

**Coordinating and integrating state-of-the-art Earth Observation
Activities in the regions of North Africa, Middle East, and Balkans and
Developing Links with GEO related initiatives towards GEOSS**



**Deliverable D7.6
Sustainability Plan**

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Executive Summary

The sustainability plan has been developed by GEO-CRADLE to maximize the project's impact. This plan is described under the **deliverable D7.6** and presents guidelines to allow the optimal exploitation of GEO-CRADLE's results. It aims to identify strategies to guarantee the use and reuse of the project's knowledge, outputs and services beyond the end of the EC funding period, including the enlargement of the GEO-CRADLE Regional Network and Data Hub, as well as the replication of best practices.

The **main pillars** that underpin the **sustainability** and **exploitation** methodology of GEO-CRADLE are:

- The foundation of the [GEO-CRADLE Regional Network](#) that enabled the development of regional EO activities including workshops, as well as new collaborations, and lead to the [upgrade of GEO-CRADLE project first to GEO Community Activity and then to GEO Initiative](#).
- The concrete promotion - through the [Regional Data Hub](#) as a first stage towards GEOSS - of data interoperability, discovery, access, integration and re-use by EO actors in the Region of Interest (RoI) active in North Africa, Middle East, and the Balkans (NAMEBA Region).
- The implementation of a **sustainable, long-term resource mobilisation strategy** that will build on the foundations built by GEO-CRADLE towards addressing the specific **regional challenges** (i.e. through the [pilots](#) as: Adaptation to Climate Change, Improved Food Security & Water Extremes Management, Access to Raw Materials, Access to Energy) and exploitation of the know-how developed during the project, such as the **(G)EO maturity**.

In order to define and implement an appropriate scheme to maximize the exploitation of GEO-CRADLE's results, we developed this **sustainability plan** building on the exploitation scenarios of each of the major components from the project. For the production of this sustainability plan, partners identified key activities based on:

- (i) definition of the **targets, indicators and milestones** to ensure that Network / Data Hub or Pilot results will be properly exploited after the completion of the project.
- (ii) specification of the **guidelines** to transfer project results outside the project network.

This information has been extended in a pre-defined exploitation template (Annex 1) addressing the current situation and the change that partners expected as a result of the project. We have learnt that exploitation of the major deliverables is closely related to the sustainability of the project; since its activities ensured that results will be used by the target groups and possibly transferred to other contexts outside the project.

The success of GEO-CRADLE came from the joint project implementation by partners. Their participatory approach during the last 34 months ensured the sustainability of the **pilots** while the **network** provided continuous opportunities to foster understanding, cooperation and participation of the stakeholders in the NAMEBA region but also globally. Since the beginning of the GEO-CRADLE project in February 2016, **12 regional workshops, 3 dedicated side events and 2 national networking activities** have taken place in the RoI towards the implementation of [GEO](#), [GEOSS](#) and [Copernicus](#). These events were instrumental for the identification of some of the local **challenges** and **needs** which were then addressed integrating EO and geo-information services and enabling more informed decision making in the region. During the implementation of the pilots, different **mechanisms for discussion** and sharing information among partners and stakeholders have been established. This collaboration yielded the satisfaction of stakeholders and provided fruitful outcomes taking root in local areas with opportunities for further sustainability and expandability, while seeking solutions to enhance growth and innovation in the EO and geo-information sector.

Furthermore, the GEO-CRADLE partners participated in several conferences and workshops all over the world, disseminating the added value of the project, the [GEO](#) priorities, and the [Copernicus](#) services. In addition to that, GEO-CRADLE launched both its [Networking Platform](#) and its [Regional Data Hub](#). The



Networking Platform provides a wealth of information on key EO stakeholders active in the RoI where users can navigate through the profiles of stakeholders and be informed on the existing networks, capacities, skills, etc. in the entire region. The Regional Data Hub provides access to both region-related datasets, portals, and services developed by a network of raw data providers, intermediate users/service providers, end-users from the industry, the academic and public sector from the RoI, and, also, datasets and services directly harvested by the [GEOSS portal](#). The Networking Platform and the Data Hub will expand after the project completion.

From its very conception and throughout its implementation, GEO-CRADLE has been in accordance with and driven by the strategic priorities laid out in the GEO Strategic Plan 2016-2025 regarding the implementation of GEOSS and with the Copernicus Regulation defining the actions towards Copernicus uptake. Following the 34 months of its activities, it is now possible to demonstrate its value and underline its contribution to the achievement of GEO/GEOSS and EuroGEOSS goals in the region, as well as to argue for the need to maintain the existing GEO-CRADLE coordination and networking mechanism alive and further scaled up for the benefit of EU GEO supported initiatives and Copernicus.

EXCERPT

The main objective of the sustainability plan is to ensure that project results will foster environmental, community and financial sustainability. It details the necessary actions to exploit project results within and beyond the project's lifetime. The GEO-CRADLE project through its extensive network has proven its relevance with the current development of Earth Observation in the Region. Its sustainability is based on the commitment by the partners to maintain network engagement and the momentum which has already been formed. The strategy to develop this sustainability plan was the involvement of some stakeholders and end-users in the exploitation activities; so they were and will be able to experiment and incorporate the products in their activities.



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Acronyms and Abbreviations

Acronym	Description
DoW	Description of Work
CEDARE	Center for Environment and Development for the Arab Region and Europe
CERT	Research and Studies Telecommunications Center
CUT	Cyprus University of Technology
CKAN	Comprehensive Knowledge Archive Network
DKAN	Drupal-based open data platform
Dx.y	Deliverable number y from Work Package x
EARSC	European Association of Remote Sensing Companies
EC	European Commission
EO	Earth Observation
ESA	European Space Agency
EU	European Union
EUMETSAT	European Organization for the Exploitation of Meteorological Satellites
GEO	Group on Earth Observations
GEO DAB	GEO Discovery and Access Broker (DAB)
GEOSS	Global Earth Observation System of Systems
GEOSS GCI	GEOSS Common Infrastructure
GI	Geo-information
GIS	Geographic information system
(G) EO	(Geoinformation / Geospatial) and Earth Observation
INCA	Institute for Nature Conservation in Albania
INOE	National Institute for Research and Development in Optoelectronics
INO	InoSens doo
IP	Intellectual Property
NAMEBA	North Africa, Middle East and Balkans
NOA	National Observatory of Athens
RDH	Regional Data Hub
SBA	Social Benefit Areas
SRTI	Space Research and Technology Institute of the Bulgarian Academy of Sciences
STAR	Space Technology and Advanced Research (Romania)
UZAY	Scientific and Technological Research Council of Turkey Space Technologies Research Institute
RoI	Region of Interest
ROSA	Romanian Space Agency
WP	Work Package



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Project Information

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1. Introduction

The GEO-CRADLE project has the overall objective to create a multi-regional coordination network in the North Africa, Middle East and Balkans (NAMEBA), the Region of Interest (RoI) to:

- (i) support the effective integration of EO capacities,
- (ii) provide the interface for engaging the complete ecosystem of EO stakeholders,
- (iii) promote the uptake of EO services and data in response to regional needs and
- (iv) contribute to implementing or using GEOSS¹ and Copernicus data and services in the RoI.

The overarching objectives, considered as achievements to a good extent in this deliverable, are:

- the promotion of the **uptake of EO services and data** (some of the services have been considered as good cases for potential EuroGEOSS² pilots,
- the **effective integration** of existing EO capacities,
- the **engagement of the ecosystem** of stakeholders in the region and
- the **participation of the countries** and the implementation of GEOSS and Copernicus in NAMEBA region.

The sustainability plan for GEO-CRADLE shows the capacity of the project to continue its existence and functioning beyond its end. The deliverable (D7.6) is an important step to meet these objectives providing an assessment of the best mechanisms to support long-term usage of GEO-CRADLE within user communities ensuring sustainability of some pillars of the project through a combination of market development actions and exploitation strategies.

GEO-CRADLE also aims at providing tangible and exploitable results that served the main project pillars: **networking, promotion and regional challenges** and therefore builds on the initial exploitation scenarios and includes actions towards many of the tasks performed under GEO-CRADLE.

- Promoting innovation capacity building based on the utilisation of the [GEO-CRADLE network](#) ([D2.2: Inventory of in-situ instrumentation and regional networks](#), [D2.3: Inventory of numerical modelling and computing facilities](#), [D2.4: Inventory of Spaceborne capacities](#) (including the [Regional Data Hub](#) > D5.3: Regional Data Hub Specifications)) by different target communities such as service providers and end-users ([D2.1: User Need Analysis Survey](#), [D2.5: User Need Analysis Report \(I\)](#) and [D2.6: User Need Analysis Report \(II\)](#)).
- Assessing the viability and feasibility of the different **pilot activities** ([D4.5: Pilot activity report ACC](#), [D4.6: Pilot activity report IFS](#), [D4.7: Pilot activity report ARM](#), [D4.8: Pilot activity report SENSE](#)).
- Fostering wider and better-targeted access to data, based on the outputs of the concrete pilot activities carried out in the project (GEOSS and GEO-CRADLE data portal ([D5.4 \(I\)](#), [D5.5 \(II\)](#) and [D5.6 \(III\)](#))).
- Supporting the priorities outlined in the [Roadmap](#) for future implementation of GEOSS in the RoI (D5.7: Roadmap for future GEOSS and Copernicus implementation) while placing specific emphasis on the exploitation of GEO-CRADLE and/or its components in that regard ([funding opportunities](#), [maturity level](#) (Maturity Indicators and country (G)EO profile (I) and (II), [D3.2](#) and [D3.4](#) respectively)). The Roadmap for the regional implementation of GEOSS and Copernicus is a key driver for the realization of the long-term impact of the project. It provides the connecting thread amongst the project activities, and between the project and other activities (at project, initiative and programme level) ongoing or foreseen in the future.

¹ GEOSS: Global Earth Observation System of Systems (GEOSS). More info.

² EuroGEOSS. The concrete work of EuroGEOSS will involve developing and scaling-up pilot applications in Europe. These will answer specific user-needs in relation to Earth observation. More info.



An initial list of 5 main "exploitation scenarios" (see Table 1) has been developed for the sustainability of GEO-CRADLE, or components thereof, beyond the lifetime of the project. It must be noted that these scenarios are not mutually exclusive. This allows the provision of constructive inputs to the elaboration of the subsequent funding schemas. Moreover, the elaboration of the [Roadmap](#) (D5.7) towards future implementation of GEOSS and Copernicus in the RoI, enables the exploitation of the project's results in future GEO activities. The effectiveness of the exploitation activities heavily relied on the continuous and deep engagement of the different stakeholders throughout the project and across the different WPs, especially the [feasibility studies](#) including the activity reports of the pilots in the RoI ([D4.5](#), [D4.6](#), [D4.7](#), [D4.8](#)).

To that end, the **sustainability strategy** has been adapted to the needs of the different communities and has been developed hand-in-hand with:

- the [exploitation](#) strategy
- the stakeholder [engagement](#) activities (i.e. across the complete EO value chain and covering the whole region) and deeper engagement of the different communities (i.e. hands-on involvement, active collection of feedback, provision of workshops/forums for direct interaction) including the EO scientific community, EO service providers and application developers, end-users and decision makers
- through a set of [partners commitment actions](#) and
- the [roadmap](#) for future implementation of GEOSS and Copernicus.

