

Draft V2.2 of GEO Strategic Plan 2016-2025: Implementing GEOSS

This Document comprises four parts:

- 1. A cover note to the Executive Committee;*
- 2. Version 2.2 of the Strategic Plan;*
- 3. Reference Document for the Strategic Plan;*
- 4. Proposed modifications to the Rules of Procedure.*

This Document is presented for consultation.

Cover Note to Executive Committee

Dear Executive Committee members,

On behalf of the Implementation Plan Working Group (IPWG), we are pleased to present to you an updated version of the *GEO Strategic Plan 2016-2025: Implementing GEOSS*, for your review and comment. You will recall that in March 2015, we presented to you the first official draft and at the same time we engaged directly with GEO Plenary Members and Participating Organisations.

This second version of the *GEO Strategic Plan 2016-2025: Implementing GEOSS* reflects the input we received from you during the 33rd Executive Committee meeting, as well as from Plenary Members and Participating Organisations during our engagement activities, including the Work Plan Symposium.

The IPWG has made significant efforts to respond to the constructive guidance and comments we received. In order to facilitate your review, below you will find the proposed approach and details on how we have specifically addressed comments:

The unique value proposition of GEO has been further developed, highlighting in particular GEO's role in convening communities, through its broad membership and aim to respond to societal challenges, and brokering coordinated actions towards improved quality, timeliness, range, availability, and use of Earth observations. A corresponding new feature of this version of the Strategic Plan is the proposal that GEO should implement a structured process for defining and agreeing on priority needs and gaps. Discussion on this new element continues in the IPWG and we welcome thoughts and suggestions on this.

Following comments received, we have also expressed a clearer linkage with the Sustainable Development Goals (SDGs).

The Societal Benefit Areas (SBAs) have been further refined to become more impact oriented.

The IPWG refined the three Strategic Objectives Advocate, Engage and Deliver; in particular, the areas of advocacy and engagement have been more fully described.

The GEOSS (Global Earth Observing System of Systems) is now presented as a set of coordinated independent Earth observation, information and processing systems that interact and enable monitoring of the state of the Earth and enhanced prediction capabilities for societal benefits.

The IPWG refined the Core Functions and developed targets and indicators further. The Core Functions scope how GEO is active to support its Strategic Objectives. The targets, included in the Reference Document, are constructed to be specific, measurable, and achievable. They should enable an effective implementation, including monitoring of progress and evaluation of achievements.

The IPWG maintained the four Implementation Mechanisms, revising their description to improve clarity and consistency. Following advice received during Work Plan Symposium, the criteria for their selection have been improved.

Based on input from the GEO Community at and around the Work Plan Symposium, the GEO Secretariat has prepared a first draft for the transitional Work Programme 2016. The IPWG emphasizes that the important next step will be for the GEO Members and Participating Organizations to weigh in on this draft and put forward their intentions and priorities. This will need to start immediately, and can continue up to acceptance of the Work Programme by Plenary 2015.

The IPWG also refined the presentation on Governance. Following guidance by ExCom-33, the IPWG has developed proposed modifications to the GEO Rules of Procedure, including enlarging the Executive Committee membership to 16. The changes also include highlighting the strategic leadership role of the Executive Committee. The Rules of Procedures have also been modified to include the newly developed Terms of Reference for the Programme Board.

IPWG maintained the indicative scale of voluntary contributions (VISC) to support the GEO Trust Fund. Based on comments made at the ExCom-33 we now propose to use a minimum contribution of CHF 5000 to ensure that administrative costs are fully covered.

During our recent deliberations, the IPWG has noted two aspects that could be strengthened in the *Strategic Plan* and/or Rules of Procedures and invites a reaction from Executive Committee on these specific suggestions before considering them further:

Firstly, consideration could be given to strengthening the process application for Participating Organizations through a set of criteria, whereby applicants would be required to endorse the *Strategic Plan*, the Work Programme, as well as the Data Sharing and Data Management Principles, and indicate at the outset where they intend to make a contribution.

Secondly, the Executive Committee could also consider an alternative governance model whereby the four elected Co-chairs would annually take turns acting as the ‘lead Co-chair’ in interacting with the GEO Secretariat and other entities with whom Co-chairs’ communication may become necessary. The lead Co-chair would act on behalf of the four Co-chairs and on the basis of the agreed-upon annual objectives established by the Executive Committee and Plenary.

As we move forward towards the GEO Ministerial in November 2015 in Mexico, the IPWG is working to finalize the *Strategic Plan* and its supporting documents. We thank you in advance for your review and we look forward to receiving your comments.

Sincerely,

IPWG Co-Chairs

GEO Strategic Plan 2016-2025: Implementing GEOSS

(Version 2.2)

FOREWORD

The World Summit on Sustainable Development, Johannesburg 2002, highlighted the urgent need for coordinated observations relating to the state of the Earth. At the first Earth Observation Summit, convened in Washington D.C. in July 2003, governments and international organizations, as well as the European Commission, adopted a Declaration signifying a political commitment to move towards the development of a comprehensive, coordinated, and sustained Earth observation system of systems. An ad-hoc group on Earth observations was tasked to develop a 10-Year Implementation Plan which was adopted at the third Earth Observation Summit in Brussels, in February 2005. This third Summit also formally established the intergovernmental Group on Earth Observations (GEO) as a voluntary coalition of governments and participating organizations having as its mission the implementation of the Global Earth Observation System of Systems (GEOSS) to meet the need for timely, quality long-term global information as a basis for sound decision-making.

Subsequent GEO Ministerial meetings have re-affirmed the commitment to implement GEOSS, and in 2014 the decision was made to renew the mandate of GEO through to 2025. The GEO-X Plenary (January 2014) initiated the preparation of the next implementation plan 2016-2025 for acceptance at the GEO-XII Plenary and endorsement at the Ministerial Summit in 2015.

1 INTRODUCTION

1.1 Strategic Plan

This Strategic Plan outlines the strategy and framework for the intergovernmental Group on Earth Observations (GEO) to fulfill its vision, define its objectives, and produce key deliverables while determining structures and resources needed to accomplish these goals. The Plan will be implemented through a set of activities within specific timeframes as defined in Work Programmes.

1.2 Societal Challenges and Opportunities

Food, water, and energy security; resilience to natural hazards; mitigation of, and adaptation to, climate change; population growth; pandemics of infectious diseases; sustainability of ecosystem services; poverty; and the development of a sustainable economy: these are among the primary societal challenges faced by humankind today. Moreover, in this inter-connected world, the impact of one event can immediately cross borders and bring cascading consequences to geographically remote locations.

Concerted, global action is needed to respond to these societal challenges in order to improve living conditions for all people, especially the world's poorest citizens. At the same time, these challenges point to opportunities for creating sustainable economies that can provide environmental and social security, while ensuring these conditions remain optimal for future generations. Solutions encompassing sustainability and equitability require humankind to make intelligent, evidenced-based decisions that recognize the linkages between behaviour and its impact on the planet.

Earth observations from diverse sources, including satellite, airborne and in-situ platforms, when integrated together, provide powerful tools for understanding past and present conditions of Earth systems, as well as the interplay between them. These tools, and the improved knowledge they provide, together with data describing human dimensions in the global environment, can help solve problems, address risks, and deliver skilful predictions of the future behaviour of Earth systems. The outcome of this information chain is that potential consequences of human activities on the planet can be understood and anticipated.

As such, Earth observations are an indispensable component of measuring and monitoring our progress towards addressing societal challenges. The Sustainable Development Goals (SDGs) established by the international community, for example, include clear benchmarks against which the world may measure progress over the coming decade. Earth observations will need to play a critical role in support of SDG monitoring frameworks.

1.3 GEO Vision and Value

GEO is a global partnership of governments and organizations that seeks to realize its Vision of “a future wherein decisions and actions for the benefit of humankind are informed by coordinated, comprehensive and sustained Earth observations.”¹ In support of this Vision, through collective voluntary action, the GEO community is implementing a Global Earth Observation System of Systems (GEOSS) from among a great many individual Earth observation, information and processing systems.

The implementation of GEOSS is one example of the convening power of GEO. Because of its broad spectrum of membership and contributing organizations, GEO is able to assemble and coordinate expertise from across different disciplines and communities, bringing together unique combinations of partners required to address societal challenges, drawing on comprehensive, coordinated and sustained Earth observations.

¹ The Global Earth Observation System of Systems 10-Year Implementation Plan, GEO, 2005, p. 5.

GEO is therefore positioned to:

- provide a **flexible and agile forum** for governments, public sector agencies, specialized organizations, universities and the private sector, to work together on shared interests;
- contribute to actions that address urgent societal challenges, including climate change and its impacts, by leading national, regional and global efforts to enhance **global Earth observation systems**;
- optimize the use of Earth observation systems to enable and facilitate **global monitoring, insight and foresight into the state of the planet**, and the human and environmental systems that our societies rely upon for sustenance and wellbeing;
- foster new economic opportunities, leverage public investments, and increase efficiency through **innovation and collaboration**;
- improve the **link between scientific understanding and policy-making**; and
- engage with the United Nations (UN) and governments to **support the monitoring and implementation of the Sustainable Development Goals** and similar frameworks, such as regional conventions.

In summary, GEO is a unique initiative that occupies a strategic, upstream coordination position in the international community. GEO also strives to improve the quality, timeliness, range and availability of Earth observations, data, information and knowledge about the Earth system in support of other major initiatives, and ultimately improve the observational foundations of decision-making globally.

2 SCOPE, STRATEGIC OBJECTIVES AND SOCIETAL BENEFIT AREAS

2.1 Scope

Informed, sound decision-making will lead to long-term social and economic benefits optimized for all of society, and to sustainable behaviour by humankind in relation to Earth's available resources. Current and future decision-making will rely on the ability of expert communities to handle complex data from Earth observations and combine these with social and economic analyses. Through engagement with user communities, GEO will play a key role in systematically identifying data needs while advocating provision of, and access to, multiple sources of data; delivering tools, skills and services to allow intelligent exploitation of the data by the user communities; and showcasing the value of Earth observation data in order to expand interest, uses, and benefits to society.

The end-to-end process of identifying needs, ensuring the availability of data with which to develop information to address societal challenges, and transforming that information into knowledge through the generation of products and services for end-users, defines the scope of GEO.

2.2 Strategic Objectives

To realize its Vision and maximise the benefits that GEO can bring to users, during 2016-2025, GEO defines *action areas* in which it will actively **advocate** the value of Earth observations as a fundamental component of timely information regarding the state of the Earth, **engage** with stakeholder communities to address societal challenges, and **deliver** critical data, information and knowledge to inform decision-making (Figure 1).

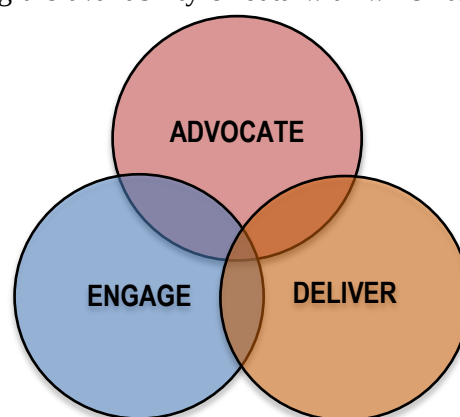


Figure 1: GEO's three overlapping action areas.

Accordingly, three Strategic Objectives will guide GEO activities through 2025:

Advocate

Strategic Objective:

GEO aims to **advocate** greater understanding of the importance of Earth observations as essential resources that must be sustained as vital means of achieving national and international objectives for resilient societies, sustainably growing economies, and a healthy environment worldwide.

Engage

Strategic Objective:

GEO aims to **engage** with stakeholder communities to address global and regional challenges by fostering strategic partnerships to improve the links between the scientific understanding of the Earth systems and policy-making through an on-going dialogue with stakeholders.

Deliver

Strategic Objective:

GEO aims to **deliver** data, information and knowledge enabling stakeholders to inform their decision-making processes, promote the exchange of best practices, enable the uptake of new technologies, and create new economic opportunities, while leveraging international investments in Earth observations through standardization, collaboration, and innovation.

2.3 Societal Benefit Areas

The Societal Benefit Areas (SBAs) provide logical domains in which GEO can demonstrate the benefits of Earth observations and deliver added-value to decision makers, end-users and society. In addition, the SBAs provide a framework within which GEO can utilise its convening power to incubate and enable end-to-end systems and services, establishing GEO as an observational backbone for informing monitoring frameworks, such as those supporting the UN post-2015 development agenda.

Underpinning the SBAs is research pertaining to terrestrial, freshwater, ocean and atmospheric domains, over a range of spatial, temporal and thematic scales that makes use of satellite, airborne and in-situ Earth observations for monitoring and understanding the current status of Earth systems. This research can also identify potential changes in Earth systems that may result in risks for global society, providing the time and means to respond.

Some societal challenges, such as climate change, are examples of cross-cutting phenomena that connect to several SBAs. Further, aspects of climate change will affect most, if not all, decisions over the coming decades in terms of mitigation and adaptation strategies. GEO will therefore need to draw on the climate observing community for key input to help design solutions to the challenges across and within SBAs. Other cross-cutting topics will be handled in similar ways.

