Post-2025 GEO Work Programme
## Description of Focus Areas

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*This document is submitted to the Programme Board **for decision on the acceptance of the six Thematic Focus Areas and two cross-cutting Focus Areas for the Post-2025 GEO Work Programme**.*

On the basis of this approval and other feedback received from Board members, the Programme Board Task Force on Post-2025 GEO Work Programme development will further refine the descriptions for Focus Areas in consultation with the current GEO Work Programme activities and the broad GEO community. These will be approved by the Programme Board by the end of August on a no-objection basis remotely. The Call for the Post-2025 GEO Work Programme will be launched after this approval.

This document provides a brief description for each of the Focus Areas proposed for prioritization of the GEO Work Programme (GWP). Additional definitions, scope of work, gaps, areas of collaboration and innovation will be defined in coordination with the GEO community and SMEs through scoping documents.

INITIAL FOCUS AREAS

- AGRICULTURE & FOOD SECURITY
- WATER & LAND SUSTAINABILITY
- ECOSYSTEMS-BIODIVERSITY & CARBON MANAGEMENT
- WEATHER, HAZARD, & DISASTER RESILIENCE
- CLIMATE, ENERGY, & URBANIZATION
- ONE HEALTH
- EQUITY & INCLUSION
- OPEN DATA, KNOWLEDGE, &INFRASTRUCTURE

Equity & Inclusion
Open Data, Knowledge & Infrastructure
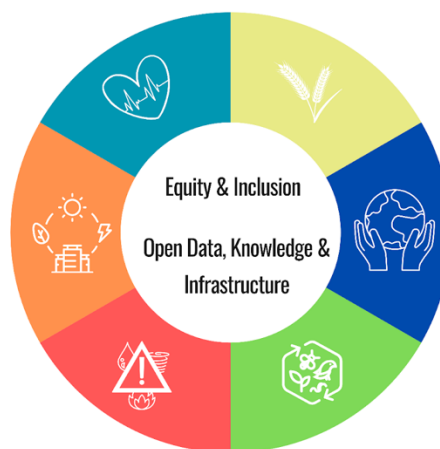
Cross-cutting

Agriculture and Food Security:

- Definition and Scope: Agriculture and Food Security represents the vital connection between sustainable agriculture and ensuring food security for the world. This focus area aims to enhance agricultural productivity, improve food supply stability, and reduce malnutrition worldwide.
- GEO positioning: GEO is strongly positioned through existing support to early warning systems that monitor conditions for crop production that impact potential yields and improve management practices. The use of Earth observations is a critical component of preventing malnutrition and preventing food insecurity.
- Potential areas of innovation: Monitoring of crop conditions ties into understanding water systems- floods, droughts,land use and climate change impacts; Serving as the intersection of various environmental and social systems to provide a holistic

understanding that supports food security; Ensuring that relevant data is easily accessible and usable for end-users, including policymakers and farmers, to make informed decisions; Predicting and preparing for the impacts of climate change on agriculture to develop resilient farming practices. Utilizing AI and ML to analyze Earth observation data, improving the accuracy of yield predictions and management practices.

Land and Water Sustainability:

- Definition and Scope: Land and water sustainability involves examining the interactions and interdependencies between land and water to promote their sustainable use. This integrated approach encourages the GWP to consider land and water resources in an integrated manner, ensuring that their use and management support long-term resource availability and security.
- GEO positioning: GEO is uniquely positioned to monitor changes in water quality and quantity, land cover, and land use. It can track pollution from land to freshwater and marine systems, observe coastal erosion, and support holistic decision-making across different sectors. By providing comprehensive data, GEO facilitates informed policies and practices that enhance land and water sustainability.
- Potential areas of innovation: Supporting holistic decision-making by linking land and water data, which can guide sustainable land management, conservation efforts, and pollution control; Offering actionable information that integrates data and products across the land-water interface, enabling comprehensive assessments of resource use and impacts; Developing tools for assessing the impact of land use on water resources, including deforestation, urbanization, and agricultural practices; assessing the impact of land use on water resources, monitoring the effects of agricultural practices on water quality, and predicting the consequences of climate change on both land and water systems; Involving local communities in sustainable practices and decision-making processes to ensure that solutions are practical and culturally appropriate.

Ecosystems, Biodiversity and Carbon Management:

- Definition and scope: A key global priority is stemming the rapid loss of biodiversity and ecosystem function. Earth observations, combined with advanced technologies such as Artificial Intelligence (AI) and Machine Learning (ML), can be used to map and classify habitats, understand the implications of habitat loss on biodiversity, and provide metrics essential in tracking national and global progress. Addressing climate change cannot be adequately done without the inclusion of ecosystem and biodiversity considerations, in particular through carbon sinks in terrestrial and aquatic ecosystems, and the direct connection between climate change drivers and ecosystem health.
- GEO positioning: GEO will be providing essential data for metrics to track national and global progress in biodiversity management, conservation and restoration. By leveraging Earth observation technologies, AI, ML, and ground-truthing methods, GEO supports the development of comprehensive strategies to protect and restore ecosystems, thereby contributing to global sustainability goals.
- Potential areas of innovation: Improving the accuracy and comprehensiveness of biodiversity and ecosystem data through advanced Earth observation technologies, AI, and ML to better inform conservation efforts; Creating integrated monitoring systems that combine data from multiple sources, including AI and ML, to provide a holistic view of ecosystem health and biodiversity; Validating remote sensing and AI-derived data with on-the-ground observations to ensure accuracy and reliability; Strengthening the understanding of the connections between climate change and biodiversity, promoting policies and actions that address both simultaneously.Enhancing the collection and accuracy of biodiversity and ecosystem data.