Table 1: GEO-CRADLE exploitation scenarios

Scenario	Dimension	Pillars / Deliverables	Description
Scenario 1: Regional initiative exploitation (institutional)	High level planning	Regional GEO Initiative i.e. [D2.2-D2.4, D3.3]	Follow up and upgrade of GEO-CRADLE activities (or part thereof) in the frame of a new regional GEO Initiative and links with existing large initiatives. The maturity level has proved to be a powerful tool to understand the level of uptake of key (G)EO initiatives.
Scenario 2: Network exploitation (sharing)	Management planning	Maintenance of GEO-CRADLE Network & Regional Data Hub by consortium i.e. [D2.2-D2.4, D5.6]	The GEO-CRADLE Networking Platform and the Regional Data Hub (infrastructure) will continue to be operated and maintained by the GEO-CRADLE partners, utilising own (national or regional) funds. Linking to EOpages (EOpages NAMEBA) will be also considered. It will bring sustainability of the data and services collected and future brokering for the various data streams in the project.
Scenario 3: System exploitation (economic)	Partnership & financial planning	Follow-up collaborative project through funding opportunities i.e. [D5.7.]	Regular funding from sources within Horizon 2020 (future GEO-related calls) are sought by the consortium (i.e. EuroGEOSS), and the activities of the project are continued, as is the case for COSME (2014-2020) .
Scenario 4: Scientific exploitation (community)	Communication & capacity planning	Continuation of GEO-CRADLE activities (awareness, communication) at national level as a result	GEO-CRADLE partners pursue continuation and deepening of specific activities, i.e. exploitation of thematic pilots , scientific innovations to acquire skills at national or transnational scale



		of the exploitation of the feasibility studies i.e. [D6.6. – D6.11.]	which will contribute to go beyond the state of the art (e.g. neighbouring countries) utilising national or regional funds. It might help to improve the exposure of the added-value products developed by the pilots to end-users/customers.
Scenario 5: Business exploitation (logistics)	Uptake planning	“Spin-off” R&D projects relying on the pilot scenarios i.e. [D4.5.-D4.8.]	Building on the outcomes of the pilot activities, a number of R&D projects and/or partnerships have been launched with the participation of GEO-CRADLE members and external entities (scaling and extending). Future Pilot-specific , commercially exploitable information products/services.

Intro

The sustainability of the project implies the exploitation of results in the long term. The intro presents how the plan will define and implement the sustainability scheme guaranteeing the long-term exploitation of the project results and the sustainability of the expected impacts across the various project activities, especially through the focus on the 5 major scenarios described above.

1.1. Sustainability context

The sustainability plan for GEO-CRADLE presents the capacity to continue its project existence and functioning beyond its end. Therefore, this plan is a strategic document reflecting on the project aims and the scaling up the major outcomes applying a systematic approach but also proposing elements to build building the roadmap (D5.7: Roadmap for future GEOSS and Copernicus implementation).

When structuring this section, we reflected on the following set of issues showed in Table 2 ensuring the long-term vision of the different sustainability dimensions and its principal justifications. The actions done during the GEO-CRADLE duration are described in brackets.

Table 2: Platform for sustainability – Questions to ensure long term vision

Relevancy	Acceptability	Financial viability	Implementation & Monitoring	Operation & Maintenance
-has the project identified clearly the targeted beneficiaries? (major actors defined in the engagement section)	-has the community in the RoI been consulted? (workshops organized throughout the RoI. Annex 6.4) -has the community accepted the main outcomes of the project?	-have the main tasks (pillars) projected an acceptable level of sustainability? (a progressive follow up is expected through the commitment of some stakeholders) -have the partners got the necessary resources to implement the overall project (including the	-what are the plans to get political support for sustaining the project or elements of the project’s operation? (communication of project results & promotion of benefit of pilots, regional network and datahub)	-has the project received necessary support (budgetary but especially institutional) to maintain required level of pilots and workshops, network, hub...etc.? (considered at the project management plan and the Impact Assessment Report)



	<p>(outcomes established in the proposal and fully tackled in the roadmap)</p> <p>-does the community consider the project as beneficial? (the pilots presented the service value in the countries. They have shown that those investments are reaching the society as a political objective)</p>	<p>pilots)? (this information is presented in the exploitation templates Annex 6.1)</p> <p>-which are the plans for a continued financial support? (main ideas are presented at the funding opportunities)</p> <p>-what other funding sources should be contacted for further support? (steps introduced at the financial sustainability)</p> <p>-have major tasks ensured the resources required for sustainability? (headed at the roadmap and exploitation forms)</p> <p>-have economic models being considered? (briefly introduced at the financial maturity indicators)</p> <p>-how do we ensure that regions will benefit the investment of public funds? (NAMEBA countries showed real engagement since the beginning of the project)</p>	<p>-which is the involvement of the community in building sustainability strategies for the project? (partner involvement in exploitation plans)</p> <p>-what services will be sustainable for the project? (sustainability focussed on concrete project outcomes such as the hub or network)</p> <p>-how other scenarios will be planned for sustainability? (dedicated section on scenarios development)</p> <p>-which are the existing programs and partner services / responsibilities towards sustainability? (section presented at the governance)</p> <p>-where GEO-CRADLE major outcomes will be in short but also long term? which steps will we need to achieve that vision? (connexion with the roadmap which identifies regional challenges)</p>	<p>-has been GEO-CRADLE project been consistent with National Priorities in R&D or space strategies? (a dedicated section on Priorities Action Plan and gap analysis has been conducted)</p> <p>-are there other groups to partner with in building political and community support for sustaining the project components? (other initiatives such as EuroGEOSS and AfriGEOSS and stakeholders [i.e. advisory board] have been contacted during the project implementation)</p> <p>-will the sustainability plan focus on long-term continuation of the GEO-CRADLE project operation? (in connection with the roadmap. A fully dedicated session was organised to present the GEO-CRADLE follow-up during the 3rd South-Eastern Europe GEO Workshop)</p> <p>-has the project incorporated mechanisms that guarantee access to and distribution of project main services on a continuous basis? (free and open accessibility to the network platform and the datahub, as well as its connection with the GEOSS, which will be maintained by NOA)</p>
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Context

The GEO-CRADLE project can be considered as sustainable if relevant results / deliverables are pursued and products are maintained or developed after the end of the EU funding. The answering of these set of questions helped to create this sustainability context addressing expected impacts across the various project activities, especially the pilots, the regional networking platform or the datahub, guaranteeing the long-term exploitation of the project.

1.2. Document structure

The sustainability plan gives the partners a direction and some perspectives which will allow the development of sustainability & exploitation activities carry on once the grant agreement ends with the European Commission. Six sections describe this document.

Section 1 (**INTRODUCTION**) introduces references to ensuring the long-term sustainability of the project through a combination of market development actions and exploitation strategies. The context part begins by recalling the **sustainability concept definition** and the structure presents the organisation of the document.

Section 2 (**PRIORITIES**) is the core of the deliverable document. It provides an overview of **guidelines** including the dimensional **principles, attributes, factors and scenarios**. In elaboration of such kind of settings we present the major priority aspects to secure the sustainability of the GEO-CRADLE project. It contains the identification of the main project results and their interrelation to the sustainability strategy. Such scenarios were identified as:

- Networking platform (including survey)
- DataHub
- Pilot activities
- Funding opportunities
- Maturity level

For each element we provide a synthetic description, with reminder to the extensive explanation into the project website related deliverable(s), together with sustainability and exploitation hypothesis.

Section 3 (**GOVERNANCE**) defines **main steps** for the sustainability of project results and activities which should be done by the identified **actors**.

Section 4 (**ENGAGEMENT**) collects key findings gathered during the **communication** activities with **stakeholders** regarding their perception and experience with the GEO-CRADLE project including a chapter with links to the GEO-CRADLE **roadmap**.

Section 5 (**TOOLBOX OF CONCRETE ACTIONS**) proposes actions for exploitation of project results in the long term, including **lessons learnt, follow up and sustainability conclusion**.

Section 6 (**ANNEXES**) includes **definitions, references and templates** such the exploitation scenarios of each of the major components from the GEO-CRADLE project.



SUMMARY INTRODUCTION CHAPTER

This chapter is introducing the sustainability plan as a strategic document reflecting GEO-CRADLE project aims and the scale up of the major outcomes. It gives the context and presents long term views for the impact of the major outcomes in the Region of Interest - (North Africa, Middle East, Balkans) with a systematic approach and the effective platform for sustainability.

The intro chapter already presents the major outcome summarizing a plan for services roll-out (toolbox) in order to ensure the greatest applicability across most stakeholders.

The sections describe how the report will assess the desired approaches to GEO-CRADLE from the end-user stakeholders, and identify critical success factors, as well as potential risks and inhibitors. The output in section 4, with a direct feedback from the stakeholders, and section 5, organized into a set of recommendations, will deliver the sustainable approach to services generation and utilization brought by GEO-CRADLE.

The major GEO-CRADLE outcomes which have been analysed from the sustainability point of view were:

- the datahub and the analytic inventory and the assessment of the existing capacities (monitoring capabilities, and scientific skills which are available for integration).
- the network, the supplementary support to EU capacities created in the Region and the understanding of its maturity.
- the reporting of the user needs in the four thematic areas (pilots): adaptation to climate change, food security & water extremes management, access to raw materials and access to energy.
- the funding opportunities and the elaboration of proposals for sustainable actions in relation to capacity building and service delivery.
- the maturity indicators methodology to estimate the current level of maturity of each country.



2. Priorities

2.1. Programmatic priorities

The alignment on various processes has been contemplated to ensure the GEO-CRADLE sustainability:

- **Integrate sustainability in all the major exploitation scenarios:** The integration of sustainability aspects has been considered right from the beginning, so it helped to develop partnerships and relations with relevant stakeholders at an early stage of project development (D6.8: Mid-term Implementation Report on Stakeholder Engagement). Efforts are also taking place in the direction of EuroGEOSS so that the outcomes of the project can be further exploited and upgraded after the end of the project. Major scenarios are examined: Initiative, Network, System, Scientific and Business exploitation.
- **Communication and outreach strategy:** The GEO-CRADLE project has developed a strong communication strategy (D6.1: Communication Strategy and Action Plan), so the results were shared with a large audience. All the pilots have been very well documented including project results which can help in getting future support from a broad range of stakeholders. The use of the networking platform was crucial to keep partners in touch with stakeholders (with currently 268 actors from 29 countries). The communications plan details how the communications channels work together and are used together to promote GEO-CRADLE activities. The outreach elements (WP6) guide the communication strategy goals and messages.
- **Involvement of key stakeholders and use of the networking platform:** Another major step to ensure sustainability was the involvement and participation of key stakeholders in the project development, especially at workshops organized to develop the dialogue between multi-stakeholders. See regional workshops in Annex 4. As stakeholders were adequately engaged during GEO-CRADLE, they had a widespread influence. Stakeholders' involvement provided expertise for the project, specifying requirements, discussing constraints of the pilots, reviewing deliverables along the way and granting acceptance.
- **Creation of an inventory of resources:** A link between each major scenario and the corresponding exploitation plan has been drafted in this strategy and the roadmap. The web portal also includes a section on deliverables and an inventory of regional capacities.
- **Fostering access:** The project developed wider and better-targeted access to data, based on the outputs of the concrete pilot activities carried out in the project and the open access to the Datahub and Networking Platform, supporting the establishment of integrated EO services that meet regional priorities and contribute to the implementation of GEOSS and Copernicus in the region.

Other mechanisms to consider:

- **Supporting priorities:** In order to achieve the project goals, the priorities outlined in the roadmap are placing specific emphasis on the exploitation of GEO-CRADLE and/or its components prioritizing the major tasks.
- **Promoting innovation capacity building:** The formulation and implementation of adequate innovation policies in the region is critical for tackling contemporary challenges. A starting point should be based on the utilisation of the GEO-CRADLE Pilots outcomes, Networking Platform and the Regional Data Hub by different target communities (end-users, service providers) to create awareness on the activities promoted by GEO-CRADLE and to present future planning for innovation policies to support follow up activities.
- **Diversify funding sources:** One of the most important aspects of sustainability is to diversify the future funding base and to develop long term partnerships with stakeholders. The goal should be to establish a base of funding which is reliable, flexible and varied: conduct a funding review, find funding sources aligned with GEO-CRADLE mission and develop alternative funding sources.



This section also describes the elements that constitute the sustainability framework. **“Sustain, enhance, expand and transfer”** are critical actions for leading to long-term sustainability of community initiatives. Although each element is important, the figure below determines essential scenarios and the major components: Initiative, Network and Datahub, System (including funding), Scientific (including national pilots) and Business exploitation (including links with industry partners for further market uptake).

The exploitation of these project actions is closely associated with the sustainability of GEO-CRADLE after its conclusion. Some of the exploitation activities ensure that the results of the project are used by its target groups and possibly transferred to other contexts (e.g. other countries; other thematic areas, other sectors). The figure below shows the GEO-CRADLE sustainability components covering the different discussion dimensions in the report.

