



EUROGEOSS CONCEPT PAPER

22 November 2017

1. Introduction

The Group on Earth Observation (GEO) is a partnership of 104 national governments plus the European Commission and 118 Participating Organizations. GEO implements a Global Earth Observation System of Systems (GEOSS) and envisions a future where decisions and actions for the benefit of humankind are informed by coordinated, comprehensive and sustained Earth observations¹.

To support this vision, GEO has divided the globe into large geographical regions. Each GEO Member belongs to one of the five following GEO regional Caucuses: Africa, Americas, Asia and Oceania, the Commonwealth of Independent States, and Europe.

When renewing the GEO mandate for the decade 2016-2025, Ministers have resolved to reinforce the regional component of the GEOSS². The perception is that GEOSS activities will benefit from stronger regional nodes in each of the GEO Caucuses. Regional GEO initiatives can accelerate capacity building and GEOSS penetration at regional to local scales. They could also help to better address priority needs varying from one part of the world to another.

Three GEO initiatives are now underway: AfriGEOSS in Africa (started in 2013), AmeriGEOSS in the Americas (started in 2014), and AOGEOSS in Asia and Oceania (started in 2015).

This paper proposes a conceptual approach towards a European GEO initiative, called *EuroGEOSS*. EuroGEOSS shall be the European component of GEOSS.

¹ GEO Strategic Plan 2016-2025; <http://www.earthobservations.org/documents.php?smid=100>

² Geneva Declaration 2014: <http://www.earthobservations.org/documents.php?smid=100>

2. Rationale

The European Caucus is the largest Caucus of GEO comprising thirty-three European governments³ plus the European Commission and many Participating Organisations⁴ all having an Earth observation mandate in Europe

Through its members and their programmes, the European GEO Caucus has been and continues to be one of the biggest contributors (in terms of resources) to GEOSS⁵.

The European members involved in GEO have significantly contributed to make more Earth observation datasets openly accessible and exploitable via GEOSS. This was achieved through implementing the GEOSS Data Sharing Principles, as well as through developing and operating a brokering technology and the GEOSS Web Portal that constitute the backbone of the GEOSS Common Infrastructure (GCI).

However, today's main challenge for GEO is to move from a "*data-centric approach*" to a "*user-driven GEOSS*". A tipping point has now been reached where GEO must show the added value and benefit of GEOSS within a European policy context for European governments, citizens, businesses, and scientific communities.

Moreover, fragmentation of past European contributions to GEOSS have often reduced their *long-term impact*.

Consultations by the Commission⁶ have already emphasized several European challenges to overcome.

Examples include:

- The strengthening GEO-related coordination mechanisms at European and national levels;
- Improving synergies between GEOSS and the EU Copernicus programme;
- Streamlining the Horizon 2020 Framework Programme in support of GEOSS and consolidating the European Research Area (ERA) in the field of Earth observation;
- Mobilising the European private sector to seize future GEOSS business opportunities in a growing global digital economy.

The EU Copernicus programme has recently launched an initiative to develop Copernicus Data and Information Access Services (DIAS) which facilitates access to Copernicus data and information from the Copernicus services. The aim of DIAS is to boost user uptake, stimulate innovation and to support the creation of new business models based on Earth Observation data and information. This is very much in line with EuroGEOSS objectives. Therefore, it is expected that all Copernicus data to be used within a EuroGEOSS context shall be made available via the DIAS.

³ *GEO Members*: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, United Kingdom. *Other contributing country*: Lithuania

⁴ This includes the following *GEO Participating Organizations*: EARSC, ECMWF, SATCEN, EEA, ESA, EuroGeoSurveys, EUMETNET, EUMETSAT, EUROGOOS, i-BEC.

⁵ > 30 % of total financial contributions (given by the GEO community to GEO Trust Fund).

⁶ GEOSS achievements to date and challenges to 2025, SWD(2014) 292 final

EuroGEOSS shall contribute to exploit the global trend towards open data and aim to leverage opportunities arising from e.g. big data technologies which are radically transforming the global Earth observation landscape. EuroGEOSS can represent a significant contribution to the development of the European Digital Single Market ensuring increased prominence within an increasingly globalised digital economy.

