



## The World Environmental Data Organization (WEDO): A Treaty-Based Governance Framework for Global Environmental Information

Salah Al-Mahdouri✉

Senior Wildlife Management Specialist, Environment Authority, Sultanate of Oman

Article Info	ABSTRACT
<p><b>Article type:</b> Research Article</p> <p><b>Article history:</b> Received: 1 March 2026 Revised: 12 April 2026 Accepted: 12 April 2026</p> <p><b>Keywords:</b> <i>Environmental data governance, Treaty-based organization, Data certification, Indigenous data sovereignty, Interoperability</i></p>	<p>Environmental data, which span climate, biodiversity, pollution, and natural resources, are currently fragmented across thousands of incompatible repositories, governed by inconsistent standards, and denied legal recognition as tradable or financially actionable assets. No existing international institution possesses the mandate — legal, technical, or financial — to unify, certify, and govern these data at a global scale. This institutional void impedes effective climate action, undermines the credibility of corporate sustainability claims, and systematically fails to protect indigenous data sovereignty. This paper proposes the establishment of the World Environmental Data Organization (WEDO), a new intergovernmental body created by a standalone treaty. WEDO would harmonize environmental data definitions across domains, operate an open federated digital infrastructure, benchmark the governance maturity of data stewards, and enforce binding ethical data sovereignty protocols. Uniquely, it would also certify environmental data as a tradable asset integrated with ISO standards. Headquartered in Muscat, the Sultanate of Oman, and capitalized through a public-private funding alliance, WEDO addresses the constitutional gap that perpetuates fragmentation in global environmental data governance.</p>

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## INTRODUCTION

Environmental data are foundational to multilateral environmental agreements, national sustainability strategies, and the rapidly expanding market for green financial products. The Paris Agreement requires transparent reporting of greenhouse gas inventories; the Kunming-Montreal Global Biodiversity Framework mandates spatially explicit indicators of species protection; and regulatory regimes in Europe, North America, and Asia are introducing mandatory disclosure standards for environmental, social and governance (ESG) performance. Nevertheless, the data underpinning these frameworks remain fragmented, frequently unverifiable, and subject to no single governing authority.

More than 500 multilateral environmental agreements currently exist, each operating with distinct, often incompatible, reporting formats (Mitchell, 2021). Over 20,000 environmental non-governmental organizations operate globally (International Directory of Environment Organizations, 1996), applying heterogeneous data-collection protocols. Earth-observation satellites, Internet-of-Things sensors, citizen-science platforms, and corporate ESG rating agencies collectively generate petabytes of data annually, yet these streams are rarely