Weather, Hazard and Disaster Resilience:

- <u>Definition and Scope:</u> Safety and resilience to hazard and disaster events (weather or climate change-induced or not) is a key priority for countries. Severe weather, pandemics or security threats are a major obstacle to economic and social progress. Developing robust systems to anticipate, respond to, and recover from these events is essential for sustainable development.
- <u>GEO positioning</u>: During extreme events, manual data collection becomes challenging, making the coordination of data from satellites, radars, and other sources indispensable. GEO's role is to leverage this data to gain insights into Earth's dynamic processes. This information is vital for predicting potential disasters, minimizing their impact, and aiding in post-disaster recovery efforts. By providing timely and accurate data, GEO supports decision-making and enhances disaster resilience.
- <u>Potential areas of innovation</u>: Developing systems that integrate data from various sources, such as satellites, radars, and ground-based sensors, to provide comprehensive disaster resilience solutions; Engaging communities in disaster preparedness and response activities to enhance local resilience and ensure that response strategies are tailored to the needs of those most affected; Creating advanced models to predict weather and climate-related hazards more accurately, allowing for better preparation and response; Implementing real-time monitoring systems to track the development and impact of disasters, enabling prompt and effective response measures; Strengthening the capacities of local governments and organizations to utilize GEO data and tools for disaster risk management and resilience building.

Climate, Energy, and Urbanization:

- <u>Definition and Scope:</u> This area aims at addressing the interconnected challenges of climate change, energy supply and consumption, and urbanization through the lens of earth observations. It will focus on localized adaptation, mitigation, and resilience strategies to ensure that urban areas and other human settlements can thrive under unprecedented climatic conditions.
- <u>GEO positioning</u>: GEO is strategically positioned to provide critical insights for monitoring and addressing the impacts of climate change on human settlements, and the impacts of energy systems on climate change. By utilizing Earth observations, GEO can track climate trends, assess renewable energy resources, and monitor urban expansion and land use patterns. This comprehensive data supports integrated planning and decision-making across sectors, fostering resilience and sustainability in urban and other environments.
- <u>Potential areas of innovation</u>: Providing data and analytics to help cities to implement cooling strategies and improve urban planning; to design and implement green infrastructure solutions, such as green roofs, urban forests, and sustainable drainage systems; and to optimize the deployment and management of renewable energy sources.

One Health:

- <u>Definition and Scope:</u> One Health is an interdisciplinary approach that recognizes the inextricable links between human, animal, and environmental health. It aims to address global health challenges by fostering collaboration across various sectors to enhance health decision-making and intervention strategies. This holistic approach seeks to improve health outcomes by considering the interconnectedness of ecosystems, wildlife, and human populations.
- <u>GEO positioning</u>: GEO is uniquely positioned to bring critical environmental intelligence to the One Health approach. By leveraging Earth observations, GEO can enhance the

prediction, management, and prevention of health impacts originating from animals and the environment. This capability allows for a more comprehensive understanding of health risks and the development of more effective interventions.

- Potential areas of innovation: Incorporating environmental data into public health decision-making processes; utilizing artificial intelligence to analyze environmental and health data can improve the prediction of health risks and the development of proactive measures; developing real-time surveillance systems that monitor environmental changes and their impacts on health.

Cross-cutting

Equity and Inclusion:

- Definition and Scope: One of the main elements of the GEO Post-2025 Strategy is 'Earth Intelligence for All' and the equity and inclusion essential to making this vision a reality. This cross-cutting area needs to be embedded throughout GEO and the GEO Work Programme Thematic Focus Areas.
- GEO Positioning: Equity and Inclusion is meant to show that GEO's priorities are aligned with delivering actionable information to those who need it most- often in countries,regions, or communities that have historically been marginalized. It also means representation for multiple voices and perspectives, including those of Indigenous Peoples and Youth. Indigenous Knowledge and co-development of EO-based solutions will also be integral parts of this effort.
- Potential Areas of Innovation: Equity and Inclusion metrics and best practices will be incorporated into the GWP structure, and GEO activities will be supported in carrying them out through applicable Conveners and Enabling Mechanisms.

Open Data, Open Knowledge, and Infrastructure

- Definition and Scope: GEO's Open Data Sharing Principles and Open Knowledge framework are a core element of GEO's mission. Enabling open access to critical data, tools, and applications is essential to delivering on the vision of 'Earth Intelligence for All". This is a cross-cutting area with elements that will need to be implemented across the GWP and its suite of activities.
- GEO Positioning: GEO has opportunities to enable and facilitate open data and knowledge as well as elements of a scalable infrastructure, such as the GEO Knowledge Hub that can deliver actionable information to users, stakeholders and decision makers.
- Potential Areas of Innovation: Multiple opportunities exist to leverage innovative technologies, such AI, ML, modeling capabilities, and to enhance access to and integration of In Situ data. This can be exemplified through the work and innovation of GWP activities that can demonstrate GEO's principles of Open Knowledge in practice and provide access to users.