It is expected that exploitation of and market creation for Earth observation data and products, including Copernicus, will be boosted by global cooperation approaches regarding data collection, processing and co-design of information products within the GEOSS context. A more coherent European action towards GEO would complement existing national and supra-national strategies (e.g. by ESA and EUMETSAT), leverage European investments in Earth observation including those from the commercial sector and reduce fragmentation within Europe.

Given the leading role which Europe has undertaken since the inception of GEO and its world class research and operational capacities⁷ within Earth observation domain, the European GEO Caucus proposes a comprehensive regional approach to help to implement GEOSS, maximise GEOSS benefits for European citizens and businesses, and leverage EO investments (including Copernicus) within a GEO context..

Such an initiative would respond to several conclusions made by the Council on 30 May 2017 on the Earth observation element of a Space Strategy for Europe. These conclusions notably refer to the needs for reinforced coordination with the space activities pursued by Europe including the European Space Agency (ESA) and their respective Member States. The focus shall be on increased innovation, space application development and the reinforcement of a space data ecosystem concept within Europe, whilst pursuing international cooperation to help stimulate the market and promote European technology and services.

In this context, EuroGEOSS shall facilitate and support the extension of the presently defined Copernicus products and services portfolio beyond the scope which is presently foreseen *e.g.* supporting relevant research and innovation applications and scaling them up to contribute to the envisaged Copernicus ecosystem.

Such a regional approach (within the GEO context) will maximise the innovation potential and value creation for the European society by exploiting the multiple research or operational assets in the Earth observation domain which already exist in Europe. This approach will also connect Europe to complementary non-European data resources made available through the GEOSS Common Interface (GCI) and other regional GEOSS hubs.

⁷ Including the EU programmes Horizon 2020 and Copernicus

3. The EuroGEOSS framework

3.1. EuroGEOSS vision

The EuroGEOSS vision is to significantly increase the benefits for Europe of its participation within GEOSS through improving user uptake of the data from GEOSS assets and harvesting the environmental information produced through the GEOSS initiatives and flagships. The EuroGEOSS regional initiative shall respond to the specific demand for Earth observation data and products that are required to support:

- European Governments in their decision making
- The European Science and Research Community in its requirement for environmental data
- European Industry in its market development service provision activities
- The European Citizen in their quest for information concerning their environment.

EuroGEOSS shall leverage the current Earth observation programmes in Europe in improved integration of existing data from European EO assets and initiatives within a GEO context into user oriented initiatives which may be renewed/developed regularly over the time as EuroGEOSS evolves. Data source examples include Copernicus Sentinel data, Inspire Geospatial data, ESA TEP outputs, Horizon 2020 projects outputs and European research infrastructures data.

The approach shall be demand driven and inspired through the consultation of European users at regional, national and local level *e.g.* municipalities, rural communities, coastal communities, small island stakeholders and commercial users from various sectors.

3.2. General objectives

Europe has much to offer the rest of the world in terms of the provision, processing, modelling and exploitation of Earth system information. The European EO landscape is at present rather fragmented and complex. There are many activities being performed on local, regional, national and European levels. Activities are based on a wide range of data sources (space borne, air-borne, in-situ and citizen observatories) which provide data at different spatial and temporal scales, in different formats and data is obtained from different access points. These activities meet the needs of a wide range of user communities but these activities are very often not connected together or coordinated to provide a coherent picture at European level.

EuroGEOSS shall provide an inclusive framework which brings all these existing elements together to provide a coherent European contribution to GEOSS. It shall follow an application oriented approach.

EuroGEOSS shall focus on delivering products and services for the achievement of the 2030 Agenda for Sustainable Development and other GEO engagement priorities within a European context.

EuroGEOSS shall leverage Member State support for the delivery of Commission policy priorities and seek to align the European GEO contribution to GEO by promoting the cooperation and coordination among the European

GEO members in-line with European strategic priorities. EuroGEOSS shall integrate existing coordination activities already being undertaken within Europe e.g. the Balkan GEOSS initiative.

EuroGEOSS shall add value by specifically fostering the European user dimension in the process of scaling-up existing multi-disciplinary pilot applications based on multiple data sources (space-borne, airborne, in-situ and citizen observations).