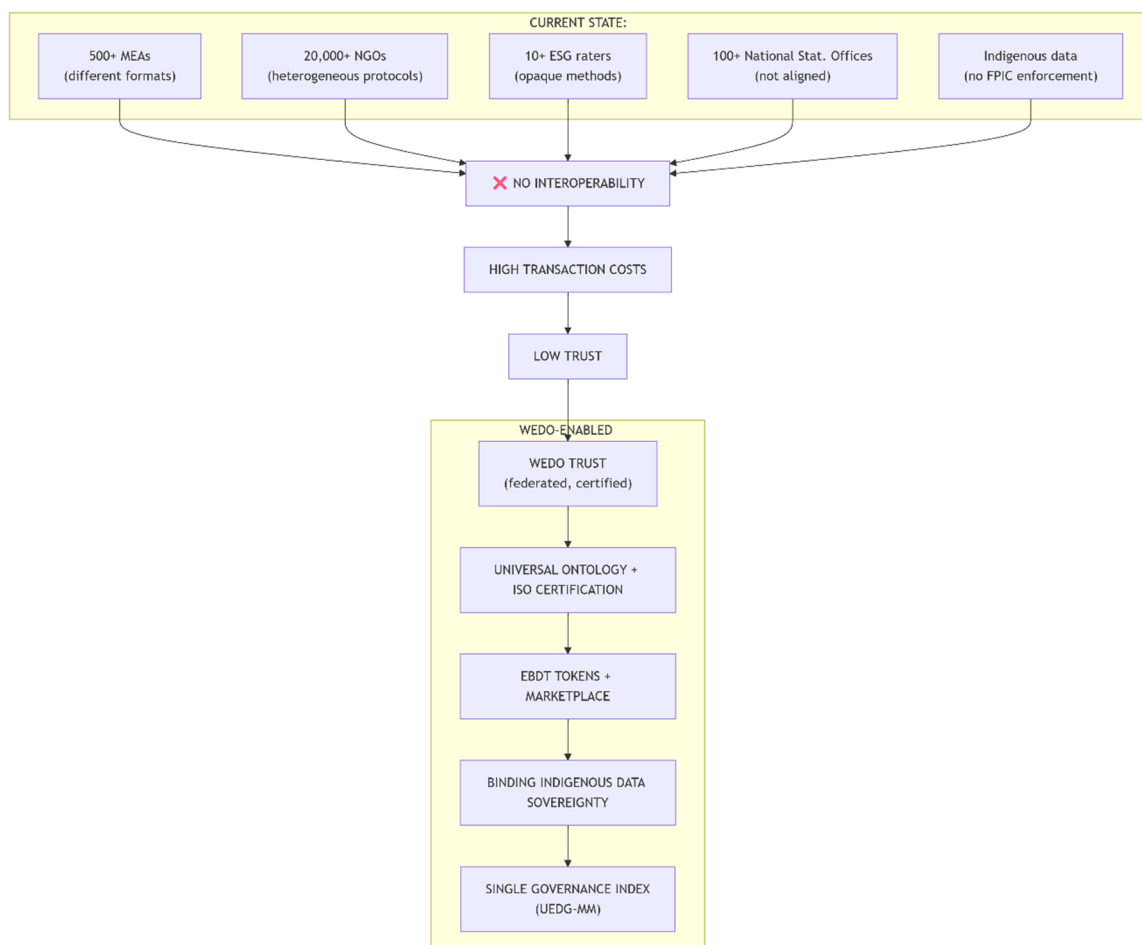
\*Corresponding Author Email: [salah.almahdhori@ea.gov.om](mailto:salah.almahdhori@ea.gov.om)

interoperable. This fragmentation elevates transaction costs, erodes trust among stakeholders, and paralyzes cross-jurisdictional environmental action (Fig. 1).

A biodiversity credit traded in one jurisdiction cannot be seamlessly verified in another; a corporate emissions claim may rely on proprietary models that are never independently audited; and indigenous communities frequently experience extraction of traditional knowledge without free, prior and informed consent (FPIC).

No existing international organization has the mandate, legal authority, or infrastructure to resolve this problem. The World Meteorological Organization (WMO) coordinates weather and climate data exchange among national meteorological services but does not cover biodiversity, pollution, ESG ratings, or indigenous data. The Intergovernmental Panel on Climate Change (IPCC) assesses scientific literature but does not certify raw data. The International Sustainability Standards Board (ISSB) provides corporate disclosure frameworks but lacks enforcement powers and does not handle primary environmental observations. The Global Environment Facility (GEF) and the Green Climate Fund (GCF) finance projects but rely on reporting that is often inconsistent and incomplete (Independent Evaluation Unit, 2025).

This paper presents the institutional design of the World Environmental Data Organization (WEDO), a treaty-based body conceived to fill this governance gap. It describes WEDO's legal foundation, its integrated certification monopoly under ISO standards, its federated technical architecture, and an innovative funding model linking mandatory contributions from polluting industries and the financial sector in the host state, the Sultanate of Oman. WEDO does not



**Fig. 1.** Current Fragmentation vs. WEDO-Enabled Integration

duplicate existing organizations; rather, it interconnects them, providing the constitutional and digital infrastructure to transform fragmented data silos into a trusted planetary information common.