GEO will advocate the value of Earth observations, engage communities and deliver data and information to support the management of:

- **Disaster Resilience:** by increasing capacity to prepare, forecast, mitigate, manage and recover from disasters; in order to achieve a substantial reduction of risk and losses of life and property through an understanding of disaster risk brought by maintaining and strengthening in-situ and remotely-sensed Earth and climate observations, and enhancing the access to, and the sharing and use of, data and information obtained from such observations.
- **Food Security and Sustainable Agriculture:** by underpinning development, management and forecasting of global food and agricultural production on land and in the water; in order to end hunger, achieve food security and promote sustainable agriculture adapted to climate change impacts through strengthening food production monitoring and early warning systems, and providing accurate, timely information on agricultural production status, outlook and forecasts.
- **Water Resources:** by supporting management of water resources while fostering and maintaining water quality; in order to ensure the availability and sustainable management of water and sanitation through sound science-based public policies informed by Earth observations, modeling and data integration.
- **Energy and Mineral Resources:** by enhancing the discovery, development and sustainable production of mineral and renewable energy resources; in order to facilitate a substantial increase in the share of renewable energy in the global energy mix through offering usable, actionable information on resource assessment, monitoring and forecasting of intermittent energy sources, including solar, wind, ocean, hydropower, geo-thermal power and biomass.
- **Public Health Surveillance:** by yielding insight into the threat of vector-borne and environmentally-linked diseases, taking into account impacts of climate change; in order to promote a substantial reduction of the number of fatalities and illnesses from infectious diseases, environmental pollution and health risks, by raising public awareness and supporting policy making and management through accurate monitoring and early warning at local, national, regional and global levels.
- **Biodiversity and Ecosystem Sustainability:** by providing information on the sustainability and health of Earth's biological systems and the provision of ecosystem services to society; in order to strengthen conservation, restoration and sustainable use of ecosystem and biodiversity under human-induced changes in climate and land use, by bridging multiple types of observation data and knowledge through science-society collaborations at local, national, regional and global levels.
- **Sustainable Urban Development:** by assisting in the development of resilient cities and assessment of urban footprint; in order to make cities and human settlements inclusive, safe and sustainable by identifying economic externalities, managing environmental, climate and disaster risks, and building capacity to participate, plan and manage through supplying objective information on the urban development.
- **Infrastructure and Transportation:** by providing support for planning, monitoring and management of infrastructure (dams, roads, rail, ports, and pipelines) and the management of transport (air, land and sea); in order to minimize environmental impacts while moving towards a low-carbon footprint.

2.3.1 Defining Earth Observation User Needs

The process of articulating which, and how, Earth observations can contribute to meeting critical user needs within the scope of each of the SBAs is an important task of this Strategic Plan. Therefore, GEO will convene various fora and collaboration activities with key stakeholders across the value chain,

from providers of the observations to the end user for whom services are developed, from the public and private sector, with the aim to:

- Identify those Earth observations most needed, relevant and useful to users in each SBA;
- Understand and articulate the characteristics and preferences of users with respect to pertinent information products and tools, including timeliness, format and frequency, in order to contribute value to the decision making process; and
- Obtain commitments from providers to effectively deliver these observations in a comprehensive, coordinated and sustained way, regionally and/or globally, as appropriate.

2.4 Action Areas

Collectively, the three areas of action – advocate, engage, deliver – guide GEO implementation activities through 2025.

2.4.1 Advocate

GEO provides a platform to facilitate political dialogue on the importance of continuity, coverage, and access to global Earth observation data and information, by advocating robust, national data collection systems (spaceborne, airborne, terrestrial and marine) and broad, open data sharing across country and disciplinary boundaries. GEO also works to champion and coordinate strategies for acquiring Earth observations with relevant existing and emerging global initiatives having complementary mandates. In collaboration with these initiatives, GEO seeks to strengthen Earth observing networks and strategic planning, and identify the needs for applications and services in support of sound decision-making.

2.4.1.1 Advocacy for the Value of Earth Observations

GEO works to expand and strengthen the global understanding of the critical role Earth observations play in managing, monitoring and preserving the functioning of the Earth systems and societies that benefit from them. GEO actively advocates investments by GEO Members and Participating Organisations in sustaining capabilities and filling gaps in observing systems, scientific knowledge, social and economic data, services, and tools for transforming observations into usable decision-support tools.

2.4.1.2 Data Sharing Principles

GEO recognizes that the societal benefits arising from Earth observations can only be achieved through the sharing of data, information, knowledge, products and services. Thus, to encourage and enhance data sharing, through its Members and Participating Organizations, GEO aims to fully implement the following GEOSS Data Sharing Principles (DSP):

- Data, metadata and products will be shared as Open Data by default, by making them available as part of the GEOSS Data Collection of Open Resources for Everyone (Data-CORE) without charge or restrictions on reuse, subject to the conditions of registration and attribution when the data are reused;
- Where international instruments, national policies or legislation preclude the sharing of data as Open Data, data should be made available with minimal restrictions on use and at no more than the cost of reproduction and distribution; and
- All shared data, products and metadata will be made available with minimum time delay.

2.4.1.3 Data Management Principles

GEO will continue to work with partners to promote the adoption of key Data Management Principles (DMP), including the need for common standards and interoperability arrangements. These arrangements enable data and information of different origin and type to be comparable and compatible, facilitating their integration into models and the development of applications to derive

decision support tools. GEO therefore strives to promote and encourage the implementation of DMP, [see *GEO Strategic Plan Reference Document* for further details] which are summarized as follows:

- Earth observations will be catalogued to facilitate discovery and access online using open standards and protocols;
- Data and services will be documented using international or community-approved standards and, to the extent possible, peer-reviewed publications standards to facilitate understanding and use of the data;
- Metadata will include access and use conditions, the results of quality control procedures, and statements indicating the origin and processing history of the dataset;
- Data and associated metadata will be periodically verified to ensure integrity, authenticity and readability, and corrections and updates to data and metadata records will be performed as required; and
- Data providers will be acknowledged by means of internationally-accepted citation standards.

2.4.2 Engage

Given its strategic, upstream coordination position in the international community with respect to observations, data and information about the Earth system, GEO is well-positioned to actively engage with key stakeholders, including, *inter alia*, UN bodies, donor organizations, businesses, and other communities of intermediary- and end-users.

Additionally, GEO will seek to act in partnership with other actors in the international donor and development community and the private sector, to effectively reach the users and, as appropriate, facilitate the development of solutions, through tools and services, tailored to those users' preferences and needs.

2.4.2.1 Capacity Building

Capacity building, as well as sustaining and enhancing existing capacity, are critical for developing the competence of GEO Members and Participating Organizations to use Earth observations efficiently for responding to societal challenges and addressing sustainable development issues. The need for greater capacity to access and use Earth observation data and tools is particularly strong in developing countries. Collaborations with key government entities and international donor and development organizations will be required to: integrate the use of Earth observation data, information tools and services in the decision-making processes in developing countries; establish and increase awareness concerning the value of Earth observation information; facilitate the development of national GEO and Spatial Data Infrastructures, as necessary; and assist in the development of technical and human capacity to fully utilize these resources.

To further these goals, GEO will therefore:

- promote engagement worldwide, including both developed and developing countries;
- assist developing countries and regions in increasing their capacity to acquire, share, store, maintain and utilize Earth observation data and information;
- engage with the international development and donor organizations to identify country-specific opportunities for demonstrating the value of Earth observations;
- pursue opportunities to work with the appropriate national and sub-national entities to develop activities towards improving their decision-making and accrue added-value; and
- promote regional cooperation through national and regional GEO mechanisms.

2.4.2.2 Communities of Practice

Communities of Practice may form within, or engage with, GEO in response to identified needs or shared interests. For example, Communities of Practice may consider aspects of societal challenges, or managing and developing pooled resources. Stronger Communities will demonstrate the convening power of GEO by including stakeholders along the full continuum of the data and information chain, from providers, to processors, to end users.

2.4.2.3 Private Sector

GEO will actively engage with the **private sector** at all stages of the data, information, and knowledge chain, not only to achieve the Strategic Objectives, but also potentially:

- enhance the added value of GEO through facilitating the use of GEOSS by the private sector; and
- improve the evidence base and implementation of environmental decision-making, both in private and public sectors.

2.4.3 Deliver

Drawing on its engagement with stakeholders, GEO aims to deliver the tools, knowledge, products and services suitable for effective exploitation by user communities.

GEO facilitates enhanced access to:

- national, regional and global Earth observation data and information (including model simulations and citizen science observations);
- related socio-economic data and information;
- information pertaining to existing gaps of observational scales and data;
- tools to transform Earth observations and other related data and information, from environmental to socio-economic, into useable formats for resource management and decision-making; and
- knowledge underlying the use of data, information and tools for decision-making.

To achieve these aims, GEO will advance the evolution of GEOSS.

2.4.3.1 Global Earth Observation System of Systems (GEOSS)

GEOSS is a set of coordinated independent Earth observation, information and processing systems that interact and provide access to key and diverse information for a broad range of users. GEOSS links these systems to strengthen the monitoring of the state of the Earth. Thus, GEOSS increases our understanding of Earth processes and enhances predicting capabilities that, when linked to relevant socio-economic data, underpins sound decision-making. GEOSS represents the main gateway to a continuous flow of environmental data and information, of identified quality and provenance, as well as to the associated knowledge and user-friendly tools and data services.

GEOSS comprises both observing and information systems:

- **Observation systems** which include ground-, air-, water- and space-based sensors, field surveys and citizen observatories. GEO works to coordinate the planning, sustainability and operation of these systems, aiming to maximize their added-value and use; and
- **Information and processing systems** which include hardware and software tools (such as models) needed for handling, processing and delivering data from the observation systems to provide information, knowledge, services and products.

These systems are recognised as being a part of GEOSS by disclosing their resources through the use of standards and sharing these resources.

GEOSS supports a broad range of implementation options, and flexibly incorporates new technologies and approaches for data collection and interdisciplinary analysis, thus exploiting the opportunities afforded by these technologies in ways that make GEOSS more relevant to wide segments in society, and trusted as a key source of information about our planet.

GEOSS, collectively, supports several functions:

- acquiring observational data;
- enabling interoperability between contributing systems;
- processing data into useful products and services; and

- finding, sharing, integrating and archiving data, metadata and products based on the Data Sharing, and Data Management Principles.

The components of GEOSS are connected together by its architecture which is based on the following principles: openness; effectiveness; flexibility; adaptability; sustainability; and reliability.

3 CORE FUNCTIONS AND TARGETS

GEO provides a platform for political dialogue advocating the use of Earth observations in achieving shared objectives, notably those of the global sustainable development agenda. GEO engages with stakeholder communities and acts as a unique broker, connecting users, data providers, engineers, scientists and other relevant experts across governments, the private sector, civil society and academia to create solutions to global challenges, which cross both country and disciplinary boundaries. Drawing on these partners, GEO will implement its Strategic Objectives through a set of Core Functions. These are oriented towards specific, measurable, and achievable targets designed to enable an effective implementation, including monitoring of progress and evaluation of achievements. The targets accompanying each of the Core Functions are listed in the *GEO Strategic Plan Reference Document*.

The Core Functions of GEO are:

I Supporting sustainable development

Actively promote the development of Earth observation-based information services in support of the global sustainable development agenda and evidence-based decision-making. Participate actively in the relevant preparatory activities to build awareness for the potential contributions from Earth observations and implement targeted pilot actions.

II Creating partnerships

Convene users, resource providers, and experts from different sectors in the domain of Earth observations and environmental information, and provide tools and knowledge to facilitate use of Earth observations in all SBAs.

III Implementing regional or global services

Incubate and pilot regional or global initiatives that provide data or information services in the SBAs to meet shared information needs, for example to monitor progress towards policy goals, and support necessary transitions.

IV Identifying gaps in the information chain

Undertake regular, systematic analyses of global observational requirements to identify, document, and prioritize gaps in the information chain. Compile global perspectives on existing planning and provide the framework for Members, Participating Organizations, and other stakeholders to help them develop common strategies in relation to investment planning, and act to sustain observing systems.

V Mobilizing and coordinating resources

Expand the meeting arenas for discussions on resource mobilization for GEO action across disciplines, sectors, and regions. Liaise with resource and funding agencies at national and international levels, and the private sector. Initiate and support studies that address challenges related to global resource mobilization, at all stages of the funding cycle, while providing input to policies relevant for Earth observations.

VI Sharing data

Pursue the GEOSS Data Sharing Principles to promote and expand the sharing, use, and reuse of data, information, and knowledge. Actively advocate, and provide support to enable uptake and implementation of, open data policies, including through the use of the GEOSS Data-CORE.

VII Managing and recovering data

Promote life-cycle management of data holdings shared within GEOSS and the recovery of historic, non-digital data through the development and maintenance of GEOSS Data Management Principles, implementation guidelines, best practice examples, and active advocacy.

VIII Facilitating integrated use of data

Facilitate improved coordination of in-situ observation networks and the integration of data from diverse sources, including in-situ, airborne, spaceborne and citizen observatories, by establishing mechanisms to exchange technology and promote standards and best practices for interoperability.

IX Maintaining an Earth observation reference

Compile and document best practices, compelling application examples, Data Sharing Principles, Data Management Principles, as well as relevant documentation on observation systems and networks, and strengthen user communities by making these available.

X Providing access to GEOSS

Operate and continuously improve technical means that provide access to GEOSS data, information, knowledge, products and services. Document the resources in GEOSS so that their provenance, quality characteristics, processing methods and potential for re-use are understood, and can be communicated easily to users.

XI Building capacity

Establish a framework for Members and Participating Organizations, from both developed and developing regions, to build capacity and support key infrastructure, institutional and individual capacities in the use of Earth observations. Collate and disseminate best practices; develop and enable sustainable training programs; build awareness of the benefits of Earth observations; foster research collaboration among scientists; and support governments and institutions to develop regional and national Earth observation plans.

XII Creating visibility and awareness

Engage with operators or coordination bodies for observing systems, demonstrate solutions and cultivate awareness for the benefit of the integrated use of earth observation data. Actively advocate protection of spectral domains needed for EO from competing uses, as well as assessing upcoming trends. Also advocate establishment of basic global reference measurements such as gravity, bathymetry and topography that provide fundamental information underpinning all observation systems.

XIII Promoting innovation

Facilitate the take-up of new and innovative approaches, such as crowd-sourcing, by promoting best practices and maintaining an inventory of methods and technologies used within initiatives.