There shall be a strong emphasis on leveraging, and integrating applications based on European in-situ data in support of the Copernicus programme.

EuroGEOSS shall aim to achieve these overarching objectives by brokering existing programmes, initiatives, expertise and infrastructures within Europe.

The focus shall be:

- To provide integrated products and services for environmental monitoring, and environment protection.
- To provide data to support appropriate levels of reporting, required by European environmental legislation.
- To contribute at international level to the GEO priorities i.e. the implementation of the agenda 2030 for Sustainable Development, the Sendai framework, and the Paris agreement.

The added value of EuroGEOSS shall be:

- The user driven systematic coordination; integration and scaling up of existing services (based on a wide range of data sources) to address Sustainable Development Goals (SDG), GEO Societal Benefit Areas (SBA) and other GEO priorities within a European context. At this early stage, examples of GEO SBAs EuroGEOSS could focus on, are Biodiversity and Ecosystem Sustainability, Food Security and Sustainable Agriculture, Sustainable Urban Development and Energy and mineral resources management.
- The leveraging of global data sets through the GEOSS Common Infrastructure (GCI) and exploitation within an European context.
- The additional support to Copernicus to address new communities within GEO and to act as an incubator for possible new Copernicus services and applications which support European priorities.

3.3. Detailed objectives

a) Strengthening European GEO data access and coordination

- To strengthen European coordination and contribution to support the European Commission's policies and to strengthen the European component in relation to the GEO Work Programmes.
- To help strengthen the GEO coordinating mechanisms at national level in European Caucus member countries whilst improving access to national Earth observation data sources, focusing particularly on *in-situ datasets* collected at national level. Some possible examples can be seen below (in no particular order):
 - Copernicus data sets
 - European Research Infrastructure data sets

- In-situ data sets
- Space-borne data sets
- Airborne data sets
- Meteorological data sets
- Citizen observatories
- Health data sets
- Socio-economic data sets
- Environmental data sets
- Open data sets

b) Leveraging and scaling up existing Earth Observation applications

- To stimulate innovative user-oriented, close-to market applications based on the integration of GEOSS and other data sets existing in Europe and open data sets available elsewhere. EuroGEOSS can map and be a pathway for existing initiatives to be scaled up such as *e.g.* GEO initiatives and flagships, Horizon 2020 innovation activities, Copernicus services and other initiatives at national or sub-national levels. Synergies can be created between EuroGEOSS and already existing initiatives. Examples of activities which can be scaled up within a EuroGEOSS context include (further examples can be found in Annex I) *e.g.*:
 - Taking an immature application from the research/concept stage to commercialisation/operationalization
 - Consolidating and combining different existing applications which address the same user needs and provide support for commercialisation/operationalization
 - Strengthening an existing application with the provision of new data *e.g.* in-situ data including support provision for commercialisation /operationalization
- EuroGEOSS shall promote existing applications supported through different institutional funding mechanisms *e.g.* Horizon 2020, Copernicus, national programmes, etc. These programmes are designed to address specific user needs. Therefore, it is assumed that identified applications to be scaled up within EuroGEOSS shall already be associated with clearly defined user needs
- International EO applications and services which are already available through GEOSS shall also be considered candidates for scaling up and adaption through EuroGEOSS for the benefit of European users.

c) Promotion and branding of EuroGEOSS in the GEO context

- To promote existing actions and resources (data, products, services, platforms, expertise), including Copernicus, to be part of Europe's contribution to GEO.
- To raise awareness in Europe about GEO opportunities, activities and societal deliveries. To promote open GEOSS data, as well as the GEO Data Sharing and Data Management Principles and Implementation guidelines in Europe.
- To promote use of open data for Earth system science

d) Securing optimum user uptake, engagement and sustainability

- To engage further European GEO members (governments and participating organisations) in a sustained regional cooperation that reflects common or complementary interests and needs at local, national, and European levels.
- To provide a structured methodology for data providers to showcase how their user driven data can be used to address societal benefit areas and link these outputs to high-level European policy goals e.g. value tree analyses
- To demonstrate the added value of GEO to European policy makers, research and innovation and to the European citizen
- To provide a sustainable framework beyond the limits of a stand-alone project
- To exploit the available synergies regarding user uptake from existing data services e.g. Copernicus and GEOSS
- To monitor and document the user up-take in the identified priorities domains, in particular those where European Commission services are actively involved
- To report to the European Commission services regarding the level of attainment of the selected SDGs or on other priority domains.

e) Exploiting synergies between environmental data platforms, data sharing and standards in Europe

- To exploit synergies and increase the use, interoperability and connectivity (enabling *e.g.* adaptability, agility and scalability) between major Earth observation and environmental data platforms and data clouds co-funded by the public sector and dedicated to open science and innovation.

