Committee of the Permanent Representatives
Subcommittee meeting
Nairobi, 19 November 2024
13.00 – 16:00 (GMT+3)
Hybrid meeting
Conference Room 4 (in person)
and Microsoft Teams (online)

Agenda item 3: Briefing on the Global Environmental Data Strategy.

This background document has been developed by the Secretariat to update the Committee on the Global Environment Data Strategy (GEDS). It is designed to support the upcoming multi-stakeholder consultations on GEDS due to take place between September 2024 and March 2025. It provides relevant background information for participants, outlining:

- UNEP's mandate to develop GEDS
- Data governance gaps and considerations that GEDS will need to address
- UNEP's framework for GEDS development and planned outputs
- The structure of the multi-stakeholder consultations and key questions that will be addressed

Following the presentation, the Committee is invited to take note of the briefing and engage in an exchange of views with Committee members and the Secretariat.

UNEP's mandate to develop GEDS

The world today faces three planetary environmental crises of climate change, pollution, and nature and biodiversity loss. Innovative digital advances, driven by diverse sources of data, are emerging as powerful tools to address these unprecedented challenges. Yet, the world still faces major challenges in using environmental data for decision-making due to the fragmentation of the environmental data ecosystem, problems merging and using data that are not interoperable, and physical and financial barriers to accessing needed data.

To address these challenges, the United Nations Environmental Assembly, at its fourth session held in March 2019, adopted resolution 4/23 entitled "Keeping the world environment under review: enhancing the United Nations Environment Programme science-policy interface and endorsement of the Global Environment Outlook". It requested the Executive Director of UNEP to develop and prioritize a long-term data strategy within the programme of work and budget, "in consultation with Governments, United Nations agencies, funds and programmes, the secretariats of the multilateral environmental agreements (MEAs), and international and regional scientific bodies, with particular attention to regular regional and global analysis of the state of and trends in environmental parameters as a basis for, inter alia, the future Global Environment Outlook process". The Ministerial declaration adopted by the United Nations Environment Assembly at its fourth session stated that the world's ministers of environment will "support the United Nations Environment Programme in developing a global environmental data strategy by 2025 in cooperation with other relevant United Nations bodies". The overarching goal of the Global Environmental Data Strategy (GEDS) is to ensure that timely and trustworthy environmental data, information and knowledge are available for use at national, regional and global levels to achieve a more sustainable world.

The development of GEDS is aligned with UNEP's broader activities promoting digital transformation, which encompasses action to advance big data analytics, cloud computing and artificial intelligence (AI) in order to bolster environmental data analysis and application. These strategic priorities are likewise taken up in the UNEP Medium Term Strategy (MTS) for the period 2022–2025 and the Programme of Work (PoW) for the period 2022–2023 – which was extended for another two years to 2025, which aim to ensure that environmental assessments, monitoring, reporting and decision-making are supported by robust, accessible and reliable data.

Challenges and gaps in environmental data governance

Since 2019, UNEP has invested in a series of reports and undertaken ad hoc multi-stakeholder consultation as inputs to the development of the GEDS (see Annex to the present document for more details). These activities have generated insights into user needs, existing platforms, data sources and standards. They point to 10 key challenges linked to the global governance of environmental data, with implications for the design of GEDS:

1. **Core data governance principles:** Several important data governance principles influence environmental data, including the FAIR principles, TRUST principles and CARE principles. All three need to be considered in developing GEDS, especially because different international data standards implement these principles in ways that are not always interoperable or consistent.

2. **Diverse sources of environmental data:** While governments only recognize official 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, spanning local to global levels. These sources include earth observation, sensors, academic research, the private sector, crowdsourcing, communities, indigenous groups and citizen science. GEDS

could facilitate a consensus-building process enabling upscaling of local data to the global level and downscaling of global data to address national needs and data gaps.

3. **Fragmentated environmental data standards and licences:** There exist multiple international standards and frameworks for environmental data, including International Organization for Standardization (ISO), Open Geospatial Consortium (OGC), International Telecommunication Union (ITU), Spatio Temporal Asset Catalogs (STAC), and more. However, awareness of these different standards is often lacking, and they are inconsistently applied. Each environmental domain is led by different stakeholders and processes, and there is no organization or mechanism ensuring interoperability across domains. GEDS will need to reference the existing data standards, identifying custodians, governance processes and key gaps. The same challenges exist in relation to data licencing frameworks. The pros and cons of different licence regimes are often difficult to understand and choosing the wrong licence 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 data consistency, compatibility, quality, interoperability and security. This deficiency makes it hard to assess and address environmental challenges uniformly across the world. It also affects the completeness and security of reporting mechanisms.

5. **Inadequate data access and capacity:** Lack of access to 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. There is also a clear disparity in the availability of data between the Global North and South, reflecting underlying inequalities in resources and capacities for collecting, processing and disseminating environmental data.

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, together with infrequent and inconsistent application of data standards hinders collaborative efforts.

7. **Limited data discoverability and machine readability:** One key challenge concerns the inconsistent use of metadata to describe environmental datasets and 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. **Difficulties assessing data quality and provenance:** Significant issues persist in assessing data quality, including accuracy, timeliness, bias, errors and relevance. There is also a lack of international processes and frameworks to vet and authenticate the best available sources of environmental data and their provenance. This undermines trust in environmental data and its utility for policymaking and research.

9. **Lack of data standards adopted by MEAs:** Only a few MEAs have adopted data standards and digital reporting platforms to help Member State harmonize reporting such that reported data can be aggregated from national to global level. Many national reporting processes still use PDF documents, which restrict accessibility and prevent easy aggregation and analysis.

10. **Absence 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. This includes basic standards on machine readability and licencing regimes for AI applications.