4 IMPLEMENTATION**4.1 GEO Implementation Mechanisms**

GEO actions can range from very substantial global activities with ambitious, multi-faceted, long-term objectives and complex stakeholder groups, to single-focus activities in smaller groups. These different types of activities contribute to GEO's objectives in various ways, but are all valuable and make important contributions. GEO implements these activities through four Implementation Mechanisms (Figure 2). These mechanisms provide a framework, which is both flexible and open, enabling the broad and diverse GEO community to work together. There is no hierarchy between GEO actions implemented through different mechanisms, nor is there a necessary progression. Each of the mechanisms serves a different purpose in GEO's framework, allowing activities of different scale and kind to be implemented [for greater detail, see *GEO Strategic Plan Reference Document*]:

- **GEO Community Activities** allow stakeholders to cooperate flexibly in a bottom-up fashion and with a low initiation cost. They can include a broad variety of activities. GEO Community Activities may, for example, define user needs, explore new frontier applications or demonstrate technical possibilities, or agree on specific observation or analysis protocols and data exchange.
- **GEO Initiatives** allow Members and Participating Organizations to coordinate their actions and contributions towards a common objective within an agreed, yet flexible framework. They develop and implement prototype services according to GEO priorities. GEO Initiatives may, for example, demonstrate technical feasibilities through pilot services, or serve a user need.
- **GEO Flagships** allow Members and Participating Organizations to spin-up an operational service serving common needs. They develop and implement near-operational services according to GEO priorities. GEO Flagships may operate for as long as they are able to generate sufficient impact to attract support for their activities. Once they reach a mature, operational stage, they may be taken up by user institutions (e.g. GEO Participating Organizations), for their continued operation over the long term.
- **GEO Foundational Tasks** allow GEO to implement selected, often enabling, tasks to achieve GEO Strategic Objectives and targets. These include coordination actions, gap analyses, the implementation of technical elements for accessing GEOSS, and other routine operations of the GEO Secretariat. Thus, they provide important support functions to Flagships, Initiatives, and Community Activities.

4.2 The GEO Work Programme and Progress Report

The multi-annual GEO Work Programme, accepted by Plenary, constitutes the primary coordination and planning instrument to assist GEO with the selection and prioritization of its activities. The Work Programme defines the GEO Foundational Tasks. Advisory mechanisms, such as Advisory Boards, may be set up for individual Foundational Tasks, as needed. It also describes the plans of GEO Flagships and GEO Initiatives, according to their applicable planning instruments, and of GEO Community Activities according to the best knowledge of the Secretariat.

Each Work Programme is proposed by the GEO Secretariat to the Programme Board, based on input from GEO Members, Participating Organizations and the greater GEO Community. Through an iterative process, the Programme Board reviews and further develops the Work Programme to ensure alignment with the priorities of, and identify resource commitments from, Members and Participating Organizations before recommending the Work Programme to Plenary for acceptance.

The Work Programme strives to optimally pursue the achievement of the Strategic Objectives through the implementation of GEO's Core Functions, within the constraints of identified and committed resources. The Work Programme will align with the priorities of GEO Members and Participating Organizations and identify resource commitments by GEO Members, Participating Organizations, and other third parties, be they actual financial contributions or in-kind.

An annual Progress Report will be compiled by the GEO Secretariat on all activities, drawing on available reports of the GEO Flagships, GEO Initiatives, GEO Foundational Tasks, and on best knowledge of GEO Community Activities. This Progress Report should give due recognition to the major contributions of GEO Members, Participating Organizations, and any third party. It should enable an evaluation of progress towards the corresponding targets.

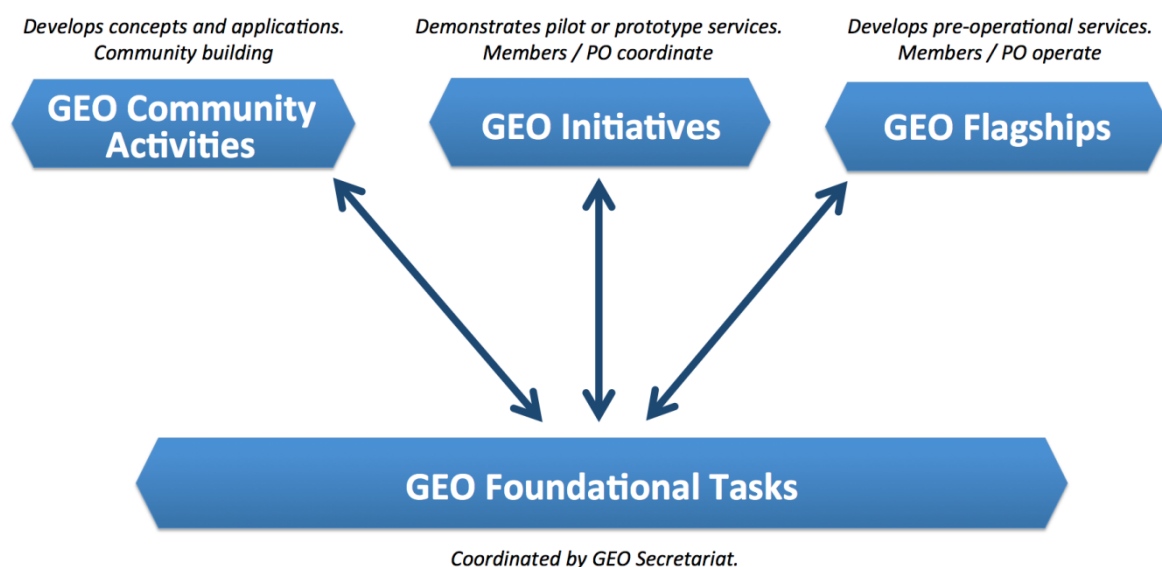


Figure 2: The four GEO Implementation Mechanisms (see *GEO Strategic Plan Reference Document* for details).

5 GOVERNANCE

5.1 Governance Principles and Organizational Structure

Sound governance and decision-making processes within GEO are required to achieve its Vision and Strategic Objectives.

5.1.1 Governance principles

In order to successfully achieve its purpose and to develop all related functions, GEO implements governance arrangements consistent with the following principles:

- voluntary, legally non-binding participation;
- consensus-oriented decision-making;
- legitimacy of decision-making;
- accountability to Plenary and Ministers;
- transparent management of activities and funding ; and
- inclusive of Participating Organisations in the overall governance of GEO.

5.1.2 Organizational structure

5.1.2.1 Ministers

Ministers will meet periodically to provide the overall strategic policy for GEO.

5.1.2.2 Plenary

GEO will meet at least annually in Plenary. This main decision-making body is composed of GEO Principals representing GEO Members and Participating Organizations, including international and non-governmental organisations, all of which actively contribute to GEO in realizing its Vision, and provide the overall direction on the implementation of the Strategic Plan.

Plenary will take decisions by consensus of GEO Members. The GEO Plenary may delegate explicitly and formally decision-making powers to other bodies of the organizational structure and/or other subsidiary bodies as appropriate, to be established in accordance with the following general criteria:

- GEO Members and Participating Organizations should be enabled to engage fully in the implementation activities of GEO; and
- Relevant stakeholders from various fields, including science and technology, economic development, social sciences and the private sector, as well as user groups should be engaged through appropriate advisory and stakeholder representation mechanisms.

Members and Participating Organizations should coordinate and may meet periodically by geographic region, or Caucus, to facilitate coordination at regional levels.

5.1.2.3 Executive Committee

An elected Executive Committee, comprised of representatives of GEO Members, will provide the strategic leadership for GEO activities when the Plenary is not in session. Four Co-chairs will lead the discussion of the Executive Committee. The number of seats on Executive committee should be reflective of the GEO membership and geographic region. Further, election procedures for the Co-chairs should ensure that developing countries are fairly represented.

Executive Committee Members, including those Members serving as Co-Chairs, will be nominated through regional Caucuses. Based on the conclusions of the regional Caucuses and further consultations as necessary, the Director of the Secretariat will present a slate of nominees, including those nominated to serve as Co-Chairs, to the Plenary for its approval.

In recognition of the important role of Participation Organisations and to help inform the discussions, a number of observer seats at the Executive Committee meetings will be granted to Participating Organizations, which includes the right to make statements and engage in discussions.

5.1.2.4 Programme Board

A GEO Programme Board, accountable to Plenary and composed of representatives of Members and Participating Organizations, will support the development and implementation of GEO activities. In particular, it will guide the GEO Secretariat in preparing the GEO Work Programmes for acceptance by Plenary.

To ensure the Programme Board's activities are aligned with the strategic leadership of the Executive Committee, the Programme Board will keep the Executive Committee informed on progress.

5.1.2.5 Secretariat

A Secretariat, led by a Director and accountable to Plenary and the Executive Committee, will facilitate and support GEO activities. The Secretariat consists of primarily co-located, well-qualified, professional and administrative staff.

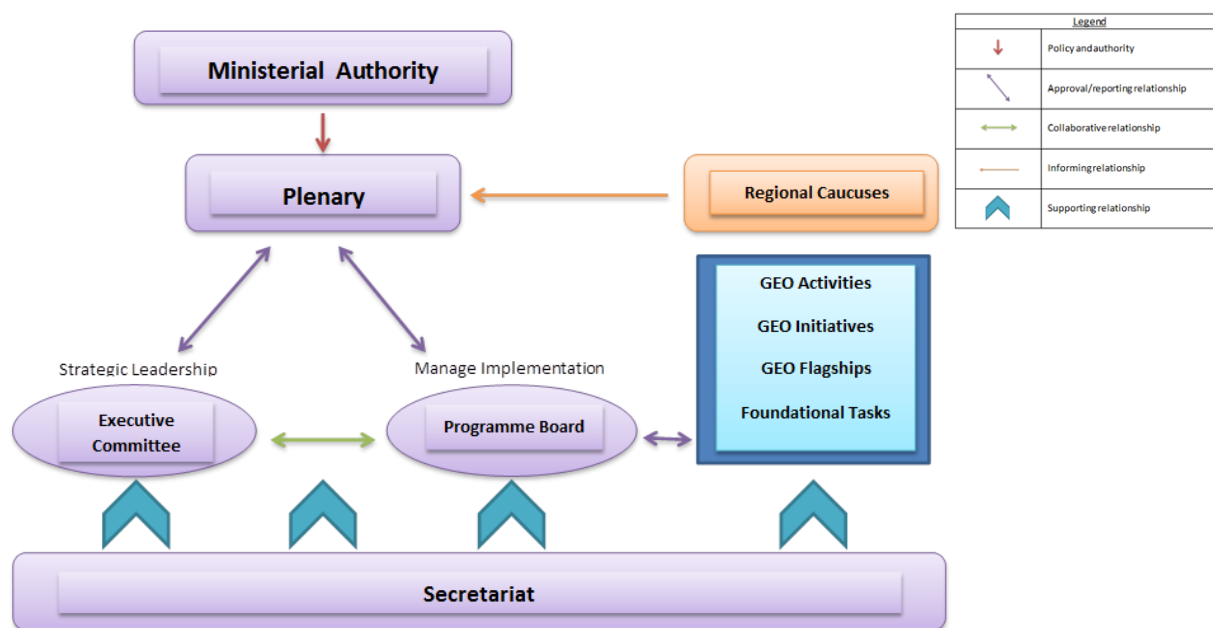


Figure 3: The organizational structure of GEO governance.

5.1.3 Rules of Procedure

Details pertaining to nomination of GEO Principals; Caucus composition; the size of, and election procedure of government representation to, the Executive Committee; the election and rotation procedures of Executive Committee Co-chairs; the designation of Participating Organization observer seats on the Executive Committee; the roles and responsibilities of the Programme Board and the election procedure for participation in the Programme Board; and the duties and responsibilities of the Secretariat are laid out in the GEO Rules of Procedure and associated Terms of Reference.

5.2 Legal Status

GEO [*will work towards attaining / may attain / will attain*] legal independence to facilitate its participation in other international bodies and its ability to undertake financial and contractual transactions. Any mechanism for achieving independent legal personality must respect the voluntary intergovernmental nature of GEO, avoid cumbersome national and international approval processes, limit the administrative burden on the part of Members, and preserve GEO's flexibility in operating.

6 RESOURCES THROUGH 2025

A sound, sustainable financial footing is required for GEO to be successful through to 2025. However, any mechanism to encourage contributions must respect the voluntary nature of GEO, be simple, adaptable, and applicable to GEO's unique context. The mechanism should also foster greater engagement with the private sector while maintaining coherence and cohesiveness across GEO.

Contributions to GEO may be distinguished as: (i) contributions to the GEO Trust Fund supporting, as decided by Plenary, the GEO Foundational Tasks, specifically-earmarked GEO Flagships, and the operations of the Secretariat; and (ii) contributions to GEO implementation activities.

Contributions may be in-kind or cash contributions. In order to recognize the value of in-kind contributions provided by many members and POs, these contributions will be quantified during the budgeting process.

6.1 GEO Trust Fund

To help achieve financial stability, GEO will encourage its Members and Participating Organizations to support the GEO Trust Fund through voluntary contributions.

A voluntary indicative scale of contribution (VISC) has also been developed for Members [see *GEO Strategic Plan Reference Document*]. This VISC will be regularly reviewed by Plenary.

The use of multi-year contribution mechanisms will be encouraged to assist in long-term budget planning.