Within the EuroGEOSS context, the following research and operational platforms are already identified:

- The GCI (including its GEOSS Web Portal and Data Access Broker) to discover and access GEOSS data and knowledge
 - The Copernicus-DIAS to access Copernicus data and products
 - ESA-funded Thematic Exploitation Platforms (TEP) to access e.g. computing resources and storage facilities
 - Data hubs being developed such as e.g. The NextGEOSS test-bed and online prototype platform to harvest and integrate European EO and non-EO data into new GEO-relevant applications
 - The European Open Science Cloud that will allow European researchers and science and technology professionals to store, share and re-use their data across disciplines and borders.
- To stimulate the use of environmental data sharing policies and standards.

3.4. Strategic activities

The three main spheres of activity to be conducted by EuroGEOSS relate to **Coordination, Combination** and **Cooperation** (EuroGEOSS 3Cs).

- **Coordinate** existing activities within Europe to ensure a coherent European contribution to GEOSS;
- **Combine** and integrate activity outputs to reach critical mass of use and added value
- **Cooperate** effectively beyond respective programmes and user communities

The following list of preliminary actions illustrates the possible nature of future EuroGEOSS actions. This list shall be revisited and amended in line with the EuroGEOSS priorities identified and agreed by the EuroGEOSS Coordination Group.

a) Inventory of EuroGEOSS innovation actions

GEO members of the European Caucus shall survey and prioritise applications under development which respond to consolidated European needs but require further demonstration, incubation, upscaling, larger deployment or more extended replication.

b) Up-scaling of pilot applications

Cooperation is foreseen at the GEO European Caucus level to streamline innovation instruments (available at EU, national or sub-national levels) to integrate and scale-up existing application components to Pan-European, EU or national levels.

Special attention shall be given to the use of the Copernicus-DIAS to access Copernicus data and exploitation of products from the Copernicus Core Services to develop downstream services of GEO relevance. These applications shall be shown to be in-line with EU and European policies and relevant policies at national level as well as the GEO priorities.

c) Showcasing of the European know-how with relevance to GEO

Promotion of national geo-spatial and socio-economic reference data sets which could be further exploited at European or global levels (including from national geological survey, mapping or statistical agencies).

One possible action is the development of an online demonstrator to showcase European capabilities to integrate both space and non-space data together, including GEOSS-relevant products and services developed by the European commercial sector.

It shall be important for traceability to link back (where possible) to the GEO priorities.

e) Linkage between EuroGEOSS applications and other GEO actions

EuroGEOSS pilot applications shall be linked to relevant GEO SBAs and GEO actions for possible upscaling, to relevant goals and indicators of the Agenda 2030 for Sustainable Development and to related European policies.

f) Benchmarking and support to the consolidation of national GEO management structures in Europe

Structuring national involvement in and contribution to GEO plays an essential role in raising GEO awareness in their own countries and help to strengthen linkages between national/sub-national activities and international GEO activities. The promotion of national GEO entities by EuroGEOSS will reinforce GEO capacity building activities and shall also help to consolidate user needs across Europe.

3.5. Governance

EuroGEOSS shall be developed in close collaboration with all member countries and participating organisations represented in the GEO High Level Working Group (HLWG) and in the context of the Copernicus governance, with the services of the Commission, European agencies and institutes, and the European commercial sector.

The EuroGEOSS governance structure shall be based on the current GEO High Level Working Group (HLWG) which involves all members of the GEO European Caucus and oversees the GEOSS implementation from a European perspective as well as helping to shape a consolidated European view in a GEO context.