Figure 1: GEO-CRADLE sustainability components

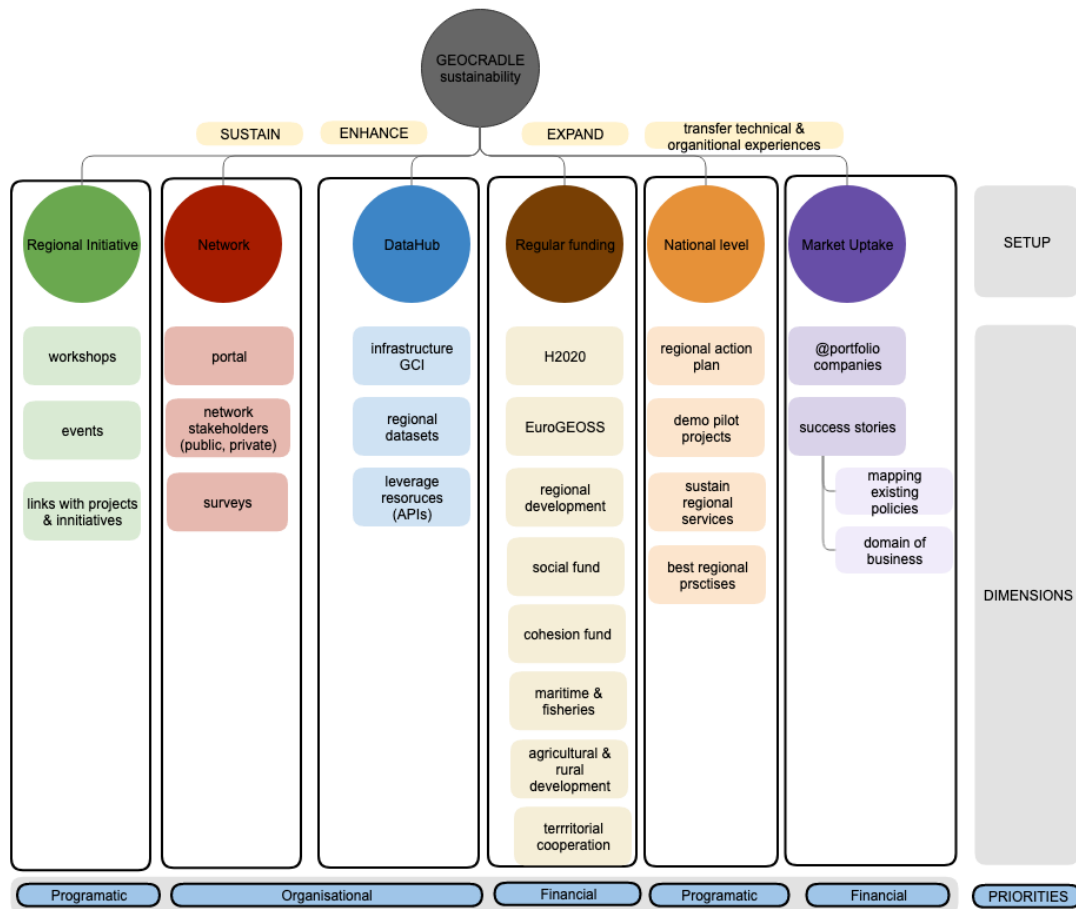


Figure 1 represents the sustainability components proposing to “enhance” and “sustain” the current knowledge of existing EO capacities in the region and “expand” its network facilitating the cooperation between EO stakeholders enabling to exchange on EO data and services through tackling regional challenges.

The right side of the graphic corresponds to the SETUP (concrete activities of the GEO-CRADLE project) which are represented in the coloured circles (aligned through the left side) and each of those proposed the required sub-activities to perform while in the bottom part, we represent the relation of the SCENARIOS with the priorities.

The following analysis will check these scenarios from the financial, organizational and programmatic perspectives:



2.1.1. Financial sustainability

To better understand the various financial options available for achieving the project goals and allowing to continue thriving them over the long term, some developments have been considered:

- **Business perspective** to generate uptake of a particular pilot: The objective of the pilot activities was not to develop new science but to build on the integration of available capacities (infrastructure, datasets, models, etc.) and skills, towards the provision of improved EO Services in the RoI. The final results were presented to relevant stakeholders (especially decision makers) in dedicated workshops. For example the SolarAtlas of Egypt has been presented as a key catalyst to support the development of progressive policies, new profitable investments, markets, “green jobs” and technological innovations.
- **Diversifying of possible funding projects** (i.e. EuroGEOSS, AfriGEOSS, EC regional development funds, etc)
- Consideration to create an **Association (group of interest) in the Region** gathering the interest of the organizations (i.e. EARSC-Balkans?)
- **Support from institutions** to sustain or expand some of the project activities (i.e. geographic expansion to the Black-Sea region, thematic expansion to disasters management and water resources management)

The financial sustainability provided the focus on the benefits of GEO-CRADLE outcomes becoming “THE” **Network and Platform for excellence in the Region** giving access to future “GEO Balkans” projects where replication of pilots, plans for research and innovation will be easier.

Other financial patterns have been explored as:

- i) **Leveraging a shared position**; in financial terms, even if resources will increase throughout the project, leverage³ involves the use of external funds. This has been achieved in some pilots which have been utilized by Ministries (Solar Atlas Egypt which has been recognized of great importance).
- ii) **Incorporating activities and services** in projects with a similar mission in the region; GEO-CRADLE regional data hub integration and connection with multiple remote data sources (wide variety of data formats, data types, and data distribution system architectures) acting as a gateway to the users. The connection of the Regional Data Hub to GEOSS was a challenging objective of the GEO-CRADLE project achieved using the GEO DAB APIs and in particular the OpenSearch API. The GEO DAB APIs are plugged and operational. The complete integration of those APIs in DKAN has proven a laborious work including a novel software architectural design.
- iii) **Applying for common grants**; joint applications from partners/geographical point of view. GEO-CRADLE was launched as an EU H2020 Project with 25 partners from 3 continents, it was then upgraded to a GEO Community Activity, and it was recently further upgraded to a GEO Initiative. In parallel many GEO-CRADLE partners have submitted a series of EUROGEOSS Expressions of Intent, while several of the feasibility studies have been considered among others in the development of the EUROGEOSS Initiative.
- iv) **Having project results be picked up** by other organizations; How to provide access to region-related (North Africa, Middle East, Balkans) datasets and services, directly fed by the GEOSS-portal, and local portals, while at the same time being the centralised gateway for regional data providers to contribute to GEOSS. Assessing the maturity of EO capacities at national level has proven to be a powerful tool to highlight strengths and weaknesses, communicate on identified gaps, understand the level of uptake of key initiatives such as Copernicus and GEO.

³ Leverage wikipedia definition



- v) **Finding funding from partners;** GEO-CRADLE has designed and put in operation the Networking Platform, which brings together key EO stakeholders in the region, and the Regional Data Hub which is the focal node for data sharing in the regions of North Africa, Middle East, Balkans in the context of GEOSS and Copernicus implementation. NOA will support the maintenance of these portals after the finalisation of the pro.

Financial sustainability facilitates the uptake of GEO-CRADLE EO-derived benefits in a region with strong interest for Europe (EuroGEOSS) and solid foundations for cooperation (see PRIMA⁴, EO4SD⁵, IPA⁶, ENI⁷... etc).

2.1.2. Organizational sustainability

The organizational sustainability was based on the “**GEO-CRADLE identity**” made up of its vision, mission, values, brand and leadership. GEO-CRADLE brought together key players from the NAMEBA region representing the entire EO value chain, with the overarching objective of establishing a **multi-regional coordination network**.

We have explored the ways to achieve organizational sustainability within the project and summarized the major objectives in the table below.

Table 3: Organizational sustainability

Activities done	Status	Enhancement
Promoted the uptake of EO services and data in response to regional needs.	GEO-CRADLE carried out four feasibility studies showcasing the potential of a consolidated regional EO platform for coping with critical societal and economic challenges in the areas.	Explore a flexible approach of finding new opportunities.
Supported the effective integration of existing Earth Observation Capacities in the region.	GEO-CRADLE identified gaps and captured the user needs assessment of existing EO services. Moreover, through the development of Regional Data Hub, the project facilitated access to and sharing of EO data across and beyond the region of interest.	Develop partnerships and future partners' engagement.
Facilitated the engagement of the complete ecosystem of EO stakeholders in the region.	GEO-CRADLE created a regional network that enabled the engagement of regional stakeholders across the complete EO value chain.	Boost existing relations in the region.
Enhanced the participation in and contribution to the implementation of GEOSS and Copernicus in North Africa, Middle East and the Balkans.	GEO-CRADLE built up on the momentum created in N. Africa by initiatives such as AfriGEOSS and BRAGMA; and have addressed the significant under-representation of Middle East countries in GEO.	Communication and outreach helping in showcasing GEO-CRADLE.

Organizational sustainability:

- (i) Showed how to foster the progressive operationalisation of EO-based services, building on the results of GEO-CRADLE deliverables, especially the pilots which provided links to the national needs for achievement of SDGs and the involvement of the private sector.

⁴ PRIMA: Partnership for Research and Innovation in the Mediterranean Area (PRIMA)

⁵ EO4SD: Earth Observation for Sustainable Development (EO4SD)

⁶ IPA: Instrument for Pre-Accession Assistance (IPA) Assistance for transition and institution building; Cross-border cooperation

⁷ ENI: The European Neighborhood Instrument (ENI) | EU Neighbors



(ii) Promoted the coordination of EO activities at regional level through the sustained operation of the GEO-CRADLE networking platform. Through the “upgrading” of GEO-CRADLE to a GEO Initiative, an even larger community will be attracted, helping to build a more integrated ecosystem of EO stakeholders.

2.1.3. Programmatic sustainability

The programmatic sustainability summarized strengths and areas for improvement identified in the major tasks but particularly during the pilot results. It was a participatory phase, with a rapid-assessment process for identifying the needs and making concrete plans for improvement.

- The community involvement in the project was essential for reassuring ownership in the region, skills and knowledge making the project services transferable and also replicable.
- The community advocacy was fundamental for having long term impacts for the outcomes, it also sensitized the stakeholders about the benefits ensuring sustainability in the long run.
- The involvement of local and regional governments helped in sustaining the project activities beyond the project duration.

Programmatic sustainability:

(i) The verification and demonstration of project results in the countries done via interviews and workshops which grasped stakeholders’ needs and guidelines to develop the pilots and validated adequateness of the activities in the area: cost-effectiveness have been suggested to balance between input and outputs from the pilots.

(ii) The effective implementation of Data Sharing principles in the region and the linkage of national datasets to GEOSS further promoted.

(iii) The maturity of EO activities at national level assessed, towards informing targeted capacity building activities.

2.2. GEO-CRADLE scenarios

The effectiveness of activities and technologies transferred during the project were observed. Named as scenarios, those are: Initiative, Network, Funding, Scientific, and Commercial.

The contributing factors to secure sustainability and expandability of the project outcomes were extracted through the careful analysis of the activities from the preparation stage to the end of the project. Those factors provide useful tips to be referred for the effectiveness of the implementation.