6.2 Contributions to GEO activities

GEO activities are the core of GEO and ensure that GEO is meeting its targets and objectives. In order for GEO to achieve its objectives, GEO activities need to be properly funded. The Implementation Mechanisms set out in Section 4 adopt a resourcing model where resources committed are commensurate with the type of action (i.e. GEO Community activities, GEO Initiatives, GEO Flagships, and GEO Foundational Tasks). This model is described below:

- **GEO Community Activities** form at the initiative of interested parties. They often will not have all necessary resources identified from the beginning and the objectives may be defined at a relatively general level.
- **GEO Initiatives** have a clearly identified objective and an implementation plan that describes how the objective is to be achieved. Initial contributions by Members, Participating Organizations, private sector players and other third parties are identified to the extent known. Further commitments may often be sought during the implementation of the Initiative. Contributions are typically made in kind (e.g. by observation systems operated to serve the Initiative's objectives, models, funded research projects or programmes).
- **GEO Flagships** have both a clearly identified objective and an implementation plan that describes how that objective is to be achieved. Corresponding contributions by Members, Participating Organizations, private sector players and other third parties are identified at the outset. While these contributions must be sufficient to implement the initial objective of a GEO Flagship, additional contributions and partners may be added during implementation. Contributions are typically made in-kind, e.g. by observation systems operated to serve the Initiative's objectives, models, funded research projects or programmes, but may also include direct financial contributions or those that are earmarked within the Trust Fund as being in support of a particular GEO Flagship.
- **GEO Foundational Tasks** contributions can be made available from the GEO Trust Fund and may be complemented by further contributions, either directly or in kind, from GEO Members, Participating Organizations, or other partners.

6.3 Private Sector

GEO offers unique information and opportunities to the private sector and development banks to serve their information needs, for example, in agriculture, transportation, resource extraction and insurance sectors. In turn, GEO benefits from participation of the private sector through access to new types of data, different skill sets and a broader community network. Further, development banks offer a unique avenue to GEO to engage directly with developing countries. Given these mutual benefits, the private sector and development banks are likely to be key contributors to make substantive progress towards GEO's Strategic Objectives. GEO will actively engage with these investors to seek out new opportunities for collaboration.

7 GETTING INTO ACTION – KEY MILESTONES

As GEO enters into its next decade it will focus on addressing the societal challenges facing humankind by being an advocate for the value of Earth observations, engaging with key stakeholders including the private sector and development banks, and delivering data information and knowledge all critical to informing decision making. This Strategic Plan will enable GEO to fulfill this role and realize its Vision of “of “a future wherein decisions and actions for the benefit of humankind are informed by coordinated, comprehensive and sustained Earth observations”, through a structured Work Programme process, sound governance, and a plan for sustained resourcing.

This Strategic Plan will be implemented by achieving key milestones. A transitional Work Programme for 2016 has been developed and, starting in 2017, three -year Work Programmes will be developed for the duration of the Strategic Plan. Plenary will meet at least once annually to review progress towards the strategic objectives and provide overall guidance and direction. Ministers will meet at mid-term in 2020 to review progress and course-correct as appropriate, and will meet again at the end of the 10 years in 2025 to conclude on the past and provide direction for the future. These meetings will be informed by the ongoing work of the Executive Committee, the Programme Board, and the Secretariat.

GEO Strategic Plan 2016-2025: Implementing GEOSS

Reference Document

GEO

6/23/2015

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GEOSS Description

The Global Earth Observation System of Systems (GEOSS) is a set of coordinated independent Earth observation, information and processing systems that interact and provide access to key and diverse information for a broad range of users. GEOSS links these systems to strengthen the monitoring of the state of the Earth. By linking it to relevant socio-economic data, the GEOSS increases our understanding of Earth processes and enhances predicting capabilities that underpins sound decision-making. GEOSS represents the main gateway to environmental data and information, of identified quality and continuous flow, as well as to the associated knowledge and user-friendly tools and data services.

GEOSS comprises both observing and information systems:

- Observation systems which include ground-, air-, water- and space-based sensors, field surveys, and citizen observatories. GEO works to coordinate the planning, sustainability and operation of these systems, aiming to maximize their added-value and use;
- Information and processing systems which include hardware (architecture) and software tools (such as models) needed for handling, processing and delivering data from the observation systems to provide information, knowledge, services and products.

GEOSS, responsive to user needs, support a broad range of implementation options, and be able to incorporate new technologies and approaches for data collection and analysis (e.g. new satellites, cloud computing, sensor webs, Big Data, crowdsourcing and citizen science).

GEOSS is to be open to new contributions of observations, data, information products and services by the private sector and civil society, and exploit the opportunities afforded by new technologies in ways that make GEOSS more relevant to wide segments in society, and trusted as a key source of information about our planet.

GEO promotes the adoption of Data Sharing and Data Management principles and facilitates and enables elements of GEOSS to be developed and operated so that user information requirements can be met.

GEO promotes and enables interoperability between contributing systems in GEOSS and maintains, operates and upgrades the technical components that allow users to search, discover, access and share data, products and services.

GEOSS, collectively, supports several functions:

- to address user requirements
- to acquire observational data
- to process data into useful products and services
- to find, share, integrate and archive data, metadata and products based on the Data Sharing, and Data Management principles ; and
- to monitor performance against the defined requirements and intended benefits.

The components of GEOSS are connected and tied together in a GEOSS architecture, which has the following principles:

Openness: The architecture shall be open and allow interoperability among multiple stakeholders to contribute their data and services and add value to the GEOSS.

Effectiveness: The architecture shall be capable of sufficient performance in all areas to meet GEOSS and stakeholder strategic goals and objectives.

Flexibility: The architecture shall be scalable, to meet current and future requirements; flexible, to meet a broad variety and scale of GEOSS requirements; and agile, to be able to provide solutions across GEOSS with minimum tailoring and re-architecture.

Sustainability: The architecture shall provide the solution for the near and long term in a cost-efficient manner, as technology, policies, and data providers change.

Reliability: The architecture shall be robust, and allow GEOSS to meet users' expectations and effectively manage risk.

GEOSS Data Sharing Principles post 2015

Submitted by the Data Sharing Working Group (DSWG)

The need for the updated GEOSS Data Sharing Principles is based on the following important findings. The Open Data trend worldwide has considerably expanded since the adoption of the GEOSS Data Sharing Principles in 2005. Today the awareness of the benefits and increased commitment towards full and open Earth observation data sharing without restrictions on reuse is stronger in many jurisdictions participating in GEO. In addition, the current GEOSS Data Sharing Principles do not take advantage of the GEOSS Data-CORE mechanism (established as part of the GEOSS Data Sharing Action Plan adopted in Beijing). The renewed GEO (2016-2025) brings an opportunity to further strengthen GEO's role in promoting data availability on a full and open basis. This need was recognised by the GEO members at the GEO Plenary 2014 when the updated Data Sharing Principles were endorsed at the GEO Plenary 2015:¹

- DSP-1. Data, metadata and products will be shared through GEOSS as Open Data by default, by making them available as part of the GEOSS Data Collection of Open Resources for Everyone (Data-CORE)² without charge, without restrictions on reuse, subject to the conditions of registration and attribution when the data are reused.
- DSP-2. Where international instruments, national policies or legislation preclude the sharing of data as Open Data they should be made available through GEOSS with minimal restrictions on use and at no more than the cost of reproduction and distribution.
- DSP-3. All shared data, products and metadata will be made available through GEOSS with minimum time delay.

The main drivers for the updated Data Sharing Principles are the following:

1. Asserting that sharing data as part of GEOSS Data-CORE is the default standard for GEO elevates the status of this mechanism, as well as its overall importance for the successful operation of GEOSS and achievements of the GEO goals, including expanding the commitment to sharing of Earth observations as emphasised in the Vision for GEO 2025 document adopted by the GEO X Plenary;
2. Reference to the term "Open Data" provides context for the interpretation of the use conditions pertinent to data shared as part of GEOSS Data-CORE, as well as brings GEOSS Data Sharing Principles in line with the relevant international, regional, national and organizational developments;
3. The option of sharing data through GEOSS with restrictions on use is presented as a deviation from the default mechanism, with the emphasis on imposing as few restrictions on the use of shared data as possible. This shift in emphasis better recognizes the motivations for GEOSS: encouraging and facilitating reuse of EO data and products, as well as helping make informed decisions within the SBA.
4. The definition of Open Data means that data are shared at minimum cost, for any purpose and to any user. This reflects the current move by many governments towards Open Data and is in accord with the GEO objectives of encouraging data sharing in order to tackle stated societal objectives and promote economic benefits. The current wording of the third Principle that limits free-of-charge sharing to research and education purposes is less apt to achieve these objectives.

¹ Report on Data Sharing Principles Post-2015 and Mechanisms to Ensure Legal Interoperability of Shared Data, Document 8, GEO-XI Plenary.

² GEOSS Data Collection of Open Resources for Everyone (GEOSS Data-CORE) is a distributed pool of documented datasets with full, open and unrestricted access at no more than the cost of reproduction and distribution.

5. Various legal mechanisms of making data available as part of the GEOSS Data-CORE are presented and analysed in the White Paper “Mechanisms to Share Data as Part of GEOSS Data-CORE” as approved by the GEO Plenary in November 2014.

GEOSS Data Management Principles

Prepared by the GEO Data Management Principles Task Force

Approved by Data Management Principles Task Force on April 28, 2015

1 BACKGROUND AND CONTEXT

The background discussion for these initially proposed principles can be found in Document 7³ from GEO XI.

The GEOSS Data Management Principles build on the GEOSS Data Sharing Principles in the sense that they outline what is required in terms of data management to allow data to be shared as Open Data, promptly and at minimum cost. Good data management implies a number of activities which ensure that data are discoverable and accessible, that they may be understood and used, and that they are looked after in the long term.⁴

A Core Function of GEO is to develop and maintain Data Sharing Principles and advocate for the application of the Principles by organizations contributing to GEOSS. Guidelines for implementation will be provided elsewhere.

2 DATA MANAGEMENT PRINCIPLES

To further maximize the value and benefit from the GEOSS Data Sharing Principles, GEO will continue to work with partners to promote the adoption of key Data Management Principles, including the need for common standards and interoperability arrangements. This will enable data and information of different origin and type to be comparable and compatible, facilitating their integration into models and the development of applications to derive decision support tools. GEO therefore strives to promote and encourage the implementation of Data Management Principles, [see GEO Strategic Plan Reference Document for further details] which are summarized as follows:

- Earth observations will be catalogued or otherwise advertised on the internet so that they can be discovered and accessed online using open-standard encodings and services;
- Data and services will be comprehensively documented using international or community-approved standards, and to the extent possible, peer-reviewed publications, so that users can understand and make use of the data;
- Metadata will include access and use conditions, the results of quality control procedures, and provenance statements indicating the origin and processing history of the dataset or product;
- Data and associated metadata will be protected from loss and periodically verified to ensure integrity, authenticity and readability;
- Corrections and updates to data and metadata records will be performed as required; and
- Persistent identifiers will be assigned to data so that they can be tracked and cited, and data providers can be acknowledged.

³ GEO XI Document 7: *Towards Data Management Principles*.

⁴ G8 Science Ministers' Statement (on Open Scientific Research Data), 13 June 2013
<https://www.gov.uk/government/news/g8-science-ministers-statement> : 'Open scientific research data should be easily discoverable, accessible, assessable, intelligible, useable, and wherever possible interoperable to specific quality standards.'

- Adoption of key Data Management Principles, including the need for common standards and interoperability arrangements. This will enable data and information of different origin and type to be comparable and compatible, facilitating their integration into models and the development of applications to derive decision support tools.

GEO therefore strives to promote and encourage the implementation of Data Management Principles on the basis of these five characteristics:

- Discoverability;
- Accessibility;
- Usability;
- Preservation; and
- Curation.

2.1 Discoverability

DMP-1. Data and all associated metadata will be discoverable through catalogues and search engines, and data access and use conditions, including licenses, will be clearly indicated.

2.2 Accessibility

DMP-2. Data will be accessible via online services, including, at minimum, direct download but preferably user-customizable services for visualization and computation.

2.3 Usability

DMP-3. Data should be structured using encodings that are widely accepted in the target user community and aligned with organizational needs and observing methods, with preference given to non-proprietary international standards.

DMP-4. Data will be comprehensively documented, including all elements necessary to access, use, understand, and process, preferably via formal structured metadata based on international or community-approved standards. To the extent possible, data will also be described in peer-reviewed publications referenced in the metadata record.

DMP-5. Data will include provenance metadata indicating the origin and processing history of raw observations and derived products, to ensure full traceability of the product chain.

DMP-6. Data will be quality-controlled and the results of quality control shall be indicated in metadata; data made available in advance of quality control will be flagged in metadata as unchecked.

2.4 Preservation

DMP-7. Data will be protected from loss and preserved for future use; preservation planning will be for the long term and include guidelines for loss prevention, retention schedules, and disposal or transfer procedures.

DMP-8. Data and associated metadata held in data management systems will be periodically verified to ensure integrity, authenticity and readability.

2.5 Curation

DMP-9. Data will be managed to perform corrections and updates in accordance with reviews, and to enable reprocessing as appropriate; where applicable this shall follow established and agreed procedures.

DMP-10. Data will be assigned appropriate persistent, resolvable identifiers to enable documents to cite the data on which they are based and to enable data providers to receive acknowledgement of use of their data.

Core Functions: Monitoring, Evaluation and Targets

GEO provides a platform for political dialogue on the role of Earth observations in achieving shared objectives, notably those of the global sustainable development agenda. GEO's advocacy for robust, data collection systems (space, airborne, terrestrial and marine) and conditions for their effective use aims to ensure the availability of and access to global Earth observation data and information needed.

GEO acts as a broker, connecting users, data providers, engineers, scientists and other relevant experts across governments, the private sector, civil society and academia to create solutions to global challenges, which cross both country and disciplinary boundaries. This role requires deep engagement with and understanding of all of these communities in both developed and developing countries.

Three overarching aspirational Strategic Objectives guide the work of GEO in its second decade towards achieving outcomes that address societal challenges.