The EuroGEOSS governance structure shall develop its activities on the basis of the draft roadmap enclosed in Annex II of this document. The governance shall be as simple and flexible as possible while allowing for inclusion and leadership. It is structured around working groups on two levels.

a) The Coordination Group

EuroGEOSS shall coordinate its activities through a Coordination Group chaired by the Commission (DG RTD and DG GROW) and comprises GEO members and participating organisations from the European Caucus. This group shall oversee the implementation of EuroGEOSS strategic actions assess progress against stated objectives and regularly report to the GEO HLWG.

Particular focus shall be placed on:

- Providing strategic guidance regarding the implementation of EuroGEOSS actions
- Identify, propose and review of EuroGEOSS pilot applications/services to be scaled up (see some possible examples in Annex I)
- Providing feedback to the GEO HLWG regarding the implementation of EuroGEOSS
- Ensuring synergies between selected EuroGEOSS pilot applications, relevant GEO actions, Copernicus and Horizon 2020 activities to avoid duplications and to track and report progress
- Monitoring and documenting user uptake and engagement across the member countries and the European Commission
- Identifying and supporting implementation working groups for identified pilot activities
- Providing recommendations for the evolution of the EuroGEOSS framework

The coordination group shall bring together all the contributions from the various implementation working groups and establish a consolidated picture which shall be in line with EuroGEOSS objectives. The group shall ensure/facilitate any necessary cross-communication and coordination amongst the individual implementation working groups.

b) Implementation Working Groups

Implementation Groups shall be identified by the Coordination Group to manage the implementation needs arising from the EuroGEOSS strategic actions.

It is anticipated that the Implementation Groups shall be based on the existing application/project/initiative/activity team members. These groups shall comprise representatives nominated by the supporting Caucus' member(s) and/or participating organization(s). One implementation group is suggested for each EuroGEOSS pilot application.

The groups shall focus on effective monitoring and reporting to the Coordination Group. As well as the ability of these pilot applications/services to contribute to the Sustainable Development Goals, the GEO Societal Benefit Areas, GEO engagement priorities and relevance to European policies. It is expected that such groups shall use existing key performance indicators e.g. the GEOSS key performance indicators to define concept readiness, monitor progress and adherence to EuroGEOSS objectives

This governance shall support greater responsibility and engagement regarding a European regional (within the GEO context) coordination, combination, cooperation (EuroGEOSS 3Cs) which reflects the local, national and European interest.

c) Terms of Reference (ToR)

Further details of the governance shall be developed in the Terms of Reference (ToR) for the aforementioned groups. Appropriate communication channels and interface/interactions shall be established following agreed EuroGEOSS protocols.

3.6. Resources

Experience has shown that GEOSS implementation relies significantly, though not exclusively, on in-kind contributions such as observing capacities, networks, expertise, staff time, interoperability arrangements and standards, datasets, information systems, services, projects and programmes. EuroGEOSS shall follow the same approach with a focus on leveraging *existing* European capacities and streamlining of existing programmes and funding schemes.

It is not the objective of EuroGEOSS to establish new data platforms in Europe. Instead, EuroGEOSS shall build on the GCI and the upcoming Copernicus Data and Information Access Services (Copernicus-DIAS) to take advantage of multiple, existing or upcoming capacities in Europe including:

- The dedicated Copernicus space segment including the Sentinel series of satellites which (once fully operational), shall deliver > 10 petabytes of data each year.
- Copernicus third party missions
- The Copernicus Data and Information Access Services (Copernicus-DIAS) which will provide access to Copernicus data and products alongside processing resources, tools and other relevant data.
- Other space borne resources from national space agencies collaborating through the Committee on Earth Observation Satellites (CEOS) from Europe and beyond

