

Committee of the Permanent Representatives
Subcommittee meeting
Nairobi, 18 April 2024
09:00 – 12:00 and 13.00 – 16:00 (GMT+3)
Hybrid meeting
Conference Room 2 (in person)
and Microsoft Teams (online)

Agenda Item 4: Briefing on the Global Environmental Data Strategy.

This background document has been developed by the Secretariat to provide an overview of UNEP's progress in developing the Global Environmental Data Strategy (GEDS), outlines the forthcoming consultation process, and seeks input from Member States to help shape future directions. As per [UNEA resolution 4/23](#) and the UNEA 4 Ministerial Declaration, UNEP has been tasked with developing the GEDS by 2025. UNEP's Chief Digital Officer is leading stakeholder consultations to develop the strategy, focusing on five key pillars: data quality, interoperability, access, governance, and capacity building.

Following the presentation, the Committee is invited to take note of the information, consider a call for interest in leading the regional consultations to further engage stakeholders, and engage in an exchange of views with Committee members and the Secretariat.

Background

The fourth session of United Nations Environmental Assembly ([UNEA-4](#)), held in March 2019, provided through its Ministerial Declaration and Resolution 4/23, a clear and strong mandate to UNEP to develop a Global Environmental Data Strategy (GEDS) by 2025 in consultation with Governments, United Nations agencies, funds and programmes, the secretariats of the multilateral environmental agreements, and international and regional scientific bodies. As part of the current UNEP Medium Term Strategy (MTS) 2022 – 2025 and the Programmes of Work (PoW) 2022 – 2023 and 2024-2025, this strategic focus enhances UNEP's efforts in climate action, nature conservation, and pollution control by ensuring that environmental assessments, monitoring, reporting and decision-making are supported by robust, accessible, and reliable data. GEDS also aligns with UNEP's emphasis on Digital Transformation, advocating for advancements in big data analytics, cloud computing, and Artificial Intelligence (AI) to bolster environmental data analysis and application.

This vision of GEDS is to enable the availability of timely and trustworthy environmental data, information, and knowledge for effective use at national, regional, and global levels as key tools for the achievement of a more sustainable world. UNEP plays a leading role in the further development and effective use of environmental data and statistics, accounting, and their analyses to inform policy-making and drive action and accountability for environmental sustainability.

Initial analysis and stakeholder consultations conducted by UNEP

UNEP has made initial investments and started various ad hoc multi-stakeholder consultation processes as core inputs to GEDS. These have generated valuable insights on user needs, existing platforms, data sources and standards. The following activities have been carried out to shape the vision of UNEP for GEDS.

Preliminary analysis

- **UNEP Roadmap on Environment Statistics, Accounting and Analysis (2021).**
This internal document aims to enhance environmental statistics and accounting to bolster the implementation of Sub-programmes on Nature, Pollution, and Climate Action, aligning with the 2030 Agenda. It also focuses on developing innovative tools for statistical analysis, fulfilling UNEP's international obligations as a Custodian Agency for various SDGs, and providing coordinated support on environmental information management to Member States and stakeholders.
- **Exploratory Analysis and Research for GEDS Conceptual Framework (2022 - 2023).**
The document outlines a comprehensive framework for the development and implementation of a Global Environmental Data Strategy (GEDS), emphasizing the urgency of coordinated action, adaptive design principles, and alignment with existing UNEP workstreams to effectively address environmental challenges. The recommendations for implementing GEDS encompass several key strategies: firstly, applying a Decentralized Autonomous Organization (DAO) mechanism to manage

and access data consistently across the organization, ensuring transparency and efficiency. Secondly, emphasizing three pillars to transform GEDS into actionable objectives: cultivating enablers to drive change and innovation, nurturing capabilities to improve data technical aspects and support decision-making, and enhancing adaptability through responsive analytics, prioritized use cases, data quality frameworks, and cohesive data architecture. The document also discusses alignment with UNEP's current workstreams, particularly supporting environmental assessments and integrating environmental data through the World Environment Situation Room (WESR).