Table 4: GEO-CRADLE scenarios & SWOT analysis (Strengths, Weaknesses, Opportunities and Threats)

Sc. Title & factors	Activity	Connections	(i.e) SWOT
Scenario 1: Regional GEO initiative. Vision: Programmatic & political.	Sustain and expand the network of stakeholders and the datahub. Uptake, follow up and extend (geographically and thematically) the GEO-CRADLE activities in the frame of a new regional GEO Initiative program. Links with	-Workshops engagement of the complete ecosystem of EO (i.e: Inter-regional Round table for SDGs in Balkans) -Network stakeholders such	-Maturity indicators (s) first indication on where the country stands in (G)EO (w) selection of the maturity indicators depending on the country reality (o) citations and impact factors (t) adoption per country.



	existing large initiatives.	as National GEO offices & Copernicus relays opportunities -Links with GEO projects (EuroGEOSS, AfriGEOSS, GEO-VENER, GMES and Africa) and initiatives (PRIMA)	
<p>Scenario 2: Maintenance of GEO-CRADLE Network & Regional Data Hub by consortium.</p> <p>Vision: Technical & social.</p>	<p>Facilitate partnering & sustainable way for GEOCRADLE Data: The GEO-CRADLE Network and the Regional Data Hub will continue to be operated and maintained by the GEO-CRADLE partners, utilising own (national or regional) funds. As GEO-CRADLE has become a GEO Initiative the network will be reanimated. Concretely GEO-CRADLE partners' email remains operative reaching and disseminating Regional information to the community. When referring to the DataHub, NOA maintains the hub for the next two years but there is a strong commitment to get maintenance resources through EuroGEOSS.</p>	<p>-Infrastructure connected to GEOSS, bringing together regional datasets, fostering cooperation EO activities Rol</p> <p>-Leveraging GEOSS resources and GEO DAP APIs</p> <p>-Data hub interoperability (GEO DAB API)</p>	<p>-GEO-CRADLE has significantly supported the establishment of a vibrant ecosystem of EO stakeholders across the NAMEBA region. This has been achieved through the organisation of multiple regional workshops, and the setup and operation of a dedicated networking platform with currently 268 actors from 29 countries. These networking activities triggered several regional collaborations either on R&D activities or on operational services but also helped to raise awareness on who does what, where and on what resources. Therefore, through the "upgrading" of GEO-CRADLE to a GEO Initiative, an even larger community will be attracted, helping to build a more integrated ecosystem of EO stakeholders. To that end, NOA commits to maintain the platform and will seek to integrate it in the EuroGEOSS.</p> <p>-Searchable data within the project (using the networking) (s) maximises re use of scientific knowledge (w) generation gap between old and new communications, rejection of consumer technology by some decisions makers, unwillingness to share data (o) replicability (t) misuse of results</p> <p>-Open access of data for ROI through the GEOSS (Data Hub) (s) exploits technology, few disciplines covered, more citations, spread the word about the network (w) quality of data, easiness to upload > reward open practises (o) support from government, replicability (t) stakeholder opposition to share national / regional data.</p>



<p>Scenario 3: Follow-up collaborative project through funding.</p> <p>Vision: Institutional, financial & economic.</p>	<p>Follow resources on pilot activities & strength the EO industry / R&D dimension: Regular funding from sources within Horizon 2020 (future GEO-related calls) are sought by the consortium, and the activities of the project are continued, as is the case for COSME (2014-2020).</p>	<p>-Other financial resources through programmes and projects: H2020 (NextGEOSS project), Copernicus DIAS, EuroGEOSS, eoMALL, Regional Development Fund (ERDF), Social Fund (ESF), Cohesion Fund (CF), Maritime & Fisheries Fund (EMFF), Agricultural Fund for Rural Development (EAFRD), Territorial Cooperation (ETC) / INTERREG</p>	<p>- Geographical location interest and number of participants interested in the project (s), Unstable economic situation (w), Political and public support (o), involvement of governments might jeopardise the uptake and commercialisation (t)</p>
<p>Scenario 4: Continuation of GEO-CRADLE research & scientific activities at national level.</p> <p>Vision: National, scientific, technical & social.</p>	<p>Prototype methodology & detailed assessment: GEO-CRADLE partners pursue continuation and deepening of specific activities, i.e. exploitation of thematic pilots or acquired skills, at national or transnational (e.g. neighbouring countries) level utilising national or regional funds.</p>	<p>- The regional action plan delivered support actions & thematic priorities addressing regional challenges. For example, the outcomes of the pilots have been used by the National stakeholders to expand into other areas, so proven their sustainability and expandability.</p>	<p>-Access to publications (scientific exploitation) (s) review information valuable for researchers, improves the quality of papers.</p> <p>-Dissemination of results (outreach exploitation) (s) can reach other stakeholders outside partners, faster access to project results (w) lack of critical mass, risk of noise in the region (o) motivate engagement, use data in another projects (t) out of scope for other communities.</p>
<p>Scenario 5: Commercial uptake R&D projects relying on the pilots.</p> <p>Vision: business, financial & economic, technical.</p>	<p>Support the EO market: Building on the outcomes of the pilot activities, a number of R&D projects and/or partnerships is launched with the participation of GEO-CRADLE members and external entities (scaling and extending)</p>	<p>-Business model: Pilots as success stories understanding the local market, & capacities bringing the proposed solution to market</p> <p>-Mapping existing eo policies.</p>	<p>- Development of pilots and results used in further research activities outside the project such as standardisation activities (s), lack of long-term budget planning (w), availability of investment funds in the RoI through EC funding (o), poor cooperation research & industry (t).</p>

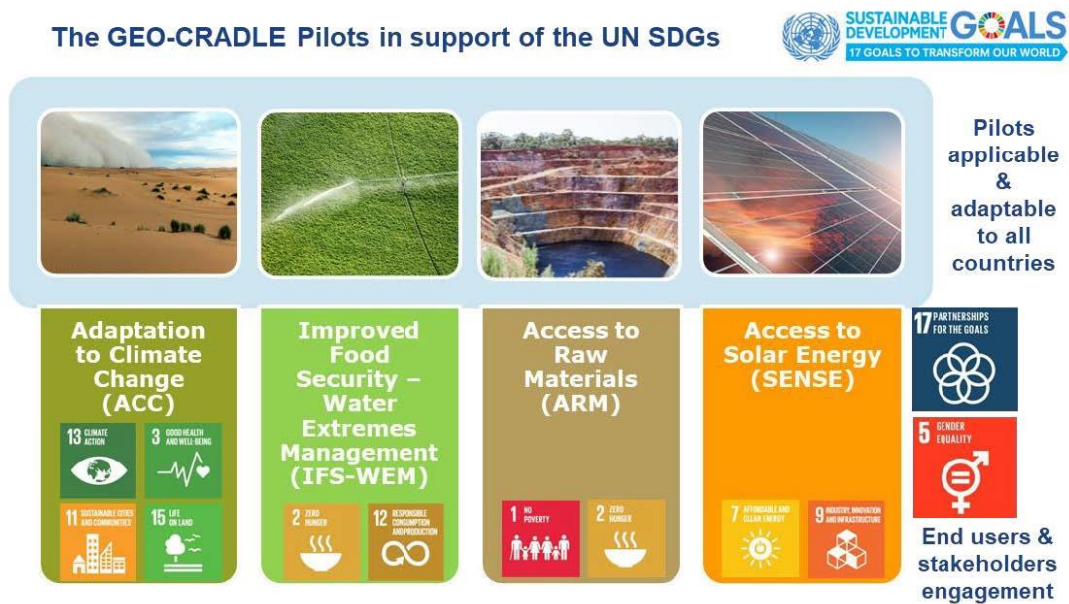
Scenarios

This section shows a sustainable approach to services generation and utilization brought by the SWOT analysis (Strengths, Weaknesses, Opportunities and Threats).

2.2.1. Pilot Activities

Following the identification of regional priorities, GEO-CRADLE has prepared 4 feasibility studies (“Pilots”) related to **adaptation to climate change, improved food security and water extremes management, better access to raw materials and better access to energy**. The figure below shows how the GEO-CRADLE pilots are supporting the UN SDGs.

Figure 2: GEO-CRADLE pilots in support of the UN SDGs



2.2.1.1. Adaptation to Climate Change

The RoI has been recognised by the [Intergovernmental Panel on Climate Change](#) as one of the most sensitive and vulnerable to climate change regions on Earth. Climate change is governed to a large extent by atmospheric processes, in particular, the interaction between radiation and atmospheric components (e.g. aerosols, clouds, greenhouse, and trace gases), some of which also contributing significantly to air quality degradation. In summary, the ACC pilot: (a) supported the sustainability of regional EO infrastructures and trigger needed synergies, (b) improved knowledge on current regional climate adaptation policies, and (c) provided reliable assessments on the level of needed coordination and future investment to be carried towards the implementation of GEO, GEOSS and Copernicus in the RoI. The way forward is expressed in the table below.

Table 5: Adaptation to Climate Change pilot Activities (The DEAR Pilot)

<p>Background</p>	<p>The DEAR-Clima is a Data Extraction Application for Regional Climate. DEAR-Clima provided reliable and user-friendly open access of Essential Climate Variables (ECVs) and Climate Indices (CI) for future climate change from high resolution RCM projections which are essential to support decision makers, stakeholders, intermediary users and end-users for climate change impacts, mitigation and adaptation in sectors such as: Agriculture, Tourism, Energy, Water management and Natural Hazards.</p>
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Activities	-Support coordination of existing EU networks [ACTRIS, EARLINET, EUFAR] and infrastructures on triggering synergies between atmospheric science communities -DEAR-Clima: high resolution past-present-future climate information for Essential Climate Variables [ECVs] and Climate Indices [CI]
Way forward	The DEAR-Clima is fully operational (http://datahub.geocradle.eu/dataset/dear-clima). There is space for further development with a) more RCM projections, b) with more calculated climate indices and c) with inclusion of GIS. Follow-up of an extended ACC pilot with dedicated activity in climate services for agriculture. Pilot study for grape cultivation in Greece
Users	Wineries
Exploitation	Provision scheme: Climate Application Tool, Climate Services Funding from: PRIMA, Copernicus
Services	- Looking for open access to future Climate Change Data for Europe click here Climate Change Data – Models - Looking for Climate Change Dust Data click here Climate Change Data – Dust Data
Leader	National Observatory of Athens (NOA)

2.2.1.2. Improved Food Security – Water Extremes Management

Food security depends on many aspects such as water abundance and extremes (flooding and drought), vegetation stresses, yield monitoring, soil quality monitoring and sustainability. Plants need nitrogen, phosphorus and potassium, none so easily available in the RoI. Common standards and protocols following the FAO principles for long-term monitoring of soils and minerals have been defined for the first time in the RoI. For the first time the available EO means, service chains, and methods developed in soil science discipline over the past years will be evaluated and tailored to meet the RoI specific mapping needs. A scientific challenge of using multiple satellite missions including the Copernicus missions, together with a large dataset of field spectral measurements has been addressed. New service specifications and roadmaps raised for deriving food security essential parameters (e.g. soil degradation, soil acidification, soil moisture, and water extremes). Diversified EO datasets and soil spectra libraries together with their metadata became accessible through the GEO-CRADLE Data Hub for the benefit of all potential users. The way forward is expressed in the table below.

Table 6: Improved Food Security – Water Extremes Management (The IFS-WEM pilot)

Background	The IFS-WEM has established a standardized Soil Spectral Library and a Flood & Drought Observatory being a focal point for the region for water, meteo, and hydrological data and developing an extensive observational and modelling service capacity. Key results: (i) Establishing for the first time in the region an open standardized SSL (ii) Building the partners' capacities to exploit & contribute to the SSL through webinars & training sessions (iii) Creating the MyDEWETRA platform http://geo-cradle.mydewetra.org/ (iv) Developing EO maps using Copernicus data and the regional SSL (v) Utilizing EO data to establish hydrological maps for the BAMENA region.
Activities	-Open, regional, vis-NIR SSL -Build partner capacities to exploit and contribute to the SSL -MyDEWETRA web-GIS platform for exploring and visualizing data for water extremes -Soil maps using Sentinel-2
Way forward	Expand the SSL and myDEWETRA with new data as they become available Exploit the SSL to map the soil of even more areas in the RoI using EO data Follow up of an extended pilot action with dedicated activity in climate services for agriculture
Users	Soil science community, Agronomists



Exploitation	Provision scheme: Service, Database, Software Funding from: H2020, PRIMA, other funds
Services	-Looking for a dataset containing a regional vis-NIR (350-2500 nm) soil spectral library of the region BAMENA click here Spectral Soil Library -Looking for GEO-CRADLE Mydewetra Platform click here Mydewetra Platform
Leader	InterBalkan Environment Center (i-BEC)

2.2.1.3. Access to Energy

GEO-CRADLE led a coordinated effort to support and improve the regional EO infrastructures through the Solar Energy Nowcasting SystEm (SENSE) pilot. SENSE demonstrated ways to maximise the value and benefits of EO investments in the RoI and trigger synergies between the private sector with public services and user communities. End-users in both public and private sector (e.g. solar plants, power networks and distributors, state authorities, stand-alone solar panels installations) benefit from the provision of real-time information on solar energy availability, enabling safer prediction of power distribution from renewables, while preserving natural resources and reducing their reliance on fossil fuels. It is a unique demonstrative example of how EO science and industries (private sector) can come together in contributing to the solution of the “energy” issue in the area, empowering also the decision makers to design energy planning that stimulate future investments. This is vital for the sustainable development of EO resources and activities that have strengthen the competitiveness and performance of the energy and research sectors. The way forward is expressed in the table below.