#### *Legal Foundation: The WEDO Convention*

WEDO would be established by a dedicated convention—the Convention on the Governance of Global Environmental Data (hereafter the “WEDO Convention”)—adopted at a diplomatic conference and entering into force following the deposit of at least 25 instruments of ratification. The treaty would grant WEDO juridical personality, privileges, and immunities equivalent to those of other specialized UN organizations, along with a mandate to issue binding technical regulations for the exchange, certification, and ethical handling of environmental data.

The treaty structure parallels that of the WMO, which successfully harmonized global meteorological practices through legally binding technical regulations while respecting national sovereignty over data generated within a state’s territory (World Meteorological Organization, 2023). WEDO’s scope, however, is substantially broader: it encompasses all environmental domains (climate, biodiversity, land, water, oceans, pollution, geology) and all environment-correlated data streams, including ESG ratings, corporate sustainability reports, environmental impact assessments, health-environment nexus data, and financial flows labelled as “green” or “sustainable”. By incorporating the classification systems of the International Energy Agency, the System of National Accounts, and the ISSB, WEDO would provide a universal, machine-readable ontology for environmental information.

#### *Governance Architecture*

WEDO’s governance structure comprises the following bodies:

- **World Environmental Data Assembly (WEDA):** The plenary body of all state parties and accredited non-state observers.
- **Executive Council:** A 36-member council balancing geographic and stakeholder representation.
- **Scientific and Technical Commission (STC):** An independent body providing scientific and technical guidance.
- **Ethics and Equity Board:** A body with binding powers over indigenous data sovereignty.
- **Secretariat:** The administrative arm of the organization.
- **Ecosystem Architect:** An integrative role ensuring that all 27 operational functions (from data collection and validation to encryption and trading) operate as a unified system rather than as isolated functions.

#### *Certification Monopoly: Environmental Data as a Tradable Asset*

A critical deficiency in the current system is the absence of credible, universal certification for environmental data. Financial markets and compliance regimes increasingly demand verifiable data, yet the market for environmental information remains fragmented among proprietary rating agencies using opaque methodologies (ERM, 2025). WEDO addresses this by becoming the sole global scheme owner for environmental data certification, accredited under ISO/IEC 17065 (product certification) and ISO/IEC 17029 (validation and verification of environmental information statements) (International Organization for Standardization, 2012). This monopoly is not a commercial privilege but a legal mandate embedded in the WEDO Convention, justified by the need for a single, neutral, publicly accountable arbiter of data quality in a market rife with conflicting private standards. The certification process integrates multiple ISO standards: ISO 14065:2020 (bodies validating environmental information) (International Organization for Standardization, 2020), ISO 14019-1:2026 (sustainability information verification) (International Organization for Standardization, 2026), and ISO 14066:2023 (competence of