- **Inventory of UNEP data platforms and APIs (May 2023).** The inventory evaluated 41 environmental data platforms managed by UNEP, of which 28 APIs were developed in-house. The evaluation focused on the technical aspects of the platforms and the underlying data.
- **Preliminary mapping of Environmental Data Standards (July 2023).** Given the importance of seamless integration and analysis of data from diverse sources, UNEP undertook a preliminary mapping of existing environmental data standards. This exercise revealed the existence of national, regional, and global environmental data standards, along with several thematic data standards. The most common type of standards are domain-specific and exist at different levels of implementation maturity. The existing thematic environmental data standards and their respective communities, custodians, and conventions can serve as integral components in establishing specifications and requirements for the GEDS.
- **Survey of environmental data consumers and producers across UNEP (November 2023).** The findings, based on a survey of 75 respondents representing a diverse range of environmental experts and data scientists within UNEP as well as a combination of data producers and consumers underscores a range of challenges such as inconsistent access to national environmental data, varied processes for validating external data, and limited availability of relevant data for in-country engagements. Recommendations include prioritizing the development of metadata standards, ensuring data quality control, fostering interoperability via APIs, establishing an authoritative environmental data catalogue, and implementing tailored capacity-building programs focused on digital technologies.
- **External environmental data platforms inventory (2023 – ongoing).** UNEP conducted an inventory of publicly available environmental data sources and platforms. As of February 2024, in a review of 428 environmental data platforms, it was found that 373 align with the three Medium-Term Strategy (MTS) Pillars, while 55 others offer data indirectly linked to the environment, potentially useful for future analysis such as humanitarian or socio-economic data. These platforms mostly contribute to multiple pillars, with a focus on nature action followed by climate action. However, many of these platforms serve as data repositories lacking analytical interfaces. Prominent topics covered include climate change, land cover/use, and water, with 142 platforms offering APIs and 115 recognized as best practice.
- **Development of use cases for WESR (2023 - ongoing).** UNEP has co-identified several priority use cases for the environmental data contained within the World Environment Situation Room based on consultations with end users. One of the use cases that will benefit greatly from GEDS is the development of environmental data

dashboards to support UN Common Country Analysis (CCA). It will provide UN Country Teams with a snapshot of the environmental performance of each country according to a suite of predefined environmental indicators. This involves providing the environmental data as well as the analytics and visualizations to help prioritize environmental actions and shape programming on the ground. The design of the environmental dashboards is based on a sustained discussion with UN Resident Coordinators and UN Country Teams over the past year on their data needs.

Preliminary stakeholder consultations

- **UNEP's contribution to the UN Round Table on Digital Public Goods (March 2020).** As a follow-up to the UN High-level Panel on Digital Cooperation, the UN Technology Envoy established a series of Round Tables, including one focusing on digital public goods. UNEP was requested to contribute a policy paper on environmental data entitled "[Environmental Data as Digital Public Goods within a Digital Ecosystem for the Planet](#)". The input was developed through a series of multi-stakeholder consultations with environmental data experts. The policy input provided a range of ideas to the Round Table including ways to operationalize the Global Environmental Data Strategy.
- **Coalition for Digital Environmental Sustainability (CODES) (June 2022).** UNEP together with UNDP, ITU, the International Science Council, Future Earth, the German Environment Agency and the Kenyan Ministry of Environment and Forestry act as co-champions for CODES – a platform for convening stakeholders from the environmental and digital transformation domains to agree on key priorities for digital environmental sustainability. A global environmental data strategy was identified as one of nine global priorities within the [CODES Action Plan for a Sustainable Planet in the Digital Age](#) – launched during the Stockholm+50 international conference. The CODES platform can be used to continue multi-stakeholder consultations across the membership of 1300 stakeholders.
- **Consultation with MEA secretariat data experts participating in the InforMEA initiative (June 2023).** An Extraordinary [Working Group Meeting](#) for InforMEA was held in-person on 20-22 June 2023 in Montreux, Switzerland on the topic of data and digital transformation. The meeting discussed a number of priority workstreams linked to data inter-operability ranging from semantic indexing to piloting UN document standards. It also discussed use cases for the applications of large language models and AI to national reporting to various conventions. Participants included data experts from the Convention on Biological Diversity, the Minamata Convention on Mercury, the Basel, Rotterdam and Stockholm Conventions, the International Treaty on Plant Genetic Resources, the Ramsar Convention on Wetlands, the Convention to Combat Desertification, the UN Framework Convention on Climate Change, the World Heritage Convention, the Multilateral Fund for the Implementation of the Montreal Protocol as well as participants from the IPCC and IPBES.
- **UN Science Policy Business Forum Consultations on GEDS (September 2023).** UNEP organised consultations on GEDS during the High Level Expert Group "*Towards a Big Data Revolution for the Planet: Scoping an Integrated, Tech-Empowered Cross-Sectoral Approach to Data Optimization, Governance, and Access to Meet Multilateral Environmental Goals*" held from 11 - 13 September in Vienna. Over 150 participants