Table 7: Access to Energy (The SENSE pilot)

Background	Use of an operational, satellite-driven, real-time system for solar energy now-cast tool for TSO and DSO. Contribute to energy related capacity building. SENSE supported the local energy managing authorities by providing analytical solar atlases and business plans for establishment, operation and exploitation, as well as real-time services of solar energy potential. Now-casts and forecasts on different spatial horizons: from the local plant production to the country and continental scale. Use of solar irradiance spectra for: agricultural, health, biological and scientific applications. SENSE is an operational ready technology.
Way forward	Follow-up of SENSE pilot (as nextSENSE) with activities in the EuroGEOSS concept (forecasting at different time scales) Development and exploitation of solar energy applications through as spin off Participation in application related projects on agriculture, health, marine, energy Continue/enhance collaboration with partners/countries within Geo-Cradle
Activities	-The Solar Energy Nowcasting -System (SENSE) provides real-time information on solar energy availability -Can be readily applied to the whole region -Starting point for energy related investments
Users	TSOs, DSOs, Public bodies, Energy investors, Solar farms management authorities
Exploitation	Provision scheme: Solar energy applications, services, products and solutions. Funding from: Horizon 2020, end-users, EU projects, state funding
Services	-Looking for open access data on the solar energy for Egypt and Greece click here Solar Atlas . -Presentation: Access to Energy (SENSE), The SOLAR ATLAS of Egypt
Leader	Physikalisch-Meteorologisches Observatorium Davos/World Radiation Center (PMOD/WRC)

2.2.1.4. Access to Raw Materials



GEO-CRADLE made available in the RoI a roadmap for long-term monitoring, mapping, and management of mineral deposits, also assessing the ground changes and site degradation related to mineral exploitation. Diversified data sets together with their metadata became accessible through the Regional Data Hub. The resulted delineated waste materials areas advanced the knowledge on the critical hazardous areas for remediation purposes. The roadmap for the characterisation of waste materials promotes specifications and methodologies for engaging future operations fitted to raw materials demand, minimising the environmental footprint, and improving the evaluation of the sustainability and management of the post-mining areas. The way forward is expressed in the table below.

Table 8: Access to raw materials (The ARM pilot)

Background	Launched feasibility studies on pilot project areas for the monitoring of illegal quarrying in RoI countries, as well as the development of EO methodologies for better management of the mining and post-mining areas: Prospecting (Turkey) Monitoring Quarrying areas (Greece) and monitoring ground motion – subsidence / rehabilitation activities (Cyprus / Greece). The aim of the feasibility studies was to define the roadmap for long-term monitoring, mapping, and management of mining areas, also assessing the ground changes and site degradation related to mineral exploitation / rehabilitation activities. GEO-CRADLE has raised awareness on EO / Copernicus data in the RoI countries in relation to: (i) mapping disturbed / undisturbed land, (ii) rehabilitation monitoring of the conditions – ground movements in mining areas (iii) delineation of areas (iv) discrimination of geologic setting (v) supporting issues of spectral analysis.
Activities	-Greece: Monitoring of illegal quarrying activities -Cyprus: Abandoned Asbestos -Turkey: Central Anatolian Lignite Basin & Çelebi-Kesiköprü Iron oxide mineralization -Analysis through Copernicus and EO data
Way forward	Relate and support GEO activities – as established in the GEO 2017-2019 Work Programme: Earth Observations for Managing Mineral Resources – Activity 89 Earth Observations for Geohazards, Land Degradation and Environmental Monitoring Activity – Activity 88 Project submission in the RoI – establish additional feasibility studies / EU Innovation actions
Users	National Authorities, Geological Surveys, Private sector companies
Exploitation	Provision scheme: Service for a Geologic Mapping and Mining Monitoring tool. Funding from H2020: TOPIC: Raw materials innovation actions: exploration and Earth observation in support of sustainable mining Topic Identifier: SC5-10-2019-2020. Funding from EEA and Norway Grants Fund for Regional Cooperation “Common Challenges – Shared Solutions” - Call no. 2018-01
Services	-Looking for ARM data for Greece, Cyprus & Turkey click here ARM Data
Leader	EuroGeoSurveys – The Geological Surveys of Europe (EGS)

These activities attempted to leverage existing infrastructure, capacities and skills, to showcase how regional challenges can be addressed or which are the different factors that might prohibit or delay their success. In that respect, they provided concrete impact at country and regional level in the aforementioned thematic areas. The strong exploitation potential of these activities has been already exemplified by the keen interest shown by regional actors (Ministries, non-EO industries, etc.).

2.2.2. Survey & Networking Platform

The directory of regional stakeholders across the complete EO value chain has been integrated into a functional [Networking Platform](#) allowing different actors to showcase their EO-related capacities on-line, enabling cross-sectorial partnerships and cross-border collaborations. GEO-CRADLE built direct bridges with GEO PIs in the RoI, and in collaboration and alignment with the GEO Secretariat planning, designs its

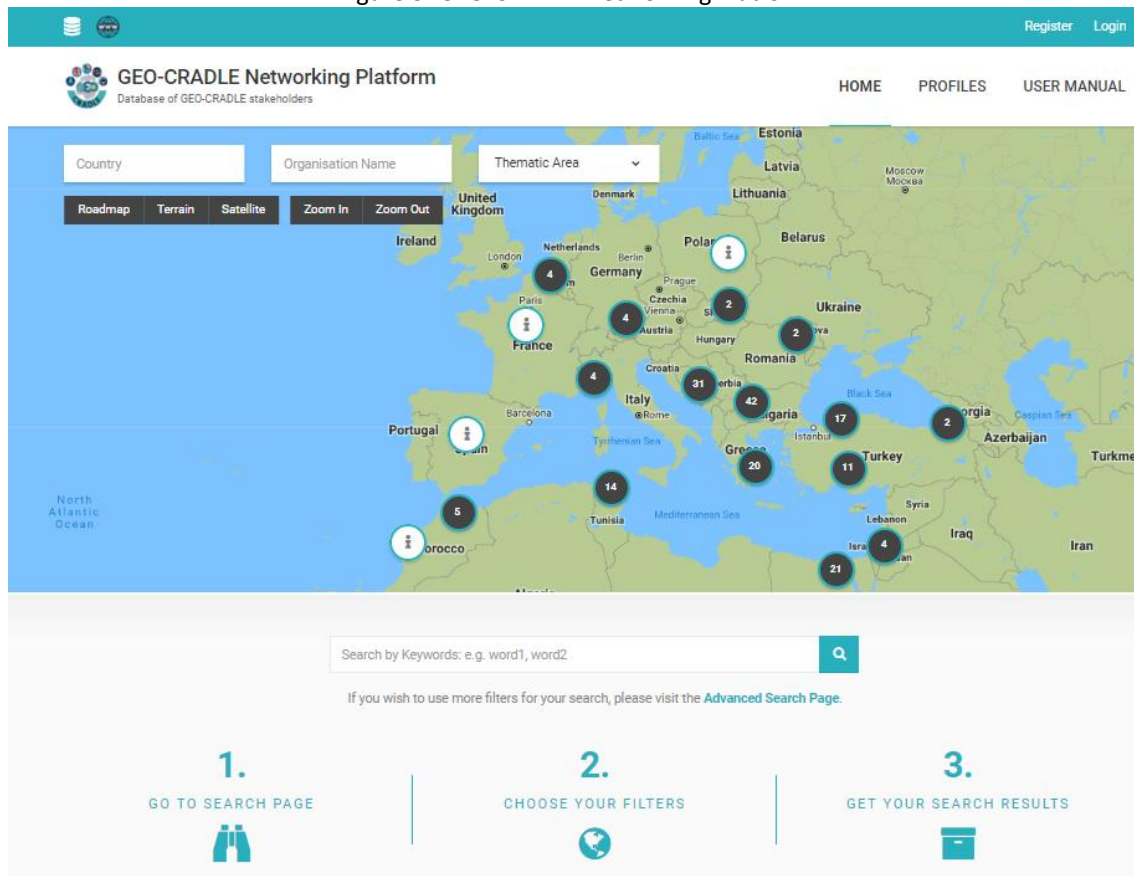


effective contribution to high level coordination in the region and the attraction of more countries as members of the GEO. The network has been one major sustainability target during the project obtaining the commitment of some key members to ensure its sustainability once the project funding ends.

The networking of stakeholders over the three regions is now a reality. It is true that when we started with GEO-CRADLE we knew very little about the EO community in the countries. Today GEO-CRADLE sustains a network of actors with a lasting activity which ensures the exchange of know-how, brings organisations together, and facilitates the team up/partnering process at regional level for identifying and solving common problems, and setting up consortia for addressing the specifications of regional calls.

About 300 organisations across the entire value-added chain from the different countries of NAMEBA have provided information about their activities in the [GEO-CRADLE Networking Platform](#). This database is searchable with both simple and advanced query modes by using criteria relating to the country, field of expertise, capacities, skills.

Figure 3: GEO-CRADLE Networking Platform



Networking

The GEO-CRADLE networking platform is available for first time in NAMEBA with open access: (i) inventory of regional capacities (ii) profiles of stakeholders (iii) assessment of country maturity (iv) potential partnerships.

An example of a sustainable partnership in the Region is the ERATOSTHENES Centre of Excellence (EXCELSIOR) which is a strategic hub in the area for the sustainability of the network, and it could further complete the existing network of international ground stations. ERATOSTHENES is able to capitalize the network of GEO-CRADLE and can act as a multiplier for the impact of the network because of its strategic connections in the above countries and especially the Eastern Mediterranean Region.



EuroGEOSS which follows a user-centric approach to enable the sustainable exploitation of EO assets in Europe and the wider user uptake of EO-based solutions will help providing sustainability to this platform. The National Observatory of Athens (NoA) will promote the outcomes of the GEOCRADLE network (Balkans, Northern Africa) through the links of other projects. Synergies with NextGEOSS platform, EuroGEOSS initiative and other ongoing initiatives and projects will help in that direction. Indicatively, in the case of NextGEOSS, the platform, the services and the datasets which will be developed in the framework of NextGEOSS will be also shared and become visible through the GEO-CRADLE Regional Network of stakeholders and the GEO-CRADLE Regional Data Hub.

2.2.3. DataHub

The [GEO-CRADLE Regional Data Hub](#), through its link to the [GEOSS portal](#) (and the adoption of the DAB API), allows a modern yet compliant to the GEOSS portal presentation of the region-related datasets. Some actions have been done identifying Data Portals in the region and liaising with their managers in order for them to integrate their datasets into GEOSS, through which the Regional Data Hub (RDH) provides stakeholders interested in the region to access and share data.

The GEO-CRADLE project as a whole has identified a sample of emerging business models for the data hub and through workshops presented in the RoI, tested the potential viability of these models with key stakeholders. Typically, sustainability actions include the maintenance and update of data and software or the provisioning of services and their persistent and self-sustainable maintenance. As indicated in the Impact Assessment Methodology (D7.3) the importance of such a hub in a region where data sharing is still very poor cannot be overstated, and its development is implemented in a way that it remains compatible and flexible towards any evolutions and trends that will be introduced with the operation of the NextGEOSS centralized EO hub. Along the course of the project, developments enabled partners to add new capabilities to their work and to integrate new services or data on the DataHub.

Sustainable Development Goals (SGDs) are a high strategic priority at global level. However, the implementation of SGDs and many other initiatives or projects are being launched with an emphasis on collecting data that will be extensive and specific enough to serve the information needs. The RDH plays a unique regional role in this perspective. The RDH is a gateway that facilitates the access of the regional actors and EU partners to useful datasets and portals from the regions that use open standards.

