAND_COVER>  <https://doi.org/10.1787/72a9e331-en> | Completed, not (yet) endorsed by UNCEEA  http://fenixservices.fao.org/faostat/static/documents/LC/LC\_e\_2020.pdf |
| ***Water (resources, use)*** | *Eurostat, OECD,*  *UNSD, UN Env.,*  *FAO* | *Selected countries depending on data availability (EU, OECD, other)* | *1970-2019*  *(limited availability for some variables and years)* | ISIC industries  (limited availability*)* | Country reporting: OECD/Eurostat coordinated with UNSD/ UN Environment *(+ FAO Aquastat \*\*, +UN-Habitat, WHO (wastewater))* | *..* | *(cf SEEA water, SEEA CF,and SEEA water Technical note)* |

**Table 2 other accounts**

| **Accounts** | **Agencies involved** | **Country coverage** | **Time coverage** | **Classifications used** | **Data sources** | **Available databases/datasets** | **Status of methodology (compilation, estimation)** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| ***Mineral & Energy resources - asset accounts*** | OECD | Currently covering 9 countries | 1960-2022 (availability varies) | 14 resources prioritized (same as World Bank) | Country reporting | OECD : <https://stats.oecd.org/Index.aspx?DataSetCode=NAT_RES> | OECD Green Growth Working paper (2018) |
| ***Environmentally-related tax revenue (ERTR)*** | OECD, Eurostat | Selected countries depending on data availability (EU, OECD, other) | 1994-2018 | ISIC Rev4, Households  Tax bases: energy, transport, pollution, resources.  Domains: Total, air pollution, biodiversity, climate change, ocean, etc. | Country reporting:  OECD/Eurostat | Eurostat:  <https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=env_ac_taxind2&lang=en>  OECD:  <http://stats.oecd.org/Index.aspx?DataSetCode=ERTR_ACC> | Based on Eurostat manual  and OECD methodological guidelines |
| ***Environmental Goods and Services*** | *Eurostat* | *EU countries* | *2009-2017* | Total, Ancillary, Market, non-market, own final-use  ISIC  CEPA and CReMA | Country reporting,  Eurostat | Eurostat:  <http://ec.europa.eu/eurostat/data/database> , tables  env\_ac\_egss1, env\_ac\_egss2, env\_ac\_egss3 | SEEA Central Framework  Eurostat manual  Eurostat compilation guide |
| ***Environmental protection expenditure accounts (EPEA)*** | *Eurostat* | *EU countries* | *2006-2018* | Final and intermediate consumption, GFCF, imports, output, others.  Institutional sector  ISIC for some variables  CEPA and CReMA | Country reporting,  Eurostat | Eurostat:  http://ec.europa.eu/eurostat/data/database , tables  env\_ac\_epea and sub tables | SEEA Central Framework  Eurostat manual |
| ***Environmental subsidies and similar transfers*** | *Eurostat* | *EU countries* | *No data published yet* | Institutional sector  ISIC  CEPA and CReMA | Country reporting,  Eurostat | Eurostat:  http://ec.europa.eu/eurostat/data/database , tables env\_esst\_gg, env\_esst\_ggcp  Data on potentially environmentally datamaging subsidies not published yet (pilot data collection) | SEEA Central Framework  Eurostat manual |
| ***Forest accounts*** | *Eurostat* | *EU countries* | *2012-2017 (some countries back to 1986)* |  | Country reporting,  Eurostat | Eurostat:  <http://ec.europa.eu/eurostat/data/database> , table  for\_eaf | SEEA Central Framework |
| ***Ecosystem accounts (extent, condition (for forest), and select services currently available)*** | *UNSD* | *Global* | *1992-2019* | ISIC Rev4  Households  *SEEA CF Land cover interim classification*  *IUCN Global Ecosystem Typology* | Global datasets and models | <https://seea.un.org/content/aries-for-seea> | SEEA Ecosystem Accounting  Eurostat developing guidance notes for EU reporting |

1. See, for example, [Area C Cover Note from the 15th UNCEEA](https://seea.un.org/sites/seea.un.org/files/area_c_unceea_cover_note_final2_0.pdf) [↑](#footnote-ref-2)
2. https://stats.oecd.org/Index.aspx?DataSetCode=MTE [↑](#footnote-ref-3)
3. https://stats.oecd.org/Index.aspx?DataSetCode=AIRTRANS\_CO2 [↑](#footnote-ref-4)
4. [https://wedocs.unep.org/bitstream/handle/20.500.11822/36253/UNRE.pdf](https://eur02.safelinks.protection.outlook.com/?url=https%3A%2F%2Fwedocs.unep.org%2Fbitstream%2Fhandle%2F20.500.11822%2F36253%2FUNRE.pdf&data=04%7C01%7CMyriam.LINSTER%40oecd.org%7C6dbeb83a50f14ea7db3f08d929a64a77%7Cac41c7d41f61460db0f4fc925a2b471c%7C0%7C1%7C637586616458591412%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%3D%7C1000&sdata=NP%2FaPbzhw8id3P2qa1Bvbo2lQcyOfKMD%2FlTDzXspDzQ%3D&reserved=0) [↑](#footnote-ref-5)
5. https://data.apps.fao.org/catalog/dataset/global-land-cover-share-database [↑](#footnote-ref-6)