joined the meeting including from academia, private sector, member states, civil society, citizen science groups, as well as UN agencies. The meeting participants jointly identified a number of priority areas for GEDS including standards and governance processes linked to data inter-operability, quality, discoverability, accessibility, and equity. The need for UNEP to perform a vetting and authentication function for the best available environmental datasets was also highlighted.

- **COP28 UNEP Digital Day Pavilion and Stakeholder Feedback (December 2023).** UNEP organized five sessions during COP 28, addressing themes ranging from national digital strategies to advanced AI applications. UNEP also participated in the data-focused sessions, organised by Estonia and the European Commission). Two panel discussions *World Environment Situation Room: The Way Forward* and *Data For the Environment Alliance: DEAL for Informed Decisions*, organised by the Ministry of Climate of Estonia, focused on how to reach the full potential of the World Environment Situation Room and attract a wide range of data, information, and knowledge on the environment. The discussions emphasized the importance of data in informed decision-making for environmental sustainability, focusing on access and affordability. The session by the European Commission highlighted the need for merging environmental with development data, as well as capacity building. The Digital Day Pavilion also featured prototypes of various digital tools with opportunities for attendee feedback.
- **UNEA6 Digital Accelerator Lab and Stakeholder Feedback (February 2024).** UNEP organized an exhibition space called the Digital Accelerator Lab during UNEA 6. It provided a platform for various teams within UNEP to showcase their digital tools, solutions, and prototypes while actively engaging with users to gather feedback. The Digital Transformation team curated and showcased a diverse array of tools, including 11 prototypes, 9 solutions, and 14 reports and resources and TED-style talks. Through the exhibition, UNEP aimed to highlight the role of data in environmental action and policymaking, aligning with the objectives of the GEDS to enhance the effective environmental data management and use.

Environmental Data Governance Gaps Identified

Based on the preliminary consultations conducted with various stakeholders as outlined above, UNEP identified a range of key challenges and considerations linked to the global governance of environmental data:

1. **Core data governance principles:** A number of important data governance principles have been recognized by different organizations that influence environmental data. These include [the FAIR principles](#) (Findable, Accessible, Interoperable, Reusable), [TRUST principles](#) (Transparency, Responsibility, User focus, Sustainability, and Technology) and [CARE principles](#) (Collective benefit, Authority to control, Responsibility, and Ethics) for indigenous data governance. All three need to be considered in the development of GEDS, especially because different international data standards attempt to implement these principles in a range of different ways which are not always interoperable or consistent.