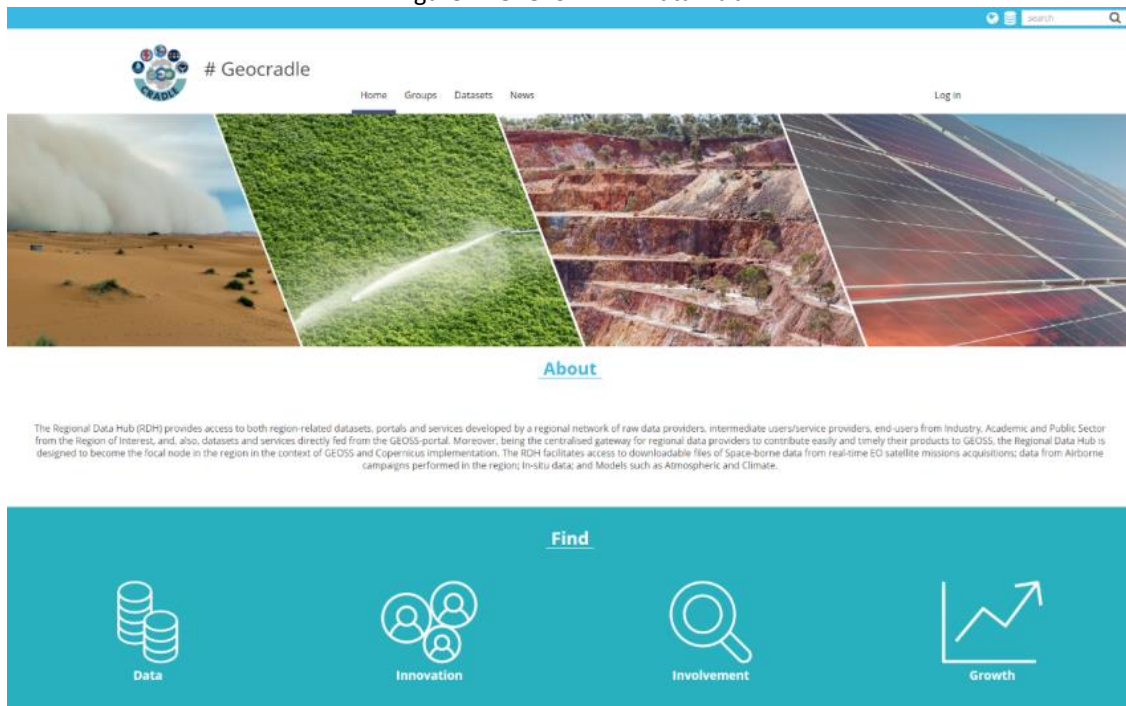
The RDH integrates advanced IT technology based on the GEO DAB (GEO Discovery and Access Broker) APIs and DKAN (Drupal-based open data platform). For the time being some millions of datasets are available by accessing through the RDH to GEOSS and local portals.

Regional DataHub

The Regional Data Hub is available for the first time in NAMEBA with open access: (i) integrated search and display mechanism (ii) full interoperability with GEOSS and GEO DAB APIs, as well as connection with data available through the project pilots. (iii) focal node in the region in the context of GEOSS and Copernicus implementation.

Short term sustainability is provided by the leverage of GEO-CRADLE project being now upgraded to a Regional initiative from GEO. The DataHub will find maintenance sources from connection with other projects such as NextGEOSS and EuroGEOSS. The datasets that were integrated and produced in the framework of the four GEO-CRADLE feasibility studies, together with other existing datasets made available by regional stakeholders, are available online on the [GEO-CRADLE Regional Data Hub](#).

Figure 4: GEO-CRADLE Data Hub



2.2.4. Funding Opportunities

One of the essential elements of the sustainability plan is the funding opportunities over the regions coming from International Funding Institutions, EU, ESA, etc. The goal during the duration of GEO-CRADLE was to continuously update the knowledge on existing funding schemes and to communicate on these to the stakeholders, especially over the NAMEBA, that have less chances to be informed. The information was also available through a presentation on the project's portal.

The service delivery and capacity building actions that have been identified as common regional priorities in the four thematic areas of the project (Adaptation to climate change, Food security and water extremes management, Access to raw materials, Access to energy) and the relevant feasibility studies which were implemented made a key input for drafting the Roadmap towards the evolution and uptake of GEO/COPERNICUS and EO market in those areas.

Another role of GEO-CRADLE was to assist the formation of consortia by engaging members of the GEO-CRADLE network any time when a relevant new call was open. For example, in October 2017 the H2020 Innovation Action call under Work Programme Year H2020-2018-2020, [EuroGEOSS](#) call was opened and the GEO-CRADLE coordination team facilitated the discussion with the European stakeholders and succeeded to bring 13 partners from the Region in a single consortium that was formed with more than 54 European partners. The proposal, under ARMINES coordination, was accepted in the 1st stage and the 2nd stage of submission was September 2018. The main objective is to strengthen the benefits for Europe of the Global Earth Observation System of Systems (GEOSS) by accelerating users' uptake of open (EO data and information for the benefit of Europe, through the effective use of European EO resources (including space, airborne, in-situ measurements and citizen observations) to prepare for operational environmental forecasting, and for mitigation and adaptation actions through building on Copernicus services and GEOSS initiatives and flagships.



Table 9: Partners from GEO-CRADLE under the EuroGEOSS call

No	Country	Organization	Role in GEO-CRADLE
1	GREECE	NOA (National Observatory of Athens / IAASARS)	Project Coordinator
2	GREECE	i-BEC (inter-Balkan Environment Center)	Regional Coordinator
3	EGYPT	CEDARE (Centre for Environment and Development for the Arab Region and Europe)	Regional Coordinator
4	BELGIUM	EARSC (European Association of Remote Sensing Companies)	Consortium Partner
5	SWITZERLAND	PMOD/WRC (Physikalisch-Meteorologisches Observatorium Davos / World Radiation Center)	Consortium Partner
6	ITALY	CIMA (Centro Internazionale in Monitoraggio Ambientale)	Consortium Partner
7	ISRAEL	TAU (Tel Aviv University)	Consortium Partner
8	BELGIUM	EGS (EuroGeoSurveys)	Consortium Partner
9	SERBIA	BIOSENSE INSTITUTE (Research and Development Institute for Information Tech)	Networking Platform
10	GREECE	AoA (ACADEMY OF ATHENS)	Networking Platform
11	BELGIUM	EVENFLOW	Networking Platform
12	GREECE	DRAXIS ENVIRONMENTAL S.A.	Networking Platform
13	GREECE	NEUROPUBLIC S.A.	Networking Platform

It was not easy to plan funding opportunities to generate the desired sustainability of the project and somehow ensure a return on investment at European level by multiplying the benefits that the assimilation of best practices can provide.

[PRIMA](#) is a new Partnership for Research and Innovation in the Mediterranean Area, envisaged to develop solutions for a more sustainable management of water and agro-food systems. The main objective of this ten-year initiative (2018-2028) is to devise new R&I approaches to improve water availability and sustainable agriculture production in a region heavily distressed by climate change, urbanisation and population growth. PRIMA is being financed through a combination of funding from participating countries (currently €274 million), and a €220 million contribution from the EU through Horizon 2020, its research and innovation funding programme (2014-2020). PRIMA programmes support research and innovation through distinct types of actions/activities:

- In Section 1: Research & Innovation Actions (RIA), and Innovation Actions (IA) as defined in the General Annexes of H2020.
- In Section 2: Research and Innovation Activities (RIA*[2]) based on national rules.
- In Section 3: National research programmes (PSIAs).

Funding Opportunities

The EuroGEOSS funding example: EuroGEOSS brings together Earth observation resources in Europe. EuroGEOSS will help to provide a coherent picture in Europe by combining existing earth observation assets and initiatives. It also targets the private-sector companies requiring EO applications for market development and developing applications therefore launched (i) the EuroGEOSS Showcases project (proposal is under evaluation) and (ii) Annual Calls for Expressions of Intent: (i) Create Action groups with new pilots (ii) Creates dynamic for new ideas and entrants into EuroGEOSS. The goal is to link the two parts and to create an open support environment to enable sustainable services with a strong commercial dimension: (a) Industry contributes to EuroGEOSS goals and benefits from EuroGEOSS actions (b) Create links with other initiatives e.g. Copernicus DIAS, FPA's, EOSC and to bring results into the EO services ecosystem.



Other funding lines have been proposed: H2020 (NextGEOSS project), [Copernicus DIAS](#), EuroGEOSS, eoMALL, Regional Development Fund (ERDF), Social Fund (ESF), Cohesion Fund (CF), Maritime & Fisheries Fund (EMFF), Agricultural Fund for Rural Development (EAFRD), Territorial Cooperation (ETC) / INTERREG

2.2.5. Maturity level

GEO-CRADLE has put forward a novel methodology to assess the [EO-related country maturity](#). This method included a concrete classification of activities, the definition of indicators within those activities and a system to evaluate how well a country is performing against these indicators. Overall, this method presented a concrete contribution of the GEO- CRADLE activities to those of GEO with view to long-term implementation.

The implementation of the maturity indicators methodology allowed the NAMEBA countries to gain insight into the current situation of the implementation of (G)EO country capacities and how it should pursue the desirable situation (i.e. a higher maturity level). The methodology highlighted the critical factors to lead to successful (G)EO strategy implementation and helped to explore on the reasons why some countries effectively implement their strategic plans. The maturity indicators are meant to help countries to mobilize resources, their position on the card points towards sort of measures which could be taken.

The data analysis was instrumental in the GEO-CRADLE [Roadmap for future implementation of GEOSS and Copernicus](#) (D5.7) which weighted the readiness and maturity of each country to address the identified gaps and pursued the means to cover the needs and established the appropriate flow direction of further exchange of know-how and best practices. The Roadmap identified regional challenges as they result from the collaboration with the regional stakeholders during the implementation of the GEO-CRADLE project and set the priorities for GEOSS and a potential regional initiative to cope with these challenges in an effective and collective manner.

EO maturity indicators & EuroGEOSS: This activity has been proposed to build on and expand the approach developed on the assessment of the maturity of EO activities at national level. Within this EuroGEOSS task the methodology will be implemented across European countries represented within the project and will be also expanded to include indicators related to the progress of EO integration in SDGs reporting.

Figure 5: GEO-CRADLE Maturity indicators assessment per country

	Maturity indicators (level c)	RANGED	ROUNDED
Albania	1,28		
Bulgaria	1,84		
Cyprus	1,47		
Egypt	1,44		
FYROM	1,13		
Greece	3,50		
Israel	3,03		
Romania	2,84		
Serbia	2,03		
Tunisia	1,78		
Turkey	2,88		



Figure 6: GEO-CRADLE Maturity indicators assessment for Greece



Greece

Assessment (ranged)

CAPACITY	↻	COOPERATION	↻	UPTAKE	↻
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Score card

maturity indicators	indicators	level	maturity indicators	indicators	level	maturity indicators	indicators	level
capacity	infrastructure	↻	cooperation	collaboration GEO	●	uptake	networking	●
	eo reserach	●		impact Copernicus	●		policy	↻
	industry base	↻		international	↻		penetration	●
				funding	↻			

Detail evaluation

capacity	indicator	level	cooperation	indicator	level
infrastructure	space authority	↻	collaboration GEO	participation GEO	●
	space borne	↻		specific actions on SDG's	●
	access 3rd party missions	↻		designated GEO office	●
	ground based	●		provision data to GEOSS	●
	in-situ	↻	impact Copernicus	projects	●
	modelling & computing	↻	international	ESA	●
	eo data exploitation	●	meteorological		●
eo research	n. public organizations	●	UN / Int. agreements		●
	n. researchers	●	INSPIRE		●
	courses offered	●	standardization		↻
	publications	●	funding	R&D participation	↻
industry base	n. companies	●	uptake		
	employment	●	networking	networking	●
	resellers, partnerships	↻		data portals	●
	clusters	↻	policy	policy	●
				budget & investment	↻
			penetration	use	●
				capacity building	●

LEGEND eo maturity card

○ initial ▤ basic ↻ intermediate ↻ advanced ● optimized

SUMMARY PRIORITIES CHAPTER

This chapter emphasized the involvement in cross-border and cross-sectoral matchmaking by building interfaces with networking communities and advocate on EO-driven benefits scaling up the regional GEO-CRADLE Networking Platform, Data Hub and Pilots' outcomes. The sustainability showed to be associated with the use of the project's results at different levels, during and after the implementation of the project. It was related with the necessary actions that brought visibility to the project and involved the target groups, end-users, stakeholders and transferred the results/products into a more operational scope.

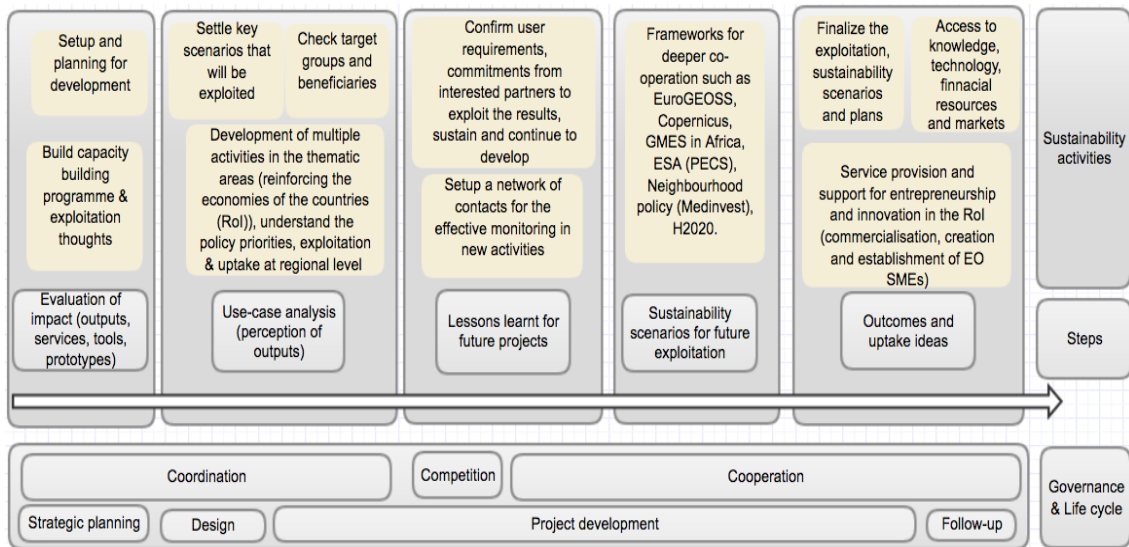
The chapter provided an overview of the guiding principles, attributes, factors and scenarios describing through matrix tables some of the most important elements such as financial, organizational and programmatic sustainability.

