

Conference Abstract

Transforming Knowledge into Practice: Science, Technology and Innovation in Support of the UN SDGs

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Abstract

A network of European organisations is coordinating a workshop in New York (USA) on September 26, 2024, as part of the Science Summit 2024 at the 79th Session of the UN General Assembly (UNGA79). This network represents active communities from the fields

of biodiversity, ecology, and engineering. It aims to strengthen science, technology, and innovation efforts to achieve the UN Sustainable Development Goals (SDGs).

These communities, through European initiatives like the European Research Infrastructures, the European Open Science Cloud (EOSC), and Digital Twin projects, have selected the Kunming-Montreal Global Biodiversity Framework (K-M GBF) as a testbed for contributing to the SDGs. Their collective focus is on the network shared impact rather than individual projects. By examining a common approach to the K-M GBF, they aim to enhance their contributions to the framework's strategic goals, particularly its 2030 and 2050 targets.

In this direction, the network:

1. Recognises the contribution and rights of indigenous peoples and local communities as custodians of biodiversity and holders of traditional knowledge for the conservation, restoration, and sustainable use of ecosystems. By adhering to the Open Science principles of “Findable Accessible Interoperable Reusable” (FAIR) and “Collective Benefit, Authority to Control, Responsibility, Ethics” (CARE), and by being consistent with the practices adopted by the scientific community, the members of the network promote traceability of their work and of the materials they use, including those provided by indigenous peoples.
2. Implements a variety of approaches to improve biodiversity monitoring, management, and protection. It promotes multi- and cross-disciplinary, integrative approaches to enhance its contribution to many of the Framework objectives. Its members support research on biodiversity at all levels of the biological organisation, from single-celled organisms, through collections and specimen data and up to the scale of ecosystems, as well as on how biodiversity responds to climate change. A key role in this process is already being played by the biodiversity Research Infrastructures, both in the EU and globally, through bi- and multi-directional linking and an increased interoperability of their data holdings, the provision of advanced access to semantically structured FAIR data, the provision of single points of access to federated data discovery from different data domains, thus supporting multi-disciplinary research addressing questions of high complexity and importance to society.
3. All organisations in the network are committed to the three principal objectives of the Convention on the Biological Diversity, namely *conservation, sustainable use, and fair sharing of benefits* derived from the utilisation of natural resources. They contribute significantly to the three above principal objectives of the CBD, by: (a) making biodiversity information readily available and developing systems to support decision making and conservation efforts that directly contribute to our ability to live sustainably with nature, as concerns the first of the principal objectives above; (b) identifying priorities and targets and raising awareness of the need to streamline efforts among scientific and societal actors, are critical elements towards the second objective; (c) developing technologies to enable the sharing of data, services and other products related to genetic resources, which are used in combination with any other type of resource or product (e.g.

- taxonomic, literature, environmental, etc.), are included among the activities to achieve the third principal objective.
4. Contributes to the achievement of the K-M GBF objectives through science, technology and innovation, based on scientific evidence, traditional knowledge, and innovative practices. This support is translated into activities such as: (a) providing solutions for research, data sharing and management, and scientific computing solutions to researchers, learners, policy makers, public administrations and businesses; (b) developing standard operating procedures, implementing standards, and promoting open science principles to enhance research integrity, accuracy and accountability in science; (c) providing federated research services, resources, and other research products to promote multidisciplinary knowledge and innovation; (d) creating models (e.g. of climate and human activity related land-use changes in biodiversity dynamics and ecosystem services), automated data flows (from sensors to data systems) and integration (e.g. biodiversity data flows combined with environmental and human activity variables); (e) building digital twins for informed decision making, such as the European Digital Twin of the Ocean (European DTO), with assured connectivity to newly collected high quality environmental and biodiversity data; (f) providing training and capacity building services for innovative tools.
 5. Supports the consideration of the ecosystem approach principle in the implementation of the K-M GBF, with a number of activities being developed by the network: (a) providing virtual representations of the ocean and land, integrating observations, modelling, and digital infrastructures, and creating digital twins that allow the scientific community to simulate and study “what if” scenarios; (b) developing and implementing technologies that enable a cross-domain, multidisciplinary approach to the study of biodiversity and ecosystems; (c) promoting ecosystem-based approaches to biodiversity management and habitat conservation in innovative publications venues (e.g. *Nature Conservation*, *Biodiversity Data Journal*, *One Ecosystem*, etc.).
 6. Promotes collaboration and synergies between the Convention on Biological Diversity and its Protocols, as well as with other biodiversity-related conventions, relevant multilateral agreements and international organisations and processes, as this will facilitate the implementation of the K-M GBF. The network is developing a variety of work, including: (a) collaborating with bodies and organisations responsible for the implementation of the CBD and its Protocols (e.g. IUCN, IPBES, European Commission) to co-design and co-develop research resources and products to support their mandates; (b) establishing strong links with policy actors such as the European Commission and the European Parliament, the JRC and others. Participate in social, scientific and technical initiatives in the European arena, such as the European Green Deal, the EU Knowledge Centre for Biodiversity and its Science Service for Biodiversity, the Biodiversity Knowledge Hub, the EU Pollinators Initiative and the EOSC. Developing links with the private sector through the Science/Business initiative, cooperation with the European Environmental Bureau (EEB), and the EOSC Digital Innovation Hub (EOSC DIH); (c) integrating and sharing of computational

resources and expertise will not only advance the frontiers of scientific knowledge, but also ensure that data-driven research initiatives around the world are well supported.

7. Contributes to the understanding and researching of the links between biodiversity and health. Particular emphasis will be placed on the following activities: (a) participating in initiatives and projects such as the EOSC Health Cluster, a platform for interdisciplinary research, EC projects such as B4Life, B-Cubed and BioAgora by publishing research that investigates how biodiversity affects human health; (b) using data from multiple sources to numerically demonstrate the links between human and environmental health, in the context of the One Health concept; (c) using digital twins to create Virtual Research Environments (VREs) that generate knowledge on how biodiversity patterns derived from taxa and habitats interact with patterns derived from data and information on their health; (d) publishing the results of the research, such as studies on zoonotic diseases, biodiversity and mental health, and the benefits of ecosystem services for public health.

During the workshop, the participants will present their collective contribution to the implementation of the K-M GBF and invite international and regional stakeholders to present their expectations on the above topic. Based on stakeholder input, the network will publish a white paper outlining its approach.

Finally, these communities will issue an open call to forge an international alliance to further integrate biodiversity conservation into the priorities of the UN Summit of the Future agenda priorities and the post-SDG agenda.

Keywords

Science Summit 2024, UN Sustainable Development Goals, Kunming-Montreal Global Biodiversity Framework, Research Infrastructures, European Open Science Cloud, Digital Twins.

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Conflicts of interest

The authors have declared that no competing interests exist.

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