- Air-borne and in-situ Earth system information resources (data products and modelling), including from the European Environment Information and Observation Network (EIONET), the European Geological Data Infrastructure (EGDI), the European Marine Observation and Data Network (EMODNET), the Meteorological infrastructure, EUMETNET, the European research infrastructures and projects contributing to the European Strategy Forum on Research Infrastructures (ESFRI).
- Information products from the Copernicus core services for monitoring land, oceans, atmosphere, climate, for security services and emergency management
- Additional relevant data sets and data products from agencies and organisations such as e.g. ESA, EUMETSAT, ECMWF and other European or national providers.
- The Infrastructure for Spatial Information in Europe (INSPIRE)
- The Copernicus Relays, Academy networks and upcoming Incubator.
- Research & Innovation resources and projects related to geo-spatial information and Earth sciences including from the European Open Science Cloud (EOSC).
- GEO-relevant projects co-funded by the EU Framework Programmes for Research and Innovation such as ERA-PLANET, NextGEOSS, GEO-CRADLE, ECOPOTENTIAL, ATLANTOS.
- Other resources, such as data processing capacities, specific data sources, and information technologies made available through the involvement of the Commercial sector in EuroGEOSS.

The success of the initial phase of EuroGEOSS shall very much depend on the staff resourcing contribution by European GEO member countries, the European Commission and participating organisations of the European GEO Caucus.

The initial phase of EuroGEOSS shall notably be supported through the Horizon 2020 (Societal Challenge 5 Call 2018). The objective shall be to demonstrate the effective use of European Earth observation resources (including space, airborne, in-situ measurements and citizen observations) to scale up and to prepare for operational environmental forecasting, and for mitigation and adaptation actions through building operational and research based activities e.g. Copernicus services, GEO initiatives and flagships.

4. Longer term sustainability

The longer term aim of EuroGEOSS shall be to develop applications and services which can become part of the operational reporting process at Commission level.

There are a number of ways in which EuroGEOSS can be sustained in the longer term. The non-exhaustive list below provides some possible ideas to be explored:

- Different EU programmes can sustain EuroGEOSS applications on the longer term if the applications support their activities (CAP, CFP, Climate mitigation and adaptation, EEAS etc.
- European governments can decide to sustain EuroGEOSS applications on a national level to support their decision making processes.
- EuroGEOSS applications can showcase how operational and research based data can be integrated together to augment data sets coming from the different domains.
- EuroGEOSS actions can be scaled on a global level if they are of global interest in particular e.g. through GEO flagship initiatives and can be sustained through GEOSS.
- EuroGEOSS actions can be taken by the Commercial sector and sustained based on a commercial model delivering products and services.
- European agencies such as EEA, EUMETSAT and ESA can sustain EuroGEOSS applications if the applications support their mandates.
- Encourage scaled up applications to become part of an operational reporting process to the European Commission.

ANNEX I: Examples of applications to be developed / showcased under EuroGEOSS building largely on Copernicus data and information

The following examples are for illustrative purposes and no decisions regarding actual pilot applications have been taken. The identification, proposal and review of pilot applications shall be the responsibility of the Coordination Group (see Governance) and it is foreseen that pilot application selection shall be one of the first items to be discussed by the Coordination Group.

These examples are taken from existing initiatives such as Next-GEOSS, ERA-Planet, GEO-Cradle and G4AW (member state initiative) and are presented in no particular order.

Example 1: Air pollution, Urban Growth, Health Risks in Megacities – DLR (planned to be delivered 2017)

The following two applications have been identified within the NextGEOSS project.

Lead: DLR – NextGEOSS project

Users: Health Community

This pilot application focuses on the analysis of air pollution trends in relation to urban growth rates and health risk indicators for megacities by using new inputs from Sentinel-3, Sentinel-5P, CAMS, WDC/RSAT using the NextGEOSS cloud platform. A multi-sensor approach shall be used to analyse air pollution variability in megacities and this shall be linked to urban growth rates. A tool will be developed to analyse local trends and health risks using the NextGEOSS cloud platform.

The link to the health community will be strengthened.

Example 2: Crop monitoring supporting Food Security – VITO (to be delivered 2017)

Lead: VITO – NextGEOSS project

Users: Agro and insurance sector

The scope of the pilot is to implement a high-resolution processing chain on the NextGEOSS cloud platform to calculate systematic on-demand vegetation parameters for a region of interest. Added value crop monitoring products will be derived as well. A dashboard will allow users to view the evolution of the vegetation parameters for e.g. specific fields

Example 3: Geodata for Agriculture and Water (G4AW) facility (NL) (on-going)

Lead: Netherlands Space Office (NSO) is executing this programme commissioned by the Dutch Ministry of Foreign Affairs.