GEDS framework and key outputs

Based on the initial research and consultations, and the data gaps and challenges identified, UNEP proposes a framework for the Global Environmental Data Strategy with five key pillars:

I. **Improving data governance:** Advancing comprehensive governance models that provide ethical, effective and sustainable methodologies for environmental data management practices. These include environmental data applications for the FAIR, TRUST and CARE principles.

II. **Promoting inclusive data access and affordability:** Detailing action items and policy recommendations to improve open access to environmental data and address challenges related to data affordability.

III. **Promoting data interoperability:** Identifying existing global and thematic data standards and custodians that represent best international practice. Proposing how these existing standards can be federated into a global environmental data framework, enabling stakeholders to efficiently share and integrate environmental data.

IV. **Enhancing data quality and provenance:** Discussing frameworks and standards to establish consensus on data quality definitions, and mechanisms for accurately identifying and classifying environmental data quality levels.

V. **Facilitating capacity-building:** Supporting Member States in acquiring the necessary knowledge and skills for effective environmental data collection, governance and use. Fostering the exchange of best practices and innovative solutions to enhance environmental data collection, processing, and dissemination. Strengthening global initiatives for more efficient environmental data management, with a focus on ensuring inclusive engagement of stakeholders from Global South countries.

Building on this framework, UNEP currently foresees four core outcomes of the GEDS process:

- First, **the Global Environmental Data Strategy document**, comprehensively setting out the findings, best practices and recommendations pertaining to the five pillars, based on the consultations, research and UNEP expertise.

- Second, **Member States may choose to operationalize implementation mechanisms for GEDS**. Implementing GEDS will require incentives, financing and regulations. This could, for example, include creating a clearing house for environmental data governance or advocating for a global framework for data exchange.

- Third, redesigning **UNEP's World Environment Situation Room as a flagship implementation of GEDS**. WESR aims to federate major environmental data sources and platforms onto a

unified platform, enabling seamless data discovery, visualization, and analysis based on GEDS. It is currently being redesigned to ensure user-centricity and technical robustness.

- Forth, a **pilot implementation of GEDS principles and best practices** in the context of a set of **data-driven digital solutions** identified by Member States and fostering cross-border collaboration.

Design of the consultations and key questions

UNEP's consultations on GEDS aim to ensure diverse and detailed inputs with the engagement of Member States and a range of other stakeholders, including relevant UN agencies and other international bodies, the academic community, private sector entities, non-governmental organizations, including the major groups and stakeholders' organisations accredited to UNEP and other experts.

Most of the time of the **Member States consultations** will be spent in breakout sessions to best allow all delegates to contribute to identifying priorities, potential technical design approaches and areas where further support or multilateral action is needed to allow Member States to best benefit from the future GEDS.

Consultations with the major groups and other stakeholders such as UN agencies, the academic community and private sector organizations will be organized by UNEP, primarily via online meetings.

In addition, an **online survey** is available for more comprehensive, written input.

The consultation sessions will all comprise a brief 10–15-minute presentation of the GEDS framework and current progress, followed by a detailed discussion of each pillar separately, focusing on the preliminary questions outlined below.

To ensure that the consultations are productive, participants are encouraged to prepare in advance by reflecting on the following proposed guiding questions.

Pillar 1: Quality and provenance

1.1 Frameworks and standards for defining and classifying data quality levels. What are the best-established standards for data quality, from your perspective?

1.2 What are the core issues affecting the quality and provenance of environmental data?

1.3 What mechanisms should we put in place to improve data quality? (e.g. create a global clearing house for data quality; implement regular data quality assessments)

1.4 What other organizations or experts are leaders in the field that you would recommend consulting? Please specify the key entities and individuals.

Pillar 2: Data governance

2.1 What key standards and best practices are influential in shaping current data governance models from your perspective?

2.2 What are the main challenges of current environmental data governance practices from your perspective?

2.3 What are the mechanisms we should put in place to improve data governance? (e.g. harmonized data governance frameworks; facilitating cross-border and cross-sector data sharing agreements)

2.4 What other organizations or experts in data governance would you recommend that we consult?

Pillar 3: Data interoperability

3.1 What key standards underpin data interoperability, and how do they support or hinder data sharing across platforms?

3.2 Should the global community agree on a limited number of data interoperability standards? If so, how many?

3.3 What are the primary challenges to environmental data interoperability from your perspective?

3.4 What mechanisms do you think can enhance data interoperability?

3.5 Who are the main actors in your country facilitating the integration of global and thematic environmental data standards, and what are some key initiatives in this area? Who else should we consult with?

Pillar 4: Data access and affordability

4.1 What are the key standards driving data access and affordability?

4.2 What obstacles currently hinder inclusive access to environmental data?

4.3 What mechanisms could help to overcome barriers to data access and affordability? Do we need an environmental data utility? How do we operationalize it?

4.4 Can you identify leading initiatives or projects that are making environmental data more accessible and affordable?

4.5 What other organizations or experts on data access and affordability would you recommend that we consult with?

Pillar 5: Capacity-building

5.1 What are the tech transfer needs to support the development of national environmental data sets?

5.2 What gaps in skills or knowledge are impeding effective environmental data governance from your perspective?

5.3 What mechanisms can facilitate capacity-building at a global scale?

5.4 Who in your opinion are exemplars for capacity-building in environmental data governance? Who would you recommend that we consult with?

Annex: Initial analysis and stakeholder consultations 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 framework 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.

- **HLPF Consultation.** UNEP organized the first formal consultation on GEDS and WESR with member states on the margins of the 2024 High-Level Political Forum on Sustainable Development (HLPF). The meeting gave an opportunity to the member states to validate and provide feedback on current conceptual frameworks for GEDS, and identify incentives, financing mechanisms, and regulations to operationalize GEDS.