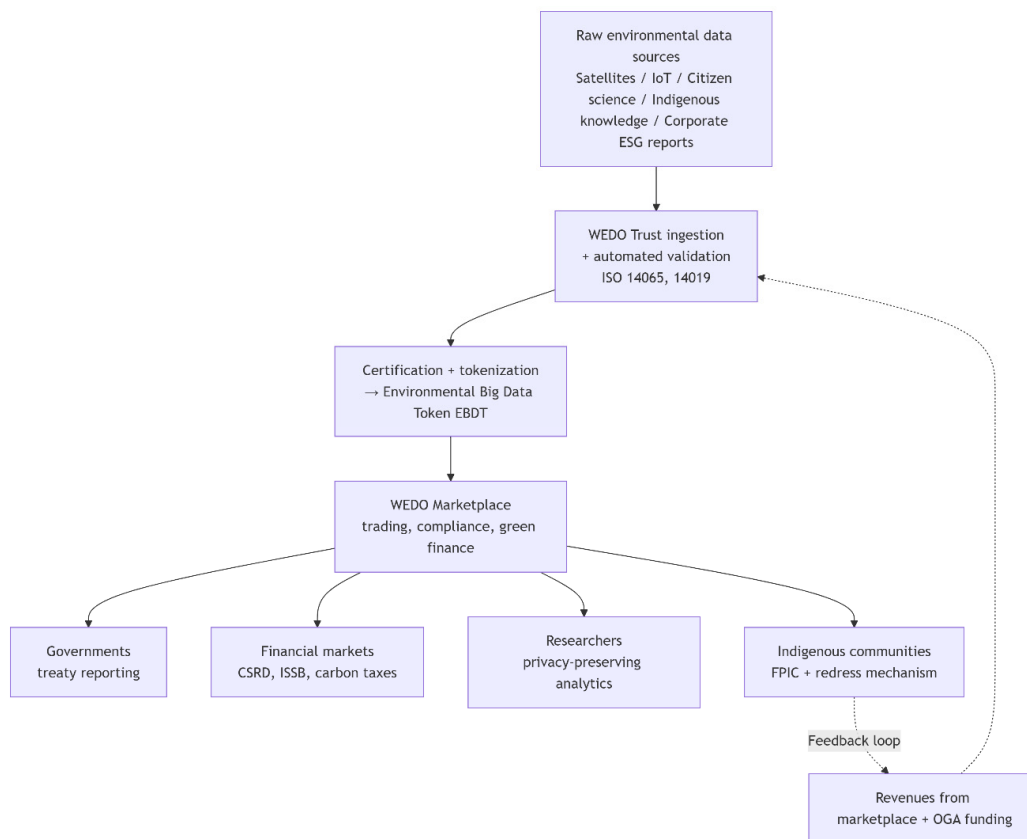


Fig. 2. WEDO Data & Value Flow Model

validation teams). Data that successfully passes WEDO’s validation and verification pipeline would be tokenized as an Environmental Big Data Token (EBDT)—a cryptographically secured digital asset whose provenance, quality score, and chain of custody are immutably recorded on a WEDO-operated blockchain. These tokens could be traded on the WEDO Environmental Data Marketplace, held on corporate balance sheets as certified green assets, and used to fulfil regulatory disclosure obligations under the EU’s Corporate Sustainability Reporting Directive (CSRD), the ISSB standards, and emerging national carbon-tax regimes.

Because WEDO certification would be a prerequisite for any environmental data to enter this marketplace—and because financial instruments such as WEDO Green Sukuk, carbon offsets administered by the host country’s funding alliance, and compliance credits could not be settled without it—certification would become effectively compulsory for entities wishing to participate in the global environmental data economy. This self-reinforcing architecture addresses the free-rider problem that has historically undermined voluntary data-sharing initiatives. Figure 2 depicts the WEDO data and value flow model. Environmental data from diverse sources enter the WEDO Trust, undergo automated validation and ISO-based certification, are tokenized as EBDTs, and become tradable, compliance-ready assets. The model preserves indigenous sovereignty through embedded FPIC and redress mechanisms, while marketplace and OGA funding sustain operations.

#### *Technical Infrastructure: The WEDO Trust*

The operational core of WEDO is the WEDO Trust, a federated, cloud-based data platform built on the architecture of the International Data Spaces Association (IDSA) Reference

Architecture Model (International Data Spaces Association, 2022), which ensures data sovereignty while enabling interoperable exchange. The Trust would ingest data from existing major repositories—including the Global Biodiversity Information Facility (GBIF), the Map of Life, CIESIN’s Compendium of Environmental Sustainability Indicators (CIESIN, 2023), the World Bank Databank, the Copernicus programme, and the WMO’s Global Data-Processing and Forecasting System—not by replacing them but by connecting them through a certified WEDO Transfer Protocol (WTP). Data entering the Trust would be automatically validated against quality rules, classified according to the universal ontology, and assigned a machine-readable WEDO Domain Code.