3. Governance

3.1. Main steps

Here we present a plan to identify key exploitable areas and target stakeholders, defining targets, indicators and milestones for the Sustainability Plan. The development of the plan looked into five major steps: 1) evaluation of impact, 2) use-case analysis, 3) lessons learnt for future projects, 4) sustainability scenarios, and 5) outcomes and uptake ideas. This graphic provides the correlation on these sustainability activities and the governance cycles (coordination, competition and cooperation) and its life cycle (strategic planning, design, project development and follow-up).

Figure 7: Guidelines identifying key exploitable areas and target stakeholders for GEO-CRADLE



The main steps in the plan are broken down into the individual activities listed in the table below. Those actions were developed through the 6 first months of 2018, while the ones reference to workshop and liaison with stakeholders were covered during all the project.

Table 10: Individual methods and activities for the GEO-CRADLE sustainability

Assessment method	Exploitation & Sustainability activity	Timeline
Provided clear vision, mission, case for support in the region	<ul style="list-style-type: none"> Discussed exploitation and sustainability plan (exploitation plan ToC). Has been setup and planned for development and approval of key lines exploitation plan. Partners guided in the planning process (template). Confirmed key scenarios that will be exploited (datahub & CGI / network / maturity indicators / communication / pilots / advisory board) after the completion of the project. 	All partners guided by NOA (2016-Q1 2018)
Clarified long term goals and objectives	<ul style="list-style-type: none"> Developed a logic model to clarify sustainability goals (objectives) and identified measures to track progress and outcomes (this information was produced at the pilot sustainability documents) <ul style="list-style-type: none"> Registrations in the GEO-CRADLE Networking Platform http://geocradle.eu/platform. (i.e. 192 public profiles of stakeholders from 29 countries. Entries are expected to increase even more). 	All partners (especially those involved with the pilots) guided by



	<ul style="list-style-type: none"> ○ Further enrich the GEO-CRADLE Data Hub http://datahub.geocradle.eu and provide more time to the GCI to register them to GEOSS (i.e. 25363383 datasets so far. Entries are expected to increase even more). 	NOA (end 2018)
Identified potential stakeholders	<ul style="list-style-type: none"> • Who/which stakeholders- needed to be at the table to define and pursue a common long-term vision? • Identified priorities such as community engagement, strategic communication, leadership development, governance and management. <ul style="list-style-type: none"> ○ Organised outreach events, including regional workshops, attracting key stakeholders and deepening knowledge about the regional capacities and needs. • Solicited ideas from stakeholders who might share interests within GEO-CRADLE outcomes. • Made the local businesses participate (how they could benefit from the outcomes?). 	All partners guided by NOA (2016-end 2018)
Initiated relationship with stakeholders and creates 'buy in'	<ul style="list-style-type: none"> • Confirmed target groups and beneficiaries (potential collaboration with partners). • Confirmed commitments from interested partners to exploit the results, sustain and continue to develop: <ul style="list-style-type: none"> ○ Discussed with community members why this project was needed, who had benefit from it, why the different local/regional organizations are the best organizations to support continuity. <ul style="list-style-type: none"> ▪ Distribution of written materials outlining the program's purpose and vision (done during the whole GEO-CRADLE project). ▪ Language have match community interests (research and interviews with community members). ○ Assessed the maturity profiles of the countries in the region. ○ Identified and talked with community leaders who shared common or similar vision/mission (got inputs). <ul style="list-style-type: none"> ▪ Organized exchange with partners in identifying and exploiting results (sustainability template: needs to respond and opportunities to address). ▪ Scheduled community/partner meetings/workshops (done during the whole GEO-CRADLE project). ▪ Engagement with actors & proposed interventions. • Built advisory committee in the region (key interested partners). <ul style="list-style-type: none"> ○ Communication with press to highlight GEO-CRADLE outcomes (during workshops). 	All partners guided by NOA (2016-end 2018)
Analysed possible sources and fundraising plan.	<ul style="list-style-type: none"> • Developed financing strategies, evaluated options, and proposed recommendations. <ul style="list-style-type: none"> ○ Map current spent and analysed funding gaps (at project coordinator level). 	All partners guided by NOA (Q1-Q2 2018)



	<ul style="list-style-type: none"> ○ Clarified financing for services and outcomes. ● Identified budgetary lines, potential frameworks or scenarios that have been followed (including objectives and timelines). <ul style="list-style-type: none"> ○ Such as EuroGEOSS, have checked exploitation requirements to sustain and further develop results. ○ Introduced scenarios (DataHub & CGI / Network / Maturity Indicators / Communication / Pilots / Advisory Board) that are valued in the community and were candidates to be sustained. ○ Identified more than one fundraising resources (grant writing, direct request, future events/workshops, awards,...). 	
Proposed intermediate analysis and follow-up	<ul style="list-style-type: none"> ● Review targets, indicators and milestones for the project. ● Determine best strategic partnerships and key community leaders to involve. ● Determine the partnership involvement. Jointly developed strong “case” for potential partner’s involvement. ● Monitor ongoing collaboration on sustainability platforms and developments on key exploitation results with partners. ● Describe good practices and validated them in different settings with selected communities. ● Opportunities for continued involvement in shaping the results of GEO-CRADLE through regular meetings and dialogue. 	All partners guided by NOA (end 2018)
Suggested uptake and commercialisation	<ul style="list-style-type: none"> ● Formulate strategies for meeting with spin-off business development prospects. ● Development of business case. ● Launch and execute venture capital requests. 	All partners guided by NOA (end 2018)
Anticipated dissemination	<ul style="list-style-type: none"> ● Identified key scenarios for the dissemination framework (approach to exploit and requirements to sustain and further develop results; methods to disseminate generated results to the end users) <ul style="list-style-type: none"> ○ Increase the dissemination and exploitation of the project ● Recommendations on how to create a successful research dissemination strategy beyond traditional academic dissemination (comparison of the new knowledge and benefits generated) <ul style="list-style-type: none"> ○ Present information to give decision on sustainability. 	All partners guided by NOA (2016-2018)
Recommended Sustainability	<ul style="list-style-type: none"> ● Finalize the sustainability/ exploitation scenarios and plans <ul style="list-style-type: none"> ○ Specify in more detail the Roadmap for the future implementation of GEOSS and Copernicus in the region, including our contribution to EUROGEOSS, PRIMA etc. ● Specify the guidelines for exploitation outside the project network and duration ● Release sustainability plan 	All partners guided by NOA (Sep 2018)



Steps

Ensure the long-term sustainability of the solutions through a combination of market development actions and exploitation strategies. The major steps are (i) evaluation of impact, (ii) use-case analysis, (iii) lessons learnt, (iv) sustainability scenarios, (v) additional outcomes and uptake of ideas.

3.2. Actors

This section provides assessment of the best mechanisms to support long-term usage of GEO-CRADLE outcomes within user communities. Throughout the discussion with stakeholders their wish-list is shown below:

- Developing impact plans for the GEO-CRADLE project outputs
- Search for funding opportunities
- Stakeholder identification and engagement
- Preparing / negotiating collaboration agreements
- Conducting downscale of the project benefits
- Understanding IP (Intellectual Property)
- Commercialisation: Licensing and Patents

Stakeholders should be committed to ensure the sustainability of the GEO-CRADLE project. Some actions are described below:

Table 11: Commitment of stakeholders to ensure exploitation of GEO-CRADLE

Stakeholders	Area	Description
Academia	Education	Outreach and disseminating activities about the project. Support students to use data, network and pilots in understanding the region.
Citizen	Public	Dissemination and communication activities to the general public with an interest the societal areas of the project.
Private companies	Commercial	Provide sustainable support to the EO sector enabling research to commercialisation. Interest in uptake (helping research to use innovative dissemination channels and to analyse the impact of their research). Involve service providers providing solutions within reach of the pilots.
Decision makers	Policy-making	Engage with national governmental contacts (Ministry of defence, Ministry of Communication and Digital Economy, or the National Commission for space activities. Develop mechanisms needed to enhance the coordination of EO activities at the national level designing programmes related to geo-information. Supervise priorities on the government policies. Preparing incubation and acceleration support.
Research community	Research & Innovation	Interested in analysing the impact of scientific work and correlating impact to the use of different dissemination channels.



The 4 pilots described a list of possible key-users and stakeholders that will need to be considered.

Table 12: Engagement of end-users and key stakeholders in the pilots

Pilots	End-Users
Pilot 1: Access to Climate Change (ACC)	<ul style="list-style-type: none"> • Office National de la Météorologie (Algeria) • Ministry of Electricity and Renewable Energy (Egypt) • Institute for Scientific Research (Kuwait) • Balloonera Company (Serbia) • GEO-CRADLE sense pilot solea company for solar energy University of Belgrade (Serbia) • Department of Meteorology (Cyprus) • National Technical University of Athens (Greece) • Agence du Bassin Hydraulique du Sebu (Morocco)
Pilot 2: Improved Food Security – Water Extremes Management (IFM-WEM)	<ul style="list-style-type: none"> • Ministry of Economic Development, Tourism, Trade & Entrepreneurship of Albania • Ministry of Environment of Albania regarding the development of the hydrological model using EO data • GEO’s Secretariat regarding the task’s activities, particular interest in countries such Albania, FYROM and Cyprus which are not represented in GEO • The agriculture cooperatives of Nestos, NESPAR, cooperative of Xanthi, Eleftheroupoli and Volvi in Greece
Pilot 3: Access to Raw Materials (ARM)	<ul style="list-style-type: none"> • Greek Ministry of Environment and Energy • Municipality of Alexandroupolis in Greece • Cyprus GSD-FD-Ministry of Agriculture, Rural Development and Environment • Hellenic Copper Mines Ltd. and Ministry of Agriculture, Rural Development and Environment (Cyprus) • JADE- Association of Geological Researchers, Turkey • JeoDijital Bilisim Teknoloji Madencilik, Turkey • Minister of Energy, Mining, Water and Environment of the Kingdom of Morocco and Morocco stakeholders.
Pilot 4: Access to Energy (SENSE)	<ul style="list-style-type: none"> • Ministry of Electricity and Renewable Energy (Egypt) • Magdi Yacoub, Aswan Heart centre (Egypt) • AAMHE • Attica Group • The PRE-TECT campaign

SUMMARY GOVERNANCE CHAPTER

This chapter studied the collaborative relationships between stakeholders as well as the development of quantifiable, time-lined objectives to reach each goal by each of the actors. Various relationships and partnering can be developed between different actors.



4. Engagement

The realization of the long-term engagement of the project is a much more complex process, that relies on the continuity of the project’s activities and the community commitment (either through renewed funding, regional coordination schemes e.g. GEO community activities and initiatives, or other exploitation scenarios). It also depends on the role of key actors in the region as multipliers/amplifiers. Thus, some of the activities of the project have achieved a longer-lasting impact as they have been promoted through the network of regional GEO PIs or GEO offices (DataHub, the different pilots) or other structures (such as for example the Copernicus Relays). In that context, it is worth noting that the GEO Secretariat has shown keen interest to take up at a central level the implementation of maturity indicators.

The combination of impact engagement actions, such as, exploitation workshops, the participation to brokerage and pitching events (list of GEO-CRADLE participation), addressing professional targets and illustrating the projects resulted to transform the GEO-CRADLE outcomes into a marketable solution, will further sustain the engagement potential. The project also maintained an active liaison with other regional coordination activities, and EO players in the RoI, thus ensuring longer-term impact. The next table introduces some barriers / challenges and successes for these engagement activities.