Users: food producers

The goal of G4AW is to:

- Improve the output of the agricultural, pastoral and fishing sector in 26 partner countries by providing food producers with relevant information, advice or (financial) products.
- Reach a minimum 10% increase in sustainable food production and/or an improved financial situation for at least three million food producers, by providing them with relevant and timely information services.
- Help achieve a 10% more effective use of inputs for food production (water, seeds, fertiliser, pesticides, etc.)
- Focus on sustainable improvement and increase of food production alongside a more efficient use of water in agriculture. G4AW aims to alleviate poverty by enhancement of sustainable economic growth and self-reliance in the G4AW partner countries.

The GAAW services make use of open and free data, e.g. from Copernicus satellites provided by the European Commission in the context of GEO.

Example 4: Developing a high resolution solar atlas for Egypt (already delivered)

Lead: Egyptian regional coordinator of the H 2020 project GEO-CRADLE

User: Government of the Arab Republic of Egypt to address the demand for energy efficiency through the use of renewable energy sources

The high-resolution solar atlas for Egypt provides estimation of the solar energy potential in Egypt for optimal photovoltaics and concentrated solar power system installations as well as an innovative now casting service in real time based on a number of priority parameters (optical properties of clouds and aerosols, solar zenith angle, total ozone column, water vapor, etc.) for efficient energy planning. This system is able to produce maps of Egypt at high resolution (1m, 0.05 x 0.05 degrees, 15 min) and the whole approach is aimed at effective energy planning and services whilst supporting local energy managing.

Example 5: Characterisation and understanding of Global Human Settlements (on-going)

Lead: Joint Research Centre

Users: migration, energy, health, emergency management, food security, water

The scope of the initiative is to develop a new generation of measurements and spatial statistics products in support to post-2015 international processes on sustainable and urban development, climate change and disaster risk reduction.

The initiative uses a globally consistent and universally applicable methodology, focusing on SDGs particularly Goal 11 (cities). Furthermore, the free and open data policy access will greatly contribute to fill the information gaps at local national and international levels.

The initiative shall test the production and the use of new global human settlement information products derived by the integration of multi-disciplinary data, namely global remote sensing, environmental, population and socio-economic data. The scope is global and multi-disciplinary, with a particular emphasis on the generation of new global fine-scale information products made available through advances in remote sensing technology and open public data access policies

Example 6: Improve management and conservation in protected areas in Europe (natural parks) (on-going)

Lead: CNR IGG, Coordinator of Horizon 2020 ECOPOTENTIAL project

Users: Park authorities

An intense use of time series of satellite products and in-situ Earth observations will be made to obtain current estimates of the state of the environment in Protected Areas as well as of the changes that have been taking place in the last 20 years and the expected future conditions. Two examples are the cases of the mountain Gran Paradiso National Park (GPNP), and the Kruger National Park in South Africa. At GPNP, this approach allows for developing models of grassland dynamics and of the response of mountain ungulate populations to different levels of climate change and human pressure. In Kruger National Park, the analysis of herbaceous biomass (time series), together with soil temperature and in situ measurements, allows for the estimation of ecosystem response and its ability to support animal populations during drought conditions.

Example 7: Sustained Earth observation applications through EuroGEOSS building on R & I outcomes in the four strands of ERA-PLANET (to be delivered)

- Urban areas and resilient societies,
- Resource efficiency and environmental management,
- Global change and environmental treaties, and
- Polar areas and natural resources

Lead: CNR – ERA-PLANET Coordinator + WP leaders of the 4 urban strands

Users: Municipalities, environment managers, international conventions, polar communities and stakeholders

ERA-PLANET leverages new developments in EO and provides a coherent EO R&I layer which is accessible at EU member state level. It shall contribute to an effective integration of space, in-situ observations and citizen observations and will support the creation of advanced technological sectors for environmental monitoring to support the implementation of EU and international environmental policy. EuroGEOSS can leverage the R&I products and scale them up into sustainable applications in the four strands of ERA-PLANET.