A privacy-preserving analytics environment would allow researchers to run cross-domain models without moving raw data, addressing the tension between openness and the protection of sensitive information (e.g., locations of endangered species or indigenous-owned data). The platform is designed to comply fully with the EU’s General Data Protection Regulation (GDPR), the CARE Principles for Indigenous Data Governance (Carroll et al., 2020), and the IDSA Rulebook’s usage-control framework.

#### *Funding Model: The Oman Green Alliance*

Financial sustainability is a persistent obstacle for new international organizations. WEDO overcomes this through a novel host-country model. The Sultanate of Oman, is able to host WEDO in many locations equipped with the necessary infrastructure such as the Knowledge Oasis Muscat Special Economic Zone, or in the Artificial Intelligence Special Zone. Capitalizing the organization could be via the Oman Green Alliance Fund (OGAF), by establishing a closed joint-stock company operating as a national funding and stewardship vehicle. The OGAF unifies three funding pillars:

**1. Mandatory Contribution Mandate (MCM):** Imposed by Oman’s Environment Authority on all licensed polluting industries (oil and gas, petrochemicals, mining, heavy manufacturing, etc.). Contributions are calculated as an annual payment linked to a license-tier multiplier and a carbon-price floor of OMR 20 per ton (approximately USD 52).

**2. Financial Sector Stewardship Program:** Mandated by the Central Bank of Oman and the Financial Services Authority, requiring banks and investment firms to allocate a small, non-interest-bearing percentage of their sustainable portfolios to WEDO (Central Bank of Oman, 2024; Financial Services Authority, 2025).

**3. Capital-markets instruments:** WEDO Green Sukuk and Stewardship Impact Bonds, issued under Oman’s Sustainable Finance Framework and listed on the Muscat Stock Exchange.

Contribution certificates issued to participating entities are fully creditable against any future national carbon tax liability, creating a fiscal incentive for early adoption and an integrated funding loop linking industrial activity to the generation of certified environmental data. By 2034, the target is for assessed contributions, certification fees, and marketplace transaction revenues to cover at least 75% of WEDO’s operating costs.

#### *Benchmarking Data Governance: The UEDG-MM*

WEDO also introduces the first cross-entity data governance benchmarking system. The Unified Environmental Data Governance Maturity Model (UEDG-MM) assesses all environmental data stewards—national agencies, multilateral funds, NGOs, and private ESG rating agencies—against 11 dimensions: governance, security, quality, ethics, and interoperability, among others (EDM Council, 2023). Each dimension is scored from 1 (ad-hoc) to 5 (optimizing), producing a publicly available Global Environmental Data Governance Index every two years. This replaces the current patchwork of partial benchmarks (e.g., the Open Data Inventory for government data, FAIR maturity assessments for scientific repositories, market surveys of ESG raters) with a single, comparable framework.

### *Indigenous Data Sovereignty*

Unlike previous global governance proposals, WEDO embeds indigenous data sovereignty as a legally binding obligation. The Ethics and Equity Board, co-chaired by indigenous representatives, validates that all data ingestion and trading comply with the CARE Principles