GEO will work to achieve these strategic objectives through a set of Core Functions. These are geared towards specific, measurable, and achievable targets designed to enable an effective implementation, including monitoring of progress and evaluation of achievements. (These Core Functions will be implemented through specific actions set out in the GEO Work Programmes. These Work Programme activities reflect GEO's specific choices on approach to implementation which may in many cases be incremental steps.) Their effectiveness can be evaluated against the targets presented here..

The targets in this Reference Document have been designed to enable an effective implementation, including monitoring of progress and evaluation of achievements. These targets are a statement of direction towards a goal with an associated (quantitative) indicator of progress towards the intended result.

1 MONITORING & EVALUATION

The Monitoring and Evaluation function within GEO will be implemented in different ways depending on the Implementation Mechanism chosen as part of the GEO Work Programme.

The purpose of monitoring is to track the progress of the completion of the GEO Work Programme. The GEO Secretariat will conduct monitoring on an on-going and systematic basis, making use where possible of indicators and coinciding timelines with the development of the forthcoming GEO Work Programme and meetings of the Programme Board.

The purpose of the evaluation is to inform improvement of GEO's activities by conducting assessments of the progress towards achieving targets, including intended outputs and outcomes. The evaluation will take note of other contributing activities that are not included in the GEO Work Programme, but are attributable, at least in part, to GEO's actions. Results of the evaluation will help determine what difference GEO has made (effectiveness). The evaluation previously performed by the Monitoring and Evaluation Working Group is implemented through a Foundational Task included in the Work Programme. Reports are used by the Programme Board. An independent Evaluation Team should be set up for each evaluation to execute the evaluation processes.

Two comprehensive evaluations should be conducted with one mid-way through the Strategic Plan period and the other near the end. The evaluations will address the full scope of the activities within GEO, although their primary focus should be on the Strategic Objectives and targets. The mid-term evaluation will also include an assessment on the extent to which the priorities identified in the Mexico City

Ministerial Declaration are being realized and re-orient / refine directions set out in the Strategic Plan to take into account emerging trends and challenges.

Proposals for conducting additional evaluations based on specific topics or Initiatives should be included in proposed Work Programmes. The results of the evaluations are presented to the Programme Board, the Executive Committee and Plenary. The Secretariat will support the evaluations, including by providing the necessary links into GEO communities.

2 CORE FUNCTIONS AND TARGETS

I. Supporting sustainable development

Core Function: Actively promote the development of Earth observation-based information services in support of the global sustainable development agenda and evidence-based decision-making. Participate actively in the relevant preparatory activities to build awareness for the potential contributions from Earth observations and implement targeted pilot actions.

Target:

- Increase the use and relevance of the GEOSS to SDGs, international conventions and treaties on the environment and development, and decision-making.

Indicators:

- Demonstrate the use of Earth observation-based information services in support of the global sustainable development agenda in at least one case for each of the SBA by 2019.
- Establish formal cooperation arrangements with all relevant UN conventions and programmes.

II. Creating partnerships

Core Function: Convene users, resource providers, and experts from different sectors in the domain of Earth observations and environmental information, and provide tools and knowledge to facilitate use of Earth observations in all SBAs.

Target:

- Create and maintain flexible frameworks for development and implementation of partnerships, which can involve stakeholders from government, international organizations, private sectors and citizens, enabling resources of members to be pooled to deliver information services in support of agreed global policy frameworks.

Indicator:

- Active and effective Communities of Practice exist in each GEO SBA, pooling knowledge and advising GEO activities within their remit and spawning new initiatives.

III. Implementing global or regional services

Core Function: Incubate and pilot regional or global initiatives that provide data or information services in the SBAs to meet shared information needs, for example to monitor progress towards policy goals, and support necessary transitions.

Target:

- Address shared societal challenges in progressing towards sustainability by building on GEO Flagships and Initiatives that support decision-making through the provision of the required data, information, knowledge, products and services (e.g. risk decision-making processes in both private and government sector that draw on GEOSS resources).

Indicator:

- At least one GEO Flagship or Initiative exists for each of the SBAs, delivering pre-operational information services, which are maintained through dedicated arrangements.

IV. Identifying gaps in the information chain

Core function: Undertake regular, systematic analyses of global observational requirements to identify, document, and prioritize gaps in the information chain. Compile global perspectives on existing planning and provide the framework for Members, Participating Organizations, and other stakeholders to help them develop common strategies in relation to investment planning and act to sustain observing systems.

Targets:

- Programme decisions at Member State or Participating Organization level provide budgetary resources to maintain and strengthen observation systems (space-based, airborne and particularly in situ) and networks of observation systems, in particular those necessary for essential variables, to support decision-making in response to global societal challenges.

Indicators:

- Regular overview of observation systems & gaps in key domains is compiled.
- Agreement on inventory of Essential Variables and Fundamental observations for all SBAs.
- Effective framework established by 2018 with relevant stakeholders to agree on criteria for priorities and on how to address gaps.

V. Mobilizing and coordinating resources

Core Function: Expand the meeting arenas for discussions on resource mobilization for GEO action across disciplines, sectors, and regions. Liaise with resource and funding agencies at national and international level, and from the private sector. Initiate and support studies that address challenges related to global resource mobilization, at all stages of the funding cycle, while providing input to policies relevant for Earth observations.

Targets:

- Explore and leverage resources within the GEO community as well as addressing political and practical issues relating to resourcing the GEO Work Programme.
- Undertake and facilitate dialogue with funding agencies (research, innovation, etc.) and add complementary knowledge.

Indicators:

- Report annually to GEO Plenary on priority gaps.

- All high-priority gaps identified through GEO are addressed through funded programmes.
- GEO Flagships and Initiatives respond to agreed-upon needs articulated by decision makers, and development banks are resourced at a level ensuring that they can achieve their objectives.

VI. Sharing data

Core Function: Pursue the GEOSS Data Sharing Principles to promote and expand the sharing, use, and reuse of data, information, and knowledge. Actively advocate, and provide support to enable uptake and implementation of, open data policies, including through the use of the GEOSS Data-CORE.

Targets:

- Further data re-use by securing free, full, and open data access.
- Increase awareness of the GEOSS Data Sharing Principles (DSP).

Indicators:

- All data used to create agreed Essential variables is available under full free and full and open data access.
- More than 50% of GEO Members put in place open data policies and provide practical data access according to GEO DSP.

VII. Managing and recovering data

Core Function: Promote life-cycle management of data holdings shared within GEOSS and the recovery of historic, non-digital data through the development and maintenance of GEOSS Data Management Principles, implementation guidelines, best practice examples, and active advocacy.

Targets:

- Interoperability, re-use and retrieval of long-term archives of data is enhanced.
- GEOSS Data Management Principles (DMP) are agreed by GEO Plenary.

Indicators:

- The quality of provenance information in GEOSS is improved and conforms to DMP and relevant standards for at least all data used in GEO Flagships and Initiatives.
- Half of the resources in the GEOSS tagged with meaningful high-quality metadata.
- Legacy data sets are increasingly digitized and available.
- All legacy datasets referring to high-priority observations in any of the SBAs, are available in digital form.

VIII. Facilitating integrated use of data

Core Function: Facilitate improved coordination of in-situ observation networks and the integration of data from diverse sources, including in-situ, airborne, spaceborne and citizen observatories, by establishing mechanisms to exchange technology and promote standards and best practices for interoperability.

Targets:

- Parameters measured in situ by regional or local networks are measured according to agreed standards and protocols.
- Stakeholders agree on a pan-regional to global network approach and develop strategies for filling gaps in the global observation networks, as required, including all possible contributions from in-situ, airborne and space systems.

Indicator:

- In situ networks with opportunities for improved coordination identified, deficits prioritized, (based on use) and progressively addressed.

IX. Maintaining an Earth observation reference

Core Function: Compile and document best practices, compelling application examples, Data Sharing Principles, Data Management Principles, as well as relevant documentation on observation systems and networks, and strengthen user communities by making these available.

Target:

- Establish an internationally recognized resource for researching Earth observation systems, networks, applications, technologies, standards and protocols, as documented by access numbers and references in published reports and literature.

Indicator:

- Earth observation reference established, capable of indicating access numbers in real time, as well as number of published reports.

X. Providing access to GEOSS

Core Function: Operate and continuously improve technical means that provide access to GEOSS data, information, knowledge, products and services. Document the resources in the GEOSS so that their provenance, quality characteristics, processing methods and potential for re-use are understood, and can be communicated easily to users.

Target:

- The GEOSS becomes an established and internationally recognized resource for finding and understanding Earth observation data, information and knowledge.

Indicators:

- More than [X] numbers of users access the GEO Portal at least once per month.
- Progressively harmonize the attributes of GEOSS data, proceeding from a set of minimum requirements for recording quality attributes, data provenance, and processing (methods) to inter-calibration of data to, where possible, standardization of methods.
- All high-priority / EV Data are tagged with data quality information according to [X] standards.
- At least [X%] of GEOSS data have harmonized provenance meta-data.

XI. Building capacity

Core Function: Establish a framework for Members and Participating Organizations, from both developed and developing regions, to build capacity and support key infrastructure, institutional and individual capacities in the use of Earth observations. Collate and disseminate best practices; develop and enable sustainable training programs; build awareness of the benefits of Earth observations; foster research collaboration among scientists; and support governments and institutions to develop regional and national Earth observation plans.

Targets:

- Strengthen the capacity to exploit and integrate GEOSS data & information into applications and solutions especially by developing countries, private, research and innovation sectors.
- Strengthen the relationship between GEO and member countries through building and reinforcement of regional GEO networks.
- Strengthen partnerships between GEO and other organisations leading related capacity building initiatives in data science and other areas related to Earth Observations.
- In particular for developing countries, accelerate the implementation of the Earth observation infrastructure to facilitate access and the use of Earth observation data and services through pooling and exchange of best practice, technology and expertise.

Indicators:

- Developing country participation in GEO initiatives is increased.
- Increase in national and regional GEO offices and networks.

XII. Creating visibility and awareness

Core function: Engage with operators or coordination bodies for observing systems, demonstrate solutions and cultivate awareness for the benefit of the integrated use of earth observation data. Actively advocate protection of spectral domains needed for EO from competing uses, as well as assessing upcoming trends. Also advocate establishment of basic global reference measurements such as gravity, bathymetry and topography that provide fundamental information underpinning all observation systems.

Targets:

- Improve the visibility and awareness of GEO and GEOSS resources and the value of Earth Observations in providing baseline status, monitoring trends, assessing impacts as well as benefits to addressing wider societal challenges.
- Actively advocate for the protection of spectral domains needed for EO from competing uses, as well as assessing upcoming trends.

Indicators:

- Develop an engagement strategy, community ambassadorial role and communication portfolio by 2016.
- Organise engagement events with sponsorship/input from new stakeholder communities, profiling relevant GEO Flagships and Initiatives to increase participation through to 2025.
- Awareness of GEO and GEOSS shows year on year improvement with a doubling between first and second evaluation.
- Inventory essential frequency ranges underpinning the objectives in the GEO SBAs which is agreed to in Plenary.

- These frequencies remain available for unimpaired use by EO systems.
- Updated inventory regularly communicated to stakeholders.

XIII. Promoting innovation

Core Function: Facilitate the take-up of new and innovative approaches, such as crowd-sourcing by promoting best practices and maintaining an inventory of methods and technologies used within initiatives.

Targets:

- Enable development of new cost effective Earth observation technologies/methods (e.g. citizens' observatories, crowd-sourcing, UVs) as means to strengthen and broaden in situ observing systems, as well as facilitating the use of data at multiple scales.

Indicators:

- [X] new citizens observatories registered in the GEOSS every 3 years to provide information about local environmental conditions;
- Demonstrated use of citizen's observatories included in the GEOSS information chain to provide useable outputs for decision making or trend monitoring (examples on phenology, biosphere integrity) in two new cases per Work programme.
- Best practice on experience made available in GEO Earth observation reference.

GEO Implementation Mechanisms

GEO employs different mechanisms to implement its Core Functions. These serve to distinguish between more substantial activities with dedicated resources, and smaller-scale activities, often driven by best-effort initiatives of individuals or small groups. By implementing all actions adequately and appropriately, GEO focuses its resources on selected priorities and matches expectations with available capacity.

The four GEO Implementation Mechanisms are defined as follows:

- GEO Community Activities;
- GEO Initiatives;
- GEO Flagships;
- GEO Foundational Tasks.

1 GEO COMMUNITY ACTIVITIES

GEO Community Activities allow stakeholders to cooperate flexibly in a bottom-up fashion, with a low initiation cost, and can include a broad variety of activities. GEO Community Activities may, for example, define user needs, explore new frontier applications or demonstrate technical possibilities, or agree on specific observation or analysis protocols. They are often conceptual, investigative or developmental in nature. Community Activities are typically smaller-scale undertakings with commitments for contributions often disparate, made at the level of institutions or individuals. Users may be involved to the extent that they have been identified and engaged.

GEO Community Activities may form spontaneously at the initiative of interested parties. All necessary resources may not be completely identified from the beginning and the objectives may be defined at a relatively general level. Corresponding to their disparate nature, the styles of management may vary considerably among different Community Activities.

Examples of GEO Community Activities in the transitional Work Programme 2016 include the Global Urban Observation, and Information Task and the Global Water Quality Information Task.

1.1 Establishing GEO Community Activities

Any self-formed group within the GEO Community may propose GEO Community Activities at any time. Often, Societal Benefit Working Groups or Communities of Practice (CoP) may be the natural frameworks within which ideas can be conceptualized and matured. The initiating groups develop brief proposals describing the activities, including its objectives, schedule, contributors and stakeholders. Community Activities may also arise as a result of GEO's engagement activities or Memoranda of Understanding between the GEO Secretariat and other institutions.