2. **Diverse sources of environmental data:** While UN member states only recognize official national data as formal sources of environmental data for monitoring and reporting purposes, many stakeholders in the private sector, civil society and academia use a range of environmental data sources. These range from official national data to earth observation data, to sensor data, academic data, private sector data, crowdsourced data, community data, indigenous data, and citizen science data. These data sources also span across the local, national, regional and global levels. The GEDS should serve as a platform facilitating the consensus-building process for upscaling the local data to global level, while also enabling the downscaling of global-scale data to address national needs and fill data gaps effectively.

3. **Fragmentation and awareness of existing environmental data standards and licences:** A number of different organizations issue international standards and frameworks that are relevant for environmental data. These include ISO, OGC, ITU, STAC, IETF, W3C, CKAN, DCAT, SMDX, JSON-stat, among others. However, these standards are inconsistently applied to environmental data – and there is no organization that crosswalks these standards to ensure full coverage and interoperability across all environmental domains. Each environmental domain is led by a unique constellation of stakeholders and processes with different levels of application, coverage and maturity. Any global environmental data strategy will need to reference the existing core data standards, identify custodians and governance processes as well as key gaps. In addition, it can be difficult for environmental actors to understand the relevant standards to apply for a given set of environmental data, suggesting a lack of awareness of existing standards and frameworks. The same also applies to data licencing frameworks – the pros and cons of different licence regimes are often difficult to understand. The wrong licence decision can reduce the availability of environmental data for further analysis and ingestion by AI.

4. **Lack of Consistent Governance and Compliance Processes:** The absence of consistent governance and compliance processes for collecting, processing, reporting, classifying, and securing environmental data critically undermines the achievement of data consistency, compatibility, quality, interoperability, and security. This deficiency not only hampers the ability to uniformly assess and address environmental challenges worldwide but also affects the completeness and security of reporting mechanisms.

5. **Inadequate Data Access and Capacity Limitations:** The lack of access to comprehensive environmental data severely undermines efforts to combat environmental degradation, particularly in the world's most vulnerable regions. These challenges encompass physical access issues, such as insufficient infrastructure and connectivity for certain countries and stakeholders, as well as barriers imposed by paywalls preventing access to crucial datasets. Moreover, inequality in data distribution further worsens the problem, arising from disparities in data collection efforts influenced by various limitations. For instance, there is a noticeable discrepancy in the availability of datasets between the global North and South, reflecting underlying inequalities in resource allocation. Capacity limitations exacerbate these challenges, as limited technical expertise and resources hinder the

effective collection, processing, and dissemination of environmental data in regions with fewer resources.

6. **Limited Data Interoperability:** A critical barrier to effective environmental action is the difficulty in merging and utilizing data from disparate sources due to varying formats and protocols. This lack of data interoperability, infrequent and inconsistent application of data standards hinders collaborative efforts and slows progress.
7. **Limited data discoverability and machine readability:** One of the key challenges relates to inconsistent use of metadata to describe environmental datasets and to the lack of approved international semantic standards for describing different domains of environmental data. In many cases, metadata is not developed in a machine-readable format which hinders discovery by search engines and AI.
8. **Difficult to assess quality, provenance, and authenticity of data:** Significant issues persist in easily assessing data quality, including accuracy, timeliness, bias, errors and relevancy. This is compounded by the fact that there is a lack of international processes and frameworks to vet and authenticate the best available sources of environmental data together with their provenance. These tend to undermine trust in environmental data and its utility for policy-making and research.
9. **Lack of data standards adopted by MEAs:** Only few of the MEAs (e.g. Minamata Convention and Convention on Biodiversity) have adopted robust data standards and digital reporting platforms to help member state harmonize reporting in a manner where reporting data can be aggregated from the national to the global level. Many national reporting process are still conducted using PDF documents which restrict the accessibility of reporting data and prevent easy aggregation and analysis by the convention secretariat.
10. **Lack of standards for data readiness for AI, digital twins, and digital product passports:** There is a lack of standards on environmental data for readiness for AI and digital twin applications as well as digital product passports. This includes basic standards on machine readability and licencing regimes for AI applications.