**Table 1.** Overlap Risk Analysis — Existing Entities and WEDO Differentiation Strategy

Entity	Entity Type	Nature of Overlap Risk	WEDO Differentiation Strategy
UNEP	UN Programme	Both produce environmental data frameworks and capacity-building programs. UNEP's GEDS (Res. 4/23) covers environmental data strategy.	WEDO = GEDS operational implementation vehicle. UNEP strategizes; WEDO enforces via treaty. Formal Article 10 MOU establishes UNEP as WEDO's policy principal. WEDO does not issue policy guidance.
IPCC	UN Intergovernmental Panel	Both reference national environmental data. IPCC may appear to 'govern' data indirectly through its data requirements.	WEDO is the verification layer beneath IPCC — it audits the source data that IPCC synthesizes. IPCC WG-I holds observer status in WEDO SAB. WEDO does not produce Assessment Reports.
WMO / WIGOS	Treaty IGO	WMO sets meteorological standards and operates WIGOS. WEDO's GEOS and Manual on the GEOS may appear to duplicate WIGOS.	WEDO formally adopts WMO-No. 8 (CIMO Guide) as technical reference. WEDO extends scope beyond meteorology to soil, biodiversity, and water — domains WMO does not govern. WMO holds IO Platform seat.
IPBES	Intergovernmental Platform	Both engage national biodiversity data systems. IPBES produces biodiversity assessments that reference national data.	IPBES assesses biodiversity; WEDO governs how biodiversity data are collected and verified. WEDO-certified data improves IPBES assessment quality. IPBES holds IO Platform seat. WEDO issues no biodiversity assessments.
IUCN / CEM	INGO / Union	IUCN Red Lists and RLE ecosystem assessments use field biodiversity data. WEDO's EEVs and GEOS cover the same ecosystems.	WEDO formally adopts IUCN GET as mandatory ecosystem classification. IUCN classifies ecosystems; WEDO certifies data flowing from them. WEDO does not publish Red Lists or RLE assessments.
GBIF	Intergovernmental IGO (MoU)	GBIF hosts hundreds of millions of species occurrence records. WEDO's Environmental Core Standard builds on Darwin Core — GBIF's standard.	WEDO does not maintain species occurrence databases. GBIF remains the global repository; WEDO certifies data quality flowing into it. GBIF adopts Data Partner tier with preferential API access.
GCOS / GEO BON	Intergovernmental (MoU-based)	GCOS defines ECVs and observing system requirements. GEO BON defines EBVs. Both are framed as observation coordinators.	WEDO incorporates GCOS 54 ECVs and GEO BON 21 EBVs into the EEV framework — elevating rather than replacing them. GCOS and GEO BON observe; WEDO governs, audits, and enforces. Both hold IO Platform seats.

**Continued Table 1.** Overlap Risk Analysis — Existing Entities and WEDO Differentiation Strategy

<b>Entity</b>	<b>Entity Type</b>	<b>Nature of Overlap Risk</b>	<b>WEDO Differentiation Strategy</b>
<b>EEA</b>	Regional IGO (EU)	EEA produces State of Environment reports, audits national data, and maintains Eionet — the EU-regional parallel to GEOS.	WEDO explicitly modelled on EEA but operates globally. Eionet data standards are formally integrated into GEOS European layer. Copenhagen Hub co-located with EEA. EEA = WEDO's European implementation arm.
<b>GGGI</b>	Treaty IGO	GGGI advises governments on green growth metrics requiring verified environmental data — potentially conflicting signals from two IGOs.	WEDO-GGGI Joint Data Committee (Year 1) aligns GEOS outputs with GGGI green growth indicators. GGGI uses WEDO data; WEDO does not advise governments on policy. GGGI holds IO Platform seat.
<b>PEMSEA</b>	Regional IGO	PEMSEA governs marine monitoring in Seas of East Asia. Singapore Hub overlaps geographically with PEMSEA's operational area.	WEDO-PEMSEA MOU signed at Constitutional Summit: PEMSEA remains primary marine governance authority; WEDO certifies and globally distributes PEMSEA's data. Joint Marine Data Committee established.
<b>CI / FFI / WCS / WWF</b>	Conservation NGOs	Large conservation NGOs operate global biodiversity monitoring networks that overlap with GEOS data collection scope.	WEDO does not duplicate NGO field operations. Data Partner tier transforms NGOs from potential competitors into GEOS data providers with co-authorship rights and preferential API access.
<b>Verra / Gold Standard / ACR</b>	Commercial VCM Standards	Carbon market verification bodies certify emissions credits using environmental data — directly overlapping with WEDO's data certification function.	WEDO is the underlying data layer; Verra et al. are the credit issuance layer. 'WEDO Audited' certification becomes mandatory data quality input for all VCM methodologies — WEDO does not issue credits.
<b>National Statistics Offices</b>	National Government Bodies	NSOs compile national environmental accounts (SEEA). Overlap with WEDO data certification of national environmental data systems.	WEDO certifies NSO data as 'WEDO Audited' — enhancing NSO credibility internationally. WEDO does not replace national statistical systems; it provides the international seal of approval.
<b>Planet Labs / Maxar / Copernicus</b>	Commercial / EU Satellite Operators	Commercial and public satellite operators provide environmental remote sensing — a direct GEOS data source but also a potential competitor for data authority.	WEDO positions satellite operators as GEOS data providers in the Private Sector Platform. WEDO does not operate satellites. Copernicus data formally integrated into GEOS European layer via Copenhagen Hub-EEA agreement.