The GEO Secretariat accepts proposed Community Activities into the GEO Work Programme and associated Progress report, based on agreed criteria. Most importantly, the GEO Secretariat must verify that a proposed Community Activity is aligned with GEO's objectives and direction. The Secretariat may also make recommendations on a proposal with respect to, for example, augmenting contributions, improving coordination with existing GEO Initiatives or other GEO Community Activities, or sharpening support for GEO's Strategic Objectives.

GEO Community Activities may evolve into GEO Initiatives if and when they provide an Implementation Plan that is accepted by the GEO Programme Board.

1.2 Criteria for establishing GEO Community Activities

- Objective(s) shared by a group of interested partners
- Multi-national stakeholder group or scope
- Relevance to GEO's Strategic Objectives

1.3 Contributors

Primary contributors to GEO Community Activities are Participating Organizations, GEO Members (through their corresponding institutions or *in situ* international observation networks), and possibly other partners from the private sector. GEO Community Activities may also include contributions from individual citizens through citizen observatories.

1.4 Management and coordination

GEO Community Activities are self-organized and implement flexible arrangements defined by participants. The GEO Secretariat may facilitate communication and implementation through, for example, limited support in organizing meetings.

A Lead must be identified for the Community Activity, who acts as an interface for the GEO Secretariat and other interested parties.

1.5 Reporting to GEO

The GEO Secretariat will seek information from GEO Community Activities (through the Lead) on progress and developments. Where such information can be obtained, it will be included in the annual GEO Progress Report.

1.6 Monitoring and Evaluation

The GEO Secretariat monitors the development of GEO Community Activities through regular interaction with the Lead. GEO does not evaluate Community Activities.

2 GEO INITIATIVES

GEO Initiatives allow Members and Participating Organizations to coordinate their actions and contributions towards a common objective within an agreed, yet flexible framework. They develop and implement prototype services according to GEO priorities. GEO Initiatives may, for example, demonstrate technical feasibilities through pilot services, or respond to a user need. GEO Initiatives concern activities for which the user communities are known at a general level (but may not yet have been fully defined in detail), where some products and services may exist (but may have not yet been fully consolidated), and where resourcing options have been identified (but may have not yet been fully identified or analyzed). Contributions are typically made in kind, including observation systems operated to serve the Initiative's objectives, models, funded projects, or other programmes.

GEO Initiatives have a clearly identified objective that responds to needs of Members and Participating Organizations and an Implementation Plan (IP) setting out how that objective is to be achieved. Initial contributions by Members, Participating Organizations, and private sector players are identified to the extent known. Further commitments may often be sought during the implementation of the Initiative. Relevant stakeholders should be engaged in the development of the Initiative, with the user community being integrated into the Initiative as it develops. Clarifying user needs and consolidating communities should be amongst the objectives of GEO Initiatives.

Some GEO Initiatives may evolve into GEO Flagships if and when accepted by Plenary following a recommendation by the GEO Programme Board. However, Initiatives may also be taken up directly by a Participating Organization, or be discontinued if, in particular, their objective has been achieved. The IP should outline any expectations with respect to the final phase of the Initiative.

Examples of GEO Initiatives in the transitional GEO Work Programme 2016 are the Forest Carbon Tracking Initiative and the African Water Cycle Coordination Initiative.

2.1 Establishing GEO Initiatives

Any GEO Member, Participating Organization, or the GEO Secretariat may conceptualize and propose a new GEO Initiative based on a detailed IP. IPs are discussed and further developed by those proposing the Initiative together with the GEO Programme Board. The SBA Working Groups should be involved when developing GEO Initiatives. Where Communities of Practice (CoP) can contribute to the development of the IP, they should be engaged at an early stage. Their role is described in the IP. The GEO Programme Board works to establish consensus concerning the proposed objectives and the IP, and to ensure that a sufficient level of resources and contributions are committed for successful implementation of the Initiative. All contributions – in kind or otherwise – are listed, described, and valued in the IP. Contributions may include specific commitments from GEO Members, Participating Organizations, private sector partners, or other third parties. If and when this can be achieved, the GEO Programme Board may accept the new GEO Initiative.

By accepting a new GEO Initiative, GEO supports its objectives and commits or acknowledges the resources specified in the IP.

2.2 Criteria for establishing GEO Initiatives

- User need or application perspective identified;
- Activity of global or regional scope;
- Multi-national stakeholder group involved;
- Pilot or prototype information service or product developed or demonstrated;
- Contribution to satisfying user need;
- User institutions identified with plans to solicit their advice;
- Sufficient resources for activities in IP identified and committed;
- Clear relevance to GEO's Strategic Objectives demonstrated;
- GEO Data Sharing Mechanisms, Data Management Mechanisms implemented;
- Capacity Building actions included;
- Implementation Plan, detailing:
 - Objective(s), shared by partners;
 - The information service or product provided;
 - Schedule for implementation;
 - Perspective(s) for evolution;
 - Quantified, itemized resources, including from Members, Participating Organizations, private sector partners and the GEO Secretariat, enabling substantial progress towards objectives;
 - Partners, including target user groups;
 - User representatives engaged, often in advisory roles;
 - Governance and management mechanisms; and

- Monitoring and Evaluation procedures.

2.3 Contributors

Primary contributors to GEO Initiatives are typically Participating Organizations, GEO Members (through their corresponding institutions), and interested partners from the private sector. The specific contributions and the roles of the different contributors may vary between different GEO Initiatives and are described in the IP.

2.4 Management and coordination

GEO Initiatives are generally managed as projects. The detailed arrangements may vary between different GEO Initiatives and are defined in the IP. GEO Initiatives should have effective dedicated steering boards that oversee implementation of the Initiative. Members of the Steering Board should be representatives of those partners providing significant resources to the implementation. Representatives of user communities should also be engaged in the steering board, or advisory boards, as appropriate.

GEO Initiatives may define their steering and advisory mechanisms according to their specific needs, though lessons may be learned from other Initiatives or Flagships.

Typically, a project coordinator will be identified. She/he will typically be resourced by a contributing Member or PO. In some cases, she/he might be established within the GEO Secretariat. The coordinator is responsible for coordinating the implementation of the agreed IP and reporting to GEO on progress and other related issues. A sufficiently resourced Initiative coordinator is an important criterion for accepting a new GEO Initiative.

2.5 Reporting to GEO

The Initiative coordinator is responsible for all reporting to GEO. This includes in particular:

- Progress reports in contribution to the annual GEO Progress Report. These will be reviewed by the GEO Programme Board; and
- Presentations to Plenary, the Executive Committee or the GEO Programme Board, as necessary.

Since many of the contributions will be made in-kind, further reporting will generally be required by individual contributors within their respective contexts.

2.6 Monitoring and Evaluation

Monitoring and evaluation activities are defined in the IP. At a general level, the GEO Programme Board will monitor progress on the basis of the reports from the project coordinator and may recommend changes to the implementation, as needed.

3 GEO FLAGSHIPS

GEO Flagships allow GEO Members and Participating Organizations to spin-up operational services serving common needs. Flagships develop and implement near-operational services according to GEO priorities. They may operate for as long as they are able to generate sufficient impact to attract support for their activities. Once the services reach a mature, operational stage, they may be taken up by user institutions (e.g. GEO Participating Organizations), for their continued operation over the long term. In most cases, Flagships have a clear policy mandate in a convention, treaty or programme. Contributions are typically made in-kind, including observation systems operated to serve the Initiative's objectives,

models, funded research projects or programmes, but may also include direct financial contributions or those that are earmarked within the Trust Fund as being in support of a particular GEO Flagship.

GEO Flagships have both a clearly identified objective responding to needs of Members and Participating Organizations, and an Implementation Plan (IP) that describes how that objective is to be achieved. Corresponding contributions by Members, Participating Organizations, and private sector players are identified at the outset. While these contributions must be sufficient to implement the initial objective of a GEO Flagship, additional contributions and partners may be added during implementation. The relevant user communities are fully engaged and assume a leading role in the implementation.

GEO Flagships may develop a service or services through to maturity, whereupon the service(s) may be taken up by a Participating Organization, or to be transferred into a new organization. The Implementation Plan outlines expectations with respect to the final phase of the Flagship.

Examples for GEO Flagships in the transitional GEO Work Programme 2016 include the Global Forest Observation Initiative (GFOI) and the Global Agricultural Monitoring Initiative (GEO-GLAM).

3.1 Establishing GEO Flagships

GEO Flagships will typically evolve from GEO Initiatives. When a GEO Initiative has matured in terms of service provision, stakeholder engagement, and is aligned with the political priorities of GEO, the GEO Programme Board may recommend that Plenary accept the given Initiative as a GEO Flagship. This recommendation and the corresponding Plenary decision are based on the IP, which must clearly set out how the criteria for GEO Flagships are met. These include the pre-operational delivery of the necessary information, through products or services, to meet the needs of identified users. These users must be identified and involved in appropriate functions in the Flagship. The responsibility for further developing the Flagship IP remains with the proposing team.

The GEO Programme Board may identify gaps in critical information to support the adequacy of the proposal vis-a-vis the criteria for Flagships. Where SBA Working Groups or Communities of Practice (CoP) can contribute to the development of the IP, they should be engaged at an early stage, with their role described in the IP. The GEO Programme Board works to establish consensus regarding the proposed objectives and the IP and achieve a sufficient level of contributions for its successful implementation. All contributions – in kind or otherwise – are listed, described, and valued in the IP. Contributions may include specific commitments from GEO Members, Participating Organizations, private sector partners, or other third parties. If and when this can be achieved, the GEO Programme Board formally recommends the new Flagship to Plenary.

By accepting a new GEO Flagship, GEO supports the Flagship's objectives and commits and/or acknowledges the resources specified in the IP.

3.2 Criteria for establishing GEO Flagships

- Policy mandate from international treaty, convention, programme, or strongly articulated policy obtained;
- Substantial activity of global or regional scope;
- Multi-national stakeholder group involved;
- Information service or product pre-operationally provided;
- User needs satisfied to a significant degree;
- Specific user institutions identified, including mechanisms to enable steering and feedback by these;
- Substantial and sufficient resources for activities in IP identified and committed;

- Clear relevance to GEO's Strategic Objectives demonstrated;
- GEO Data Sharing Mechanisms, Data Management Mechanisms implemented;
- Appropriate Capacity Building actions included;
- Implementation Plan, detailing:
 - Objective(s), shared by partners;
 - The information service or product provided;
 - Schedule for implementation;
 - Perspective(s) for operationalization;
 - Quantified, itemized resources committed at highest level, including from Members, Participating Organizations, private sector partners and the GEO Secretariat. These resources should be shown to match the Flagship's ambition;
 - Partners, including specifically identified users;
 - Users fully engaged, as a minimum, an active role in a Steering Board,
 - Governance and management mechanisms; and
 - Monitoring and Evaluation procedures.

3.3 Contributors

Primary contributors to GEO Flagships are typically Participating Organizations, GEO Members (through their corresponding institutions), and interested partners from the private sector. The specific contributions and the roles of the different contributors may vary between different Flagships and are described in the IP.

3.4 Management and coordination

GEO Flagships are generally managed as projects; the detailed arrangements may vary among different GEO Flagships and are defined in the IP. Flagships should have effective dedicated steering boards that are oversee the Flagship implementation. Members of the Steering Board should involve user representatives and representatives of those partners providing significant resources to the implementation.

GEO Flagships may define steering and advisory mechanisms according to their specific needs, though lessons may be learned from other Initiatives or Flagships.

Typically, a project coordinator will be appointed at the GEO Secretariat. The project coordinator is responsible for coordinating the implementation of the agreed IP and reporting to GEO on progress and issues. A sufficiently resourced project coordinator is an important criterion for accepting a new GEO Flagship.

3.5 Reporting to GEO

The project coordinator is responsible for all reporting to GEO. This includes in particular

- Progress reports in contribution to the annual GEO Progress Report. These will be reviewed by the GEO Programme Board;
- Presentations to Plenary; and
- Presentations to the Executive Committee or the GEO Programme Board, as requested.

GEO Flagships will generally establish Steering or Advisory Groups. These mechanisms are defined in the IP. Also, as many of the contributions will be made in-kind, further reporting will generally be required by individual contributors within their respective contexts.

3.6 Monitoring and Evaluation

The required monitoring and evaluation activities are defined in the IP. At a general level, the GEO Programme Board will monitor progress on the basis of the reports from the project coordinator and may recommend changes to the implementation, as needed.

4 GEO FOUNDATIONAL TASKS

GEO Foundational Tasks allow GEO to implement selected, enabling tasks to achieve GEO Strategic Objectives and Targets. These include coordination actions, gap analyses, the implementation of technical elements for accessing GEOSS, and other routine operations of the GEO Secretariat. Thus, they provide important support functions to Flagships, Initiatives, and Community Activities. The Core Functions set out in the *Strategic Plan 2016-2025: Implementing GEOSS* are the primary reference for these functions. Contributions are often made available from the GEO Trust Fund and may be complemented by further contributions – either directly or in kind – from GEO Members, Participating Organizations, or other partners.

The GEO Secretariat frequently plays a central role in implementing Foundational Tasks or coordination to ensure good progress towards its Target.

Examples of GEO Foundational Tasks in the transitional Work Programme 2016 include the operation and evolution of the GEOSS Common Infrastructure, the implementation of data sharing and management principles, or the protection of radio frequencies required for Earth observations.

4.1 Establishing GEO Foundational Tasks

GEO Foundational Tasks are included in the GEO Work Programme and are accepted by GEO through acceptance of that Work Programme by Plenary. The Work Programme is proposed by the GEO Secretariat. It includes an indication of the resource contribution from the GEO Trust Fund, staff resources from the GEO Secretariat, and direct or in-kind contributions from GEO Members, Participating Organizations and other partners. Requests for additional funds that have not been made available from the Trust Fund, GEO Members, and Participating Organizations are also set out in the Work Programme. Further detailed documentation on the activity may be maintained by the GEO Secretariat.