UNEP's Vision for a GEDS

Based on the initial multi-stakeholder consultations conducted to date, UNEP is proposing a vision of the five key pillars for the Global Environmental Data Strategy that require further consultation and co-design. Once agreed upon by the CPR, they will be further elaborated through a series of regional and thematic multi-stakeholder consultations to be conducted in 2025. The pillars include:

1. **Improve Data Governance:** Advance comprehensive governance models that address ethical, effective, and sustainable methodologies for environmental data management practices. These include environmental data applications for the FAIR, TRUST and CARE principles.
2. **Promote Inclusive Data Access and Affordability:** Detail action items and policy recommendations to improve open access to environmental data and address challenges related to data affordability.

3. **Promote Data Interoperability:** Identify existing global and thematic data standards and their respective custodians that represent best international practice. Propose how these existing standards can be federated into a global environmental data framework, enabling stakeholders to efficiently share and integrate environmental data.
4. **Enhance Data Quality and Authentication:** Discuss frameworks and standards to establish consensus on data quality definitions, and mechanisms for accurate identification and classification of environmental data quality levels.
5. **Facilitate Capacity Building:** Support member states requiring assistance in acquiring the necessary knowledge and skills for effective environmental data governance. Foster the exchange of best practices and innovative solutions to enhance environmental data collection, processing, and dissemination. Strengthen global initiatives for more efficient environmental data management, with a focus on ensuring inclusive engagement of stakeholders from Global South countries.

Proposed Outputs of the GEDS

UNEP presents the four key outcomes of the GEDS as follows:

1. Comprehensive **summary of findings, recommendations and financing requirements** pertaining to the five pillars outlined above.
2. **Operationalizing GEDS by relevant stakeholders.** A combination of incentives, financing and regulations will be needed for member states and other relevant actors to take further action to operationalize GEDS. Efforts could include establishing a clearing house for environmental data governance or advocating for a global framework for data exchange, thereby fostering better trust, transparency, and accountability in environmental data management. Dedicated GEDS implementation strategies will be needed for a number of key international organizations including international standards bodies (e.g. ITU, OGC, ISO, IETF, W3C and others), multilateral environmental agreements, and international funding bodies such as the GEF, GCF, and World Bank.
3. **Identification and adoption of best practices in global and thematic environmental data standards that enable AI-ready environmental data and machine-readable data formats.** This will help to facilitate integrated analysis, enhance monitoring and reporting capabilities, and promote transparency and accountability. These efforts will contribute to building trust through improved chain of custody and data provenance. The framework will also support the ongoing efforts, such as Digital Twin.
4. **World Environmental Situation Room as a flagship implementation of GEDS.** The WESR, envisioned as a federated environmental data platform, is currently undergoing a redesign phase to enhance user-centricity and technical robustness. It aims to federate all major environmental data resources and platforms onto a unified data architecture, enabling seamless data discovery, visualization, and analysis based on GEDS framework. The WESR's architecture is being developed concurrently with the identification and prototyping of use cases, ensuring tangible impacts on national policies, financial decisions, supply chains, and consumer behaviours.

Furthermore, rigorous testing and implementation of data policies, standards, governance, and interoperability frameworks will be conducted within the WESR.

Next Steps

The guidance and feedback received through this briefing will shape the vision for the upcoming multi-stakeholder consultation sessions. These thematic and regional consultations will take place till Q1 2025. In parallel with the consultation, UNEP is developing 2 - 3 use cases with interoperable data that will test the GEDS frameworks for real-life applications.

Recommendations/relevance for the CPR

The Committee is invited to provide feedback on the content and vision of the Global Environmental Data Strategy. We welcome expressions of interest from member states to host national, regional, or thematic consultations tailored to various stakeholder groups. We invite member states to participate in consultations individually or alongside a subset of their counterparts.

Delegates interested in learning more about the process and hosting the consultations are invited to contact the Office of the Chief Digital Officer at unep-chiefdigital@un.org.