(Carroll et al., 2020) and that FPIC is obtained and recorded on a tamper-proof distributed ledger before any data originating from indigenous territories is used. An Independent Redress Mechanism allows communities and individuals to challenge misuse, with the power to issue binding rectification orders.

### *Phased Implementation*

WEDO's implementation is structured over seven years (2027–2034) in the following phases:

- **Phase 0 (2027–2028):** Treaty negotiation, adoption, and ratification.
- **Phase 1 (2028–2029):** Establishment of governance bodies and securing of the permanent headquarters.
- **Phase 2 (2029–2031):** Development of the WEDO Trust and operationalization of the 27 functional roles.
- **Phase 3 (2031–2033):** Launch of the first Global Index, the ESG taxonomy, and the certification marketplace.
- **Phase 4 (2033–2034):** Achievement of 100 ratifications and financial self-sufficiency.

### *Entities Where Overlap Risk Exists*

Overlap risk exists with 14 categories of entities spanning the full spectrum of institutional types (Table 1).

## **CONCLUSION**

International regimes exist for trade, aviation, health, and meteorology, but not for the environmental data on which collective environmental governance depends. The World Environmental Data Organization is designed to fill that void. It does not replace existing institutions such as the IPCC, UNEP, the World Bank, or the ISSB; rather, it provides them with a common data constitution. By embedding a certification monopoly within a binding treaty, building an open yet sovereign digital infrastructure, and financing itself through a mutually reinforcing partnership with its host state, WEDO would transform environmental information from a fragmented liability into a certified, tradable, and ethically governed planetary asset. The constitutional moment for environmental information has arrived. Without a coordinated, treaty-based response, fragmentation will deepen, trust will continue to erode, and the transition to a sustainable global economy will remain fundamentally underinformed. A diplomatic conference to adopt the WEDO Convention should be convened without delay.

This Policy Perspective is based on a systematic review of international environmental data governance, encompassing over 50 global organizations, including intergovernmental bodies (UNEP, IPCC, WMO, GCF), international unions (IUCN), non-governmental organizations (WRI, WWF), financial institutions (World Bank, IFC), ESG rating agencies (MSCI, CDP), and data standard-setting entities (DAMA, EDM Council, IDSA, ISO, W3C, CODATA). The review examined publicly available governance documents, data-use terms, certification frameworks, and funding models. The WEDO proposal was developed through iterative synthesis of identified gaps and best practices. The funding architecture was designed in alignment with Omani law (Royal Decrees 106/2020, 114/2001; Central Bank of Oman Circular on Sustainable Finance; FSA Bonds and Sukuk Regulation) and the Sultanate's Vision 2040 (Oman Vision 2040, 2021). The WEDO Trust technical architecture is based on the IDSA Reference Architecture Model v4.0 (International Data Spaces Association, 2022) and informed by cloud-engineering case studies of the Map of Life platform. No primary data were collected.

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The present research did not receive any financial support.

## CONFLICT OF INTEREST

The authors declare that there is not any conflict of interests regarding the publication of this manuscript. In addition, the ethical issues, including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, and redundancy has been completely observed by the authors.

## LIFE SCIENCE REPORTING

No life science threat was practiced in the research.

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