By accepting the GEO Work Programme GEO commits to resource the activities it contains at the levels indicated in the Work Programme.

4.2 Criteria for establishing GEO Foundational Tasks

- Implements or supports the implementation of at least one of the GEO Core Functions;
- Sufficient resources identified and committed in Work Programme;
- Description in the GEO Work Programme detailing:
 - Objective(s) and Target(s) to be addressed;
 - Specific deliverable to be produced;
 - The activities planned over the period covered by the Work Programme;
 - Schedule for implementation;
 - Cost and resources, including from the GEO Trust Fund, Members, Participating Organizations, and private sector partners;
 - Requests for additional resources linked to specific activities; and
 - Role of the GEO Secretariat and other actors;

4.3 Contributors

Primary contributors to GEO Foundational Tasks are GEO Members, Participating Organizations, and further partners. GEO Members and Participating Organizations also contribute through allowing the GEO Secretariat to use staff and financial resources on the Foundational Tasks.

4.4 Management and coordination

Depending on the specific case, Foundational Tasks may be directly implemented by the GEO Secretariat according to its internal management or by other mechanisms such as a Working Group coordinated by the GEO Secretariat. Advisory mechanisms, such as Advisory Boards, may be set up for individual Foundational Tasks, as needed.

4.5 Reporting to GEO

The GEO Secretariat will report in annual GEO Progress Report on the activities, progress and issues in GEO Foundational Tasks.

At its own initiative or at the request of GEO SBA Teams the GEO Secretariat brings particular items to the attention of GEO, such as to Plenary, the Executive Committee, or the GEO Programme Board.

4.6 Monitoring and Evaluation

The GEO Programme Board monitors progress towards the implementation of GEO Foundational Tasks based on the annual GEO Progress Report. The GEO Secretariats regularly arranges and conducts independent evaluations of the Foundational Tasks.

5 SUMMARY TABLE

Overview of Implementation mechanisms

	GEO Flagships	GEO Initiatives	GEO Community Activities	GEO Foundational Tasks
Purpose / character	pre-operational service(s) top-down	pilot or prototype service(s); top-down	develop, test, or demonstrate application(s); bottom-up	enabling or support function(s) top-down
Initiated by	Specified Members, PO		GEO Community	GEO Secretariat
Accepted by	Plenary	GEO Programme Board	GEO Secretariat Director	Plenary (with Work Programme)
Criteria	<ul style="list-style-type: none"> • Policy mandate • Near-operational • Satisfies user need • User institutions specified • Resources identified and committed 	<ul style="list-style-type: none"> • Development, demonstration, pilot • Targets user need • Some users identified • Resources identified and committed 	<ul style="list-style-type: none"> • Relevance to GEO's Strategic Objectives 	<ul style="list-style-type: none"> • Implements/supports GEO Core Function • Sufficient resources, identified and committed in Work Programme
Management and coordination	Dedicated mechanism; coordinator		Community-based	GEO Secretariat or Working Group
User engagement	Specifically identified , fully engaged, role in Steering Board.	Target user groups generally identified , with at least an Advisory Board role.	May vary, depending on activity.	May vary, depending on Task.

GEO Work Programme Development

1 INTRODUCTION

The GEO Work Programme (GWP) presents the activities that GEO undertakes to implement its Core Functions. It describes GEO Community Activities, GEO Initiatives, and GEO Flagships, and defines GEO Foundational Tasks. The GEO Work Programme serves two functions:

- It is used by GEO Members and Participating Organizations to agree on priorities and activities, including the use of the resources made available through the GEO Trust Fund and the GEO Secretariat. By quantifying resources needed for the activities including and valuating the contributions committed, the GWP provides a tool to match ambitions with available resources; and
- It provides an overview of GEO's plans, thus serving as a basis to help stakeholders align their contributions. The GWP is complemented by annual GEO Progress Reports on the developments within GEO Community Activities, GEO Initiatives, GEO Flagships, and GEO Foundational Tasks.

A GWP Reference Document is maintained by the GEO Secretariat, complementing the Work Programme itself. It contains important background information on principal objectives of the actions in the GWP, their link to GEO Targets and Strategic Objectives, and on monitoring and evaluation activities. Thus, it represents a compilation of the Implementation Plans of GEO Flagships, GEO Initiatives and other relevant documents.

2 GEO WORK PROGRAMME

The Work Programme is proposed by the GEO Secretariat based on input from GEO Members, Participating Organizations, and the greater GEO Community. It strives to optimally pursue the realization of the Strategic Objectives through implementation of GEO's Core Functions constrained by the identifiable resources. It is further developed by the **GEO Programme Board**, which

- ensures alignment with the priorities of GEO Members and Participating Organizations;
- identifies resource commitments by GEO Members and Participating Organizations; and
- provides recommendations to Plenary for approval, in accordance with the Implementation Mechanisms description.

Thus, the GWP implements a top-down mechanism towards the selection of GEO activities. It should be noted that the GWP does not, in itself, guarantee that the activities it contains are sufficient or effective in implementing GEO Core Functions or realizing GEO's objectives. This type of analysis should be performed through dedicated actions for monitoring progress and evaluation of the activities undertaken.

The GWP is presented for acceptance by **GEO Plenary**. By accepting the GWP, GEO:

- **Accepts** that the GEO Foundational Tasks should be implemented with the resources indicated; and
- **Takes note** that the GEO Flagships, GEO Initiatives and GEO Community Activities are expected to be implemented with the corresponding indicative resources.

3 2016-2025 WORK PROGRAMMES

The Work Programme for 2016 represents a transitional Work Programme, serving as a bridge from the first 10 years of GEO (2005-2015) to the next ten years.

The subsequent Work Programmes will cover three-year time periods. This will allow implementing longer-term activities coherently. The following Work Programmes are envisioned:

- Work Programme 2017-2019 – developed by the GEO Secretariat, in consultation with the GEO Community, together with the GEO Programme Board during 2016.
- Work Programme 2020-2022 – developed by the GEO Secretariat in consultation with the GEO Community, together with the GEO Programme Board during 2018-19.
- Work Programme 2023-2025 – developed by the GEO Secretariat in consultation with the GEO Community, together with the GEO Programme Board during 2021-2022.

GEO may accept revisions of the multi-annual Work Programmes at the annual Plenary meeting, based upon recommendations of the GEO Programme Board.

4 DEVELOPMENT OF THE WORK PROGRAMME

The development of the GWP is coordinated by the GEO Secretariat. The transitional GWP 2016 was developed in consultation with the GEO Community under the guidance of the IPWG and the Executive Committee during 2015.

From the 2017-2019 GWP onwards, the GEO Programme Board will be responsible for

- Guiding the GEO Secretariat in developing the GWP and ensuring that the knowledge and capacity of the GEO Community is used as appropriate; and
- Prioritizing the allocation of resources, aiming to ensure full implementation of GEO's Core Functions and optimally advancing the achievement of the GEO Strategic Objectives, while respecting the responsibilities of resource-providers.

The GWP is developed in three phases:

- An initiation phase to collect input from the GEO Community, the GEO Members and Participating Organizations, as well as interested third parties, including from the private sector.
- A consolidation phase to agree on the implementation actions among GEO Participating Organizations and Members and to identify the necessary resources.
- An acceptance phase to formally accept the GWP and commit the necessary resources.

4.1 Initiation phase

The aim of the **initiation phase** is for the GEO Secretariat to propose a draft GWP that

- implements all GEO Core Functions and advances GEOs Strategic Objectives,
- responds to the needs and interests of GEO Members and Participating Organizations
- recognizes and builds on the capacities available in the GEO Community

During the **initiation phase** the GEO Secretariat engages with specific stakeholders such as UN Programmes, Foundations, Treaties or Conventions, the GEO Community at large, and GEO Plenary delegations. The engagement process could be carried out through dedicated discussions, workshops, or consultation processes. The GEO Community can bring forward new proposals or suggest modifications to ongoing activities. (Note that Community Activities can be added at any time). Input should also be provided by relevant advisory boards.

The initiation phase concludes with presentation of a draft GWP by the GEO Secretariat.

4.2 Consolidation phase

The aim of the **consolidation phase** is to align the GWP with GEO (Member and Participating Organizations) priorities and available resources.

During the consolidation phase the GEO Programme Board, supported by the GEO Secretariat, will discuss all GEO Foundational Tasks included in the draft GWP and actively help to make necessary resources available that will enable their implementation. Discussions with potential contributors and the stakeholders active in the activity's implementation will be held during this phase to adjust the activity's content until it can realistically be implemented with resources available.

Also, for GEO Flagships and Initiatives the GEO Programme Board will review progress with reference to their respective implementation plans and take action to help address any issues.

The consolidation phase concludes with a formal recommendation of the draft GWP for Plenary acceptance.

4.3 Acceptance phase

The aim of the **acceptance phase** is to achieve formal acceptance of the GWP and commitment of the resources made available by GEO Members.

During the acceptance phase the GEO Secretariat supports GEO delegations in preparing their commitments at Plenary through, for example, providing complementary material and reporting updates on expected resource commitments.

The consolidation phase includes the Plenary discussion on the GWP and concludes with the formal acceptance of the GWP.

Indicative Scale for GEO Trust Fund Contributions

This example uses the Gross Domestic Product figures from the World Bank so as to provide an indicative percentage for the contributions to the Trust Fund, based on a hypothetical budget of CHF 5 Million⁵. A minimum contribution of CHF 5,000 is suggested to account for administrative costs.

DRAFT for ILLUSTRATIVE Purposes - Voluntary Indicative Scale

Based on World Bank GDP 2013

		(millions of US dollars)		Indicative scale		Indicative budget	
	Ranking	Economy	US dollars				
USA	1	United States	16,768,100	23.79576%	United States	1	1189788
CHN	2	China	9,240,270	13.11295%	China	1	655648
JPN	3	Japan	4,919,563	6.98140%	Japan	1	349070
DEU	4	Germany	3,730,261	5.29365%	Germany	1 1 3,730,261	264682
FRA	5	France	2,806,428	3.98263%	France	1 1 2,806,428	199131
GBR	6	United Kingdom	2,678,455	3.80102%	United Kingdom	1 1 2,678,455	190051
BRA	7	Brazil	2,245,673	3.18685%	Brazil	1	159343
ITA	8	Italy	2,149,485	3.05035%	Italy	1 1 2,149,485	152518
RUS	9	Russian Federation	2,096,777	2.97556%	Russian	1	148778
IND	10	India	1,876,797	2.66338%	India	1	133169
CAN	11	Canada	1,826,769	2.59238%	Canada	1	129619
AUS	12	Australia	1,560,372	2.21434%	Australia	1	110717
ESP	13	Spain	1,393,040	1.97688%	Spain	1 1 1,393,040	98844
KOR	14	Korea, Rep.	1,304,554	1.85130%	Korea, Republic of	1	92565
MEX	15	Mexico	1,260,915	1.78938%	Mexico	1	89469
IDN	16	Indonesia	868,346	1.23228%	Indonesia	1	61614
NLD	17	Netherlands	853,539	1.21127%	Netherlands	1 1 853,539	60563
TUR	18	Turkey	822,135	1.16670%	Turkey	1	58335
CHE	20	Switzerland	685,434	0.97271%	Switzerland	1	48635
ARG	21	Argentina	609,889	0.86550%	Argentina	1	43275
SWE	22	Sweden	579,680	0.82263%	Sweden	1 1 579,680	41131
POL	23	Poland	525,866	0.74626%	Poland	1 1 525,866	37313
BEL	24	Belgium	524,806	0.74476%	Belgium	1 1 524,806	37238
NGA	25	Nigeria	521,803	0.74050%	Nigeria	1	37025
NOR	26	Norway	512,580	0.72741%	Norway	1	36370
AUT	28	Austria	428,322	0.60784%	Austria	1 1 428,322	30392
THA	30	Thailand	387,252	0.54955%	Thailand	1	27478
COL	31	Colombia	378,415	0.53701%	Colombia	1	26851
IRN	32	Iran, Islamic Rep.	368,904	0.52352%	Iran	1	26176
ZAF	33	South Africa	350,630	0.49758%	South Africa	1	24879
DNK	34	Denmark	335,878	0.47665%	Denmark	1 1 335,878	23832
MYS	35	Malaysia	313,159	0.44441%	Malaysia	1	22220
ISR	37	Israel	290,551	0.41232%	Israel	1	20616
CHL	38	Chile	277,199	0.39338%	Chile	1	19669
PHL	40	Philippines	272,067	0.38609%	Philippines	1	19305
EGY	41	Egypt, Arab Rep.	271,973	0.38596%	Egypt	1	19298
FIN	42	Finland	267,329	0.37937%	Finland	1 1 267,329	18968
GRC	43	Greece	242,230	0.34375%	Greece	1 1 242,230	17188
PAK	44	Pakistan	232,287	0.32964%	Pakistan	1	16482
IRL	45	Ireland	232,077	0.32934%	Ireland	1 1 232,077	16467
KAZ	46	Kazakhstan	231,876	0.32906%	Kazakhstan	1	16453
PRT	48	Portugal	227,324	0.32260%	Portugal	1 1 227,324	16130
DZA	49	Algeria	210,183	0.29827%	Algeria	1	14914
CZE	50	Czech Republic	208,796	0.29630%	Czech Republic	1 1 208,796	14815
PER	52	Peru	202,350	0.28716%	Peru	1	14358
ROM	53	Romania	189,638	0.26912%	Romania	1 1 189,638	13456
NZL	54	New Zealand	185,788	0.26365%	New Zealand	1	13183
UKR	55	Ukraine	177,431	0.25179%	Ukraine	1	12590
VNM	57	Vietnam	171,390	0.24322%	Vietnam	1	12161
BGD	58	Bangladesh	149,990	0.21285%	Bangladesh	1	10643
HUN	59	Hungary	133,424	0.18934%	Hungary	1 1 133,424	9467
MAR	61	Morocco	103,836	0.14735%	Morocco	1	7368
SVK	63	Slovak Republic	97,707	0.13866%	Slovakia	1 1 97,707	6933
ECU	64	Ecuador	94,473	0.13407%	Ecuador	1	6703
SDN	71	Sudan	66,566	0.09446%	Sudan	1	4723
LUX	73	Luxembourg	60,131	0.08533%	Luxembourg	1 1 60,131	4267
HRV	74	Croatia	57,869	0.08212%	Croatia	1 1 57,869	4106
UZB	75	Uzbekistan	56,796	0.08060%	Uzbekistan	1	4030
BGR	78	Bulgaria	54,480	0.07731%	Bulgaria	1 1 54,480	3866
CRI	81	Costa Rica	49,621	0.07042%	Costa Rica	1	3521
GHA	82	Ghana	48,137	0.06831%	Ghana	1	3416
SVN	83	Slovenia	47,987	0.06810%	Slovenia	1 1 47,987	3405
ETH	84	Ethiopia	47,525	0.06744%	Ethiopia	1	3372
TUN	85	Tunisia	46,994	0.06669%	Tunisia	1	3334
SRB	87	Serbia	45,520	0.06460%	Serbia	1	3230
PAN	89	Panama	42,648	0.06052%	Panama	1	3026
BHR	94	Bahrain	32,890	0.04667%	Bahrain	1	2334
CIV	96	Côte d'Ivoire	31,062	0.04408%	Cote d'Ivoire	1	2204
LVA	97	Latvia	30,957	0.04393%	Latvia	1 1 30,957	2197
CMR	99	Cameroon	29,568	0.04196%	Cameroon	1	2098
PRY	100	Paraguay	29,009	0.04117%	Paraguay	1	2058
EST	102	Estonia	24,880	0.03531%	Estonia	1 1 24,880	1765
CYP	105	Cyprus	21,911	0.03109%	Cyprus	1 1 21,911	1555
UGA	106	Uganda	21,494	0.03050%	Uganda	1	1525
GAB	108	Gabon	19,344	0.02745%	Gabon	1	1373
NPL	109	Nepal	19,294	0.02738%	Nepal	1	1369
HND	110	Honduras	18,550	0.02632%	Honduras	1	1316
GEO	112	Georgia	16,140	0.02290%	Georgia	1	1145
ISL	116	Iceland	15,330	0.02176%	Iceland	1 1 15,330	1088
SEN	119	Senegal	14,792	0.02099%	Senegal	1	1050
COG	122	Congo, Rep.	14,086	0.01999%	Congo, Republic	1	999
MUS	127	Mauritius	11,929	0.01693%	Mauritius	1	846
BFA	129	Burkina Faso	11,583	0.01644%	Burkina Faso	1	822
MLI	134	Mali	10,943	0.01553%	Mali	1	776
MDG	135	Madagascar	10,613	0.01506%	Madagascar	1	753
ARM	136	Armenia	10,432	0.01480%	Armenia	1	740
MLT	138	Malta	9,642	0.01368%	Malta	1 1 9,642	684
TJK	139	Tajikistan	8,508	0.01270%	Tajikistan	1	604
BHS	141	Bahamas, The	8,420	0.01195%	Bahamas	1	597
MDA	143	Moldova	7,970	0.01131%	Moldova	1	565
NER	145	Niger	7,407	0.01051%	Niger	1	526
GIN	148	Guinea	6,144	0.00872%	Guinea	1	436
BLZ	169	Belize	1,624	0.00231%	Belize	1	115
CAF	170	Central African Rep	1,538	0.00218%	Central African	1	109
SYC	172	Seychelles	1,443	0.00205%	Seychelles	1	102
GNB	177	Guinea-Bissau	961	0.00136%	Guinea-Bissau	1	68
			70,466,753		TOTAL members	96 28 17,927,471	
		European Union aggregate	17,927,471	25.44103%	1272052		5000000