Example 8: Earth Observation for Raw Materials, Geohazards and others topics under the EuroGeoSurveys umbrella (GEO Workplan 2017-2019)

Lead: EuroGeoSurveys (EGS) Expert Groups: Earth Observation & Geohazards (EO EG) Spatial Information (SI) and Mineral Resources (MREG).

The Geological Surveys of Europe represents different National Geological Surveys and some regional Surveys in Europe. Members are public sector institutions carrying out operations and research in the field of geosciences

Users: European Commission, Central and Regional authorities, Civil Protection and Environmental Agencies, Policy makers, Mining Companies, Copernicus.

The scope of this pilot project is to provide the main outputs of joint activities carried out under the aegis of EGS which have relevance to the Earth Observation domain. In 2016, a new Community Activity (CA) was approved by GEO entitled as “Earth Observations for Geohazards, Land Degradation and Environmental Monitoring” led by EGS experts. The general description of the CA is available at:

<https://www.earthobservations.org/activity.php?id=88>

ANNEX II: Indicative EuroGEOSS Roadmap (2017-2020)

Autumn 2017: Immediate Actions

- Create the EuroGEOSS Coordination Group (following a light governance approach)
- Expression of interest to members of the GEO HLWG
- Draft Terms of Reference to be prepared
- Identify the first EuroGEOSS pilot applications to be promoted in 2017-18
- Introduce EuroGEOSS language in the WP 2017-19 of GEOSS
- Establish internet presence of EuroGEOSS (EC, EASME, etc)
- Present EuroGEOSS in the Copernicus Governance (Copernicus User Forum/Committee)
- Promote EuroGEOSS in Space Working Party (Estonian presidency)
- Launch EuroGEOSS at a side event in Washington DC on the occasion of the GEO Plenary in October 2017
- Launch Horizon 2020 project in 2018

2017: Establishment of EuroGEOSS (initial phase of development)

- Include a EuroGEOSS initiative in the GEO WP 2017-19 using the template for GEO initiatives. The EuroGEOSS text for the GEO 2017-19 Work Programme shall identify Copernicus-DIAS as the EuroGEOSS data platform provider (for Copernicus data) and access point upon which added value services such as NextGEOSS applications can be placed.
- Develop EuroGEOSS framework resourcing, governance, engagement and protocols (agree terms of references for the EuroGEOSS groups).
- Collect information on user requirements from existing Horizon 2020 and Copernicus projects and focus on possible synergies and complementarities of different activities addressing different domains.
- Ensure Copernicus-DIAS is the access point for Copernicus data within EuroGEOSS.
- Proposals by the member countries and participating organisations of the European Caucus of candidate EuroGEOSS activities.
- EuroGEOSS Coordination Group proposes to the HLWG a prioritised shortlist of EuroGEOSS activities showcasing the added value of GEOSS within Europe and increase visibility of European contribution within GEO community.
- Launch of the EuroGEOSS framework at GEO Plenary in Washington DC in October 2017. Presentation of an initial shortlist of EuroGEOSS demonstrators endorsed by the European GEO Caucus.
- After the launch: appearances at multiple European meetings and conferences to inform the European EO-community about EuroGEOSS.

2018: Scaling up pilot applications and leveraging activities in Europe

- Launch of a Horizon2020 call 2018 under Societal Challenge 5 with the objective to demonstrate the effective use of European Earth observation resources to scale up user-driven GEOSS applications.
- Scaling-up of selected EuroGEOSS pilots
- Best practices to reinforce GEO national offices in Europe
- Survey of national EO activities with potential for deployment/integration at European level through EuroGEOSS
- Cooperation with GEOSS flagship and engagement priorities
- Showcasing added value of EuroGEOSS using selected application examples

After 2018: Demonstration and showcasing of the EuroGEOSS added value

- Continue to scale-up EuroGEOSS applications
- Continue to showcase EuroGEOSS pilot applications (including in view of the next GEO Summit in 2019)
- Continue to strengthen GEO National management structures
- Exploit new synergies arising from the Horizon 2020 and Copernicus (including the progressive deployment of the Copernicus DIAS)
- Assess EuroGEOSS performance

Plan for EuroGEOSS evolution and sustainability (considering combined / complementary support by GEO itself, the EU, national governments, European or national agencies, or the commercial sector in Europe).