⁵ Note that an aggregate figure for the European Countries that are part of the European Union has been provided.

Modifications to

Rules of Procedure

3 EXECUTIVE COMMITTEE

- 3.1 **Function:** Ensure the efficient conduct of GEO business between meetings of the Plenary. ~~The role of the Executive Committee is to facilitate the decisions of the GEO Plenary and to oversee and to make recommendations on the implementation of those decisions. The Plenary remains the GEO's primary decision-making body.~~
- 3.2 **Duties:** Acting by consensus, the Executive Committee will:
- a. Maintain the policy framework set by the GEO Plenary, within which the organization, including the Secretariat, will execute the strategy and advance the objectives set forth by the Plenary; ~~Ensure the efficient conduct of GEO business between meetings of the plenary;~~
 - b. Assist Plenary by facilitating and framing discussions (and decisions, as appropriate) of the issues related to a core part of the GEO Vision – coordinating observing systems, addressing observation gaps, and sustaining critical observations. The Executive Committee will conduct initial consideration and discussion of the issues, and subsequently develop papers and/or recommendations for Plenary discussion. The bases for such discussions at the Executive Committee, and subsequently by the Plenary, will be the reports of the GEO Programme Board, Societal Benefit Area Advisory Boards, Communities of Practice, and/or other GEO Working Groups established by Plenary on the critical observation needs and identified gaps, as well as Members' own choice to introduce into a discussion a relevant area of concern;
 - c. Receive reports from the Budget and Oversight Working Group (B&O WG) and discuss proposed actions and recommendations as identified by the B&O WG at meetings of the Committee. If the B&O WG does not identify issues requiring active discussion in the Executive Committee meetings, the Executive Committee can take a silent action to approve the B&O WG's document(s) for transmission to Plenary.
 - ~~b.~~ d. Supervise the work of the Director of the Secretariat and ensure that it is consistent with the direction received from Plenary;
 - ~~e.~~ e. Examine the ~~draft Annual Work Plan and~~ annual budget in preparation for its presentation to Plenary;
 - ~~d.~~ f. Report in writing at least annually to GEO Plenary;
 - ~~e.~~ ~~Fix the date and location of the next Plenary for approval by each Plenary before the end of meeting, and, through the Director, convene the meeting, produce the necessary documents and ensure the production of a timely meeting report;~~

~~f.g. Maintain detailed Rules of Procedure for GEO, to be reviewed regularly;~~ Provide recommendations to Plenary regarding nominees for the Programme Board;

~~h.~~ Provide recommendations to GEO regarding the need for and effectiveness of the Implementation Programme Boards and working-Working groupsGroups, and recommend continuation or adjustments as needed;

~~g.i.~~ Authorize specific engagements, development and signing of Memoranda of Understanding (MoU) between organizations; and

~~j.~~ Undertake such other tasks as may be delegated to the Executive Committee by the Plenary.

~~h.~~

3.3 Membership and Authorities: The Executive Committee members are a representative sub-set from the membership of the GEO Caucuses. The Executive Committee members can be both a 'delegate' and a 'representative' of their Caucus. They can represent the views, opinions and positions of their Caucus. At times, however, on the issues that need resolution prior to the next Plenary meeting or consultation with their Caucus, they may serve as a delegate to vote based on their assessment of the issue.

3.4 Composition: The Executive Committee will consist of ~~13-16~~ GEO Members based on the following geographic distribution: Africa (~~23~~), Americas (3), Asia and Oceania (4), CIS (~~4~~2), and Europe (~~34~~). Three (3) observers from Participating Organizations will be invited to participate in the discussions of the Executive Committee.

~~3.3.5~~ Co-Chairs: Four Executive Committee Members will serve collectively as Co-Chairs of the Plenary and the Executive Committee, with ~~two-at least one~~ Co-Chairs representing developed countries and ~~two-at least one~~ Co-Chairs representing developing countries. One Co-Chair will serve as lead to guide the discussion for each meeting. The lead Co-Chair will rotate among the Co-Chairs as agreed by the Co-Chairs. Individuals serving on the Executive Committee do not serve in their individual capacity but as Member representatives. Between Executive Committee meetings, the Co-Chairs will act on behalf of the Executive Committee to provide guidance to the Secretariat and will report to the Executive Committee on actions taken.

~~3.4.3.6~~ Selection: Executive Committee Members, including those Members serving as Co-Chairs, will be nominated through regional caucuses. Based on the conclusions of the regional caucuses and further consultations as necessary, the Director of the Secretariat will present a slate of nominees, including those nominated to serve as Co-Chairs, to the Plenary for its approval. Upon approval, Executive Committee members will serve a term of up to two years. The process will be guided by the following principles: (1) preserving sufficient continuity in the Executive Committee's membership; (2) ensuring sufficient opportunity for participation of GEO Members in the Executive Committee by rotation; (3) preserving the balance of developed and developing countries at the level of the Co-chairs. If a Member chooses not to complete its term of service, then the regional caucus may select another Member to represent it in the Executive Committee to complete the remaining term of service.

3.53.7 Decisions: Executive Committee decisions will be made by consensus of the GEO Members present. Observers are not extended the right to participate in decision making. The Executive Committee may take decisions authorizing certain activities, for example specific engagements, development and signing of Memoranda of Understanding (MoU) between organizations, provided these are fully aligned with the goals and strategy set forth by the GEO Plenary and for which resources are available. Any additional resources needed in conjunction with the specific engagement are guaranteed by a Member or Participating Organization, provided these engagements do not involve a commitment beyond that which has been approved by the GEO in Plenary.

3.63.8 Meetings: The GEO Executive Committee will meet at least once annually and may hold additional meetings as agreed by the Executive Committee. The Committee will work mainly by electronic mail and telephone conference.

3.73.9 Documents: The GEO Secretariat will prepare all documents for the Executive Committee's consideration and will release them to all GEO Members and Participating Organizations for information at least two calendar weeks prior to any Executive Committee meeting. The GEO Co-Chairs will approve draft Executive Committee agendas.

3.83.10 Reports: The Secretariat will release a preliminary report of Executive Committee proceedings to the Members of the Executive Committee within two calendar weeks and to the full GEO community no later than six calendar weeks following the Executive Committee meeting.

4 GEO PROGRAMME BOARD

4.1 Function: The GEO Programme Board makes decisions with regards to the implementation of GEO activities between Plenary sessions. It is composed of representatives of GEO Members and Participating Organisations (POs), and is accountable to Plenary.

The GEO Programme Board:

- Supports the development, management and implementation of the GEO activities, in particular the GEO Work Programme;
- Works to ensure the coherence of activities with the *GEO Strategic Plan 2016-2025: Implementing GEOSS* while aiming to enhance their contribution towards GEO's Strategic Objectives;
- Works to maximize coherence between implementation activities and their effectiveness in responding to societal challenges through the GEOSS; and
- Keeps the Executive Committee informed on progress.

4.2 Duties: The GEO Programme Board will:

- a. Provide high-level recommendations, and support in the on-going development and implementation of the *GEO Strategic Plan 2016-2025: Implementing GEOSS*, and actively promoting the implementation of GEOSS activities as described in the Work Programme;
- b. Review the scope and substance of activities proposed for the GEO Work Programme ensuring alignment with available resources, and recommending the Work Programme for Plenary acceptance;
- c. Accept GEO Initiatives and providing direction on the implementation of GEO Foundational Tasks, GEO Initiatives and GEO Community Activities, and reviewing their progress;
- d. Recommend GEO Flagships for Plenary acceptance based on implementation plans and progress;
- e. Nominate Participating Organization observers for the Executive Committee; and
- f. Establish advisory boards or task forces to address specific topics as needed.

4.3 **Term:** The Board's term will be for the full duration of the Strategic Plan.

4.4 **Membership:** The Board comprises individuals representing GEO Members and Participating Organisations. Members may be formally nominated by interested GEO Members and Participating Organizations, to serve for a period of 2 years. All nominees will be approved by Plenary, based on recommendations from Executive Committee who will ensure balance.

Total Board membership will be no fewer than 16 and no more than 25. At least 40% of members will be from GEO Members and 40% will be from Participating Organisations. The Board works by consensus of its members.

Board members representing Participating Organisations members will choose from among themselves a maximum of 3 individuals to sit as observers on the GEO Executive Committee, for a term of 2 years. The Observer status will enable POs to participate and inform the discussions of the Executive Committee. Executive Committee observers will be reviewed every 2 years, in synchronization with Board membership. In both instances current Board members may be re-nominated.

4.5 **Leadership:** The Board will designate two of its members to serve as co-chairs to the Board. Co-chairs serve two-year terms and may be renewed.

4.6 **Meetings:** The Board meets physically at least twice per annum. Meetings are generally held at the GEO Secretariat. Extraordinary meetings, including through electronic means, may be convened as agreed by its members. Meeting documents will be available at least four weeks prior to a meeting to allow the required national/internal consultation processes to occur. At least 50 per cent of membership attendance is required for quorum.

4.7 **Reporting:** The Board will post a report on the GEO website of each meeting held, including a list of all participants and key outcomes. In addition, Board co-chairs will report to the GEO Plenary through the GEO Work Programme, and will deliver progress reports to the GEO Executive Committee.

- 4.8 **Funding:** Costs arising from the Programme Board's activities will be borne by the Member or Participating Organization that incurs them. In specific, exceptional circumstances, participation in the Programme Board may be supported from the GEO Trust Fund, subject to the availability of funds, personnel, and other resources, and agreement of Plenary or the Executive Committee.
- 4.9 **Support and Coordination:** The Secretariat will provide administrative support to the Programme Board. Their activities will be closely coordinated with the Secretariat to maintain consistency with the approved *GEO Strategic Plan 2016-2025: Implementing GEOSS*, and to maximize the effectiveness of the GEO and the implementation of GEOSS.