Table 13: Barriers / challenges and successes of engagement sustainability

Barriers / Challenges	Successes
<ul style="list-style-type: none"> • Lack of knowledge to reach end user. Lack of support / interest from the stakeholders’ community to engage with GEO-CRADLE. • Getting the research & commercial community interested in GEO-CRADLE opportunities. • Lack of knowledge transition from R&I to commercialisation. Alignment/linkages between research and uptake. • Lack of resources and/or experts within organisation and/or region. Lack of knowledge transfer. • Lack of funding / identifying possible funds. • User needs expressed at pilot meetings might have moved on. • Conflict with IP ownership (Intellectual Property). • Coordination. • Bureaucracy. 	<ul style="list-style-type: none"> • Accelerates the research & but also commercial progress. • Yields economic benefits in the region. • Yield on environmental benefits in the region. • Impact on policy decisions.

Engagement

The engagement is the vehicle to use in order to ensure the greatest applicability across most stakeholders. During the course of the project the innovation impact and the uptake of the GEO-CRADLE activities has been supervised and addressed to key enablers (partners, national organizations, business partners) helping to foster further exploitation beyond the project duration and informing them on the evolution of the tasks. All the engagement activities have been strongly linked with the project progress and all results reflected the changes in the sustainability, providing various target groups with high-quality information ensuring maximum impact of benefits after the project ended.

Opportunities to build interface with stakeholders and to get support from initiatives were evaluated. These commitment initiatives could be dedicated to export promotion such as the on-going cross-sectorial matchmaking (e.g. European Open Science Cloud – EOSC - community-to-community approach, European Innovation Partnerships - EIP, Projects of Common Interest - PCI) or leverage GEO programme activities (e.g. EuroGEOSS).



4.1. Stakeholders communication

The main aim of this section is to highlight the key findings gathered during engagement with stakeholders regarding their perception and experience of communication and transference of knowledge. Furthermore, to communicate these communication mechanisms and initiatives that end users found most effective, barriers and challenges they have encountered and their needs in order to improve their ability to carry out effective communication and dissemination of the project outcomes with view on sustainability.

4.1.1. Communication

The impact of the GEO-CRADLE communication activities has been monitored on an ongoing basis and reported in different deliverables using a set of exploitable results (listed in Annex 2). It has made use of a suite of tools, channels and activities to achieve its communication objectives (e.g.: website, newsletter, brochure, leaflet, fact sheets, press kit and social media), underpinned by an integrated and coherent visual identity forming the basis for the recognition of the project in the Region.

The first stage of the communication activities was aimed at building the knowledge base of the GEO-CRADLE project, resulting from the assessment of the project's exploitable results and analysis of the framework conditions through the implementation of the market analysis. To this extent, the IPR (intellectual property rights), the analysis of the protection options of foreground and protection of marketing activities and business case was carried out (Deliverables 7.2 and 7.4: IPR issues).

4.1.2. Training

Using the outputs of the "Capacity Building exercises done during the pilots, some activities delivered trainings to users and providers alike. These have been directly connected to the themes highlighted in the GEO-CRADLE project proposal and have included trainings on the integration of EO services in users' operational workflows (across the sectors covered by the showcases); access or setup of services on top of different platforms; preparation of resources for showcasing on datahubs etc. The combined experience of partners in this domain was utilised.

Knowledge Transfer

Knowledge transfer: It could be done between research organizations & industry and involves processes for capturing, collecting and sharing explicit knowledge for the uptake. Extracting from bibliography, technology transfer⁸ (transfer technical and organisational experiences) across domains of business (i.e. EARSC partner and its ways of communication).

Collect Knowledge > Assess Knowledge > Profile Target User > Develop Map > Transfer User

Skills and competence: While the emphasis is on scientific and technological knowledge other forms such as technology enabled business and processes were also concerned. GEO-CRADLE included non-commercial activities such as research collaborations, consultancy, publications, licensing but also provided first ideas on commercial activities looking forward a "spin-off" creation from the pilot activities.

Interviews: Industry are often requested for completing questionnaires and surveys of all sorts and therefore potentially reluctant to answer. Our strategy here was thus not to carry out an exhaustive and statistical analysis but rather to target relevant people in industry from different European countries in order to get a general perception of the recognition of KT activities in career.

⁸ Technology transfer



4.1.3. Dissemination

The dissemination activities will be aimed at the evaluation of the added-value of the GEO-CRADLE project and the benefits brought from the demand side perspective as well as at establishing contacts with potential adopters in the Region, to be further engaged with GEO-CRADLE through exploitation-outreach-oriented activities. The market analysis activities are also studied in the roadmap. The sustainability support should be closer to the community of GEO-CRADLE partners, enabling exploitation through the development of business models and organization (partnership and governance) planned at the roadmap. The pilots have defined these models supporting this exploitation potential, including the identification of priority markets, customers and its demand and the benefits. The SWOT (Strengths, Weaknesses, Opportunities, Threats) analysis has been tackled in previous chapter (GEO-CRADLE scenarios).

According to Open Access Guidelines to Scientific Publications and Research Data⁹ for projects funded or co-funded under Horizon 2020, Europe 2020 strategy underlines the central role of knowledge and innovation in generation growth. For these reasons the European Union strives to improve access to scientific information and to boost the benefits of public investment in the research funded under the EU Framework Programme Horizon 2020. GEO-CRADLE has identified the results suitable for dissemination and exploitation activities and, according to this categorization and implemented proper exploitation paths, especially in each of the pilots.

Dissemination examples

Workshops: Organise a dedicated dissemination workshop targeting SMEs and industries to share the GEO-CRADLE ongoing activities and results and create opportunities to build up new networks of stakeholders: (i) Organization [Industry workshop April 2017](#) (ii) Organization of the European EO Product Award of the year (Focus on SDGs)

Exhibitions: Attend to private business-focused exhibitions to demonstrate the possibilities of the data provided by the GEO-CRADLE including cost/benefit analyses.

Best practises: Organise a collection of best practices across European observation network communities and specifically describe these from a business opportunity perspective.

4.1.4. The GEO-CRADLE Award

Implementing an award system can motivate and incentivise researchers and private companies in the region to want to carry out and transfer research knowledge or uptake of (G)EO services to the citizen. By establishing an award “Addressing National challenges”, acceptance by relevant stakeholders developing Links with (G)EO related initiatives and services and increasing the public’s perception of the importance of (G)EO towards the three major regions of the GEO-CRADLE project (North Africa, Middle East, and Balkans).

4.2. The Roadmap

The Roadmap is very important in the sustainability of the project as it promotes the active participation of the stakeholders through a participatory approach. The roadmap defines the guidelines for the implementation of GEOSS and Copernicus, to realistically know the readiness and maturity of the countries in relation to EO, GEO, to lay out actions for capacity building and innovative service uptake.

⁹ Guidelines on Open Access to Scientific Publications and Research



The ground is already paved for the initiation of a lasting activity through a [regional initiative in GEO](#). The first level was the upgrade of GEO-CRADLE to a Community Activity during the GEO Plenary 2017 in Washington, and the second level was the upgrade to a GEO Initiative during the GEO Plenary 2018 in Kyoto.

The Roadmap is fed by the regional challenges during the implementation of the GEO-CRADLE project. The GEO-CRADLE pilots provided a significant input for this section as they were based on real data integration aiming to support thematic services of regional importance. In line with the above, the regional Roadmap includes the vision, the specific targets, the means and recommendations for successful implementation of GEOSS and uptake of Copernicus in the region, considering all new updates of GEOSS strategic planning and Copernicus regulation.

GEO-CRADLE also organised the [3rd South-Eastern Europe GEO Workshop](#) on the uptake of GEO and Copernicus, with emphasis on Climate Change, Food Security and Water Extremes, Raw Materials and Solar Energy which took place in June 2018. The Workshop attended by over 100 delegates representing research, private and public stakeholder from across the region offered an opportunity to share and exchange insights on the long-term actions that can help maximize the impact of EO and leverage EU investments in the GEO-CRADLE region. The discussions aimed to develop a roadmap for the improved implementation of GEO/GEOSS in the region asking questions about why we need a roadmap, where are we now and where we want to be and how to get there.

The roadmap, together with funding priorities in relation to capacity building, service delivery, filling in gaps (networks, infrastructures, data sharing, skills), training, education, service provision, and business uptake at regional level, complements the GEO-CRADLE contribution to the EO market uptake.

GEO-CRADLE from the perspective of the GEO Action Areas “Advocate- Engage –Deliver”:

- Consolidate regional priorities and user needs.
- Set a validated action plan for EO uptake (relevant to capacity building, and support of services) linked with policies e.g. UN SDGs, SBAs, Sendai, Paris Agreement, Copernicus.
- Assess the maturity and readiness of the countries to engage in cooperation with EU actors in the implementation of flagships and initiatives (Copernicus, GEOSS, EuroGEOSS, etc).
- Integrate capacities/infrastructures with regional dimension.
- Enable the participation in funding instruments and assist the regional research, industry and decision-making bodies to benefit from targeted EU support.
- Coordinate actions and facilitate the formation of competitive consortia bringing in the scene local actors establishing collaborations with EU partners.
- Deliver a regional Network of stakeholders.
- Deliver the Regional Data Hub, a gateway and brokering mechanism, facilitating the access to millions of data by registering to GEOSS, portals and repositories for being visible, sustainable, and searchable by the global community of GEO.
- Deliver a set of innovative EO services used by institutional Users in many of the countries, thus creating high potential for expanding the service segment of EuroGEOSS, and Copernicus in NAMEBA.

SUMMARY ENGAGEMENT CHAPTER

This chapter presents GEO-CRADLE from the perspective of the GEO Action Areas “Advocate - Engage – Deliver”. For example, the participation to brokerage and pitching events will further sustain the exploitation potential of the GEO-CRADLE solutions. Copernicus Relays act as local champions, coordinating and promoting activities around the Copernicus Programme, its benefits, and opportunities for local residents and businesses. Connections with the Copernicus Relays might be established in order to favour the user uptake activities of GEO-CRADLE in link with Copernicus.

The sustainability of the results aims to:



- 1) improve the knowledge of the communities involved in the project or interested in the topics covered
- 2) generate additional revenues for research and
- 3) develop links between the Research & Innovation community and the commercial sector.



5. Toolbox of concrete actions

The toolbox draws useful follow-up activities of the various tasks that GEO-CRADLE carried out during the lifetime of the project. Drawing from the synthesis at RoI level, we have identified 8 key findings (exploitation results) which are directly addressed by key recommendations. The prioritised actions are detailed together with their expected exploitable forms and level of interest.

5.1. Follow up and exploitable results

The follow-up helps to establish a reference to monitor and assess the impact of the various activities beyond GEO-CRADLE. This section highlights these concrete activities that are able to survive at the end of the project. Some of them are also emphasized at the Roadmap which is the main exploitable result helping to ensure sustainable growth & competitiveness in the region.

The table below representing the follow-up creates new opportunities to use the GEO-CRADLE data and services, mobilises the network, follows-up with pilots outcomes, increases the use of the maturity indicators to validate the maturity of the region and organises funding resources increasing the use of the EU assets.

Table 14: Exploitable activities

	Exploitable activity	Exploitable form> Recommendation	Level of interest
PRIORITY	Roadmap	Ensure sustainable growth & competitiveness in the region.	Principal
SCENARIOS	Regional Datahub	Platform improving the harvesting of data	High
	Pilots	-Models to be included in an inventory. -Pilots used to improve the understanding of different areas such as adaptation to climate change, improved food security - water extremes management, access to energy and access to raw materials used by public entities. -A technology transfer should be considered to host the pilots' services at the end of the project. -Replication or advancement of pilots where private sector could be engaged in future Pilots. -The services should be accessible for free and/or as a paid service (Business model to be defined).	High
	Network	-Ensure the use and the dissemination of the knowledge achieved during and after the project. -Engagement with partners and stakeholders during and after the project which allows to underline the added value of the project and boosts further developments.	High
	Maturity indicators	-The implementation of the maturity indicators methodology allows a country to gain insight into the current situation of the implementation of (G)EO country capacities and how it should pursue the desirable situation (i.e. a higher maturity level). - The indicators are used in sets to create a multifaceted understanding of the institutional/private environment and its interactions with policy.	High



		-Validation of country data by partners & experts (interviews assure overall quality). Experts from a number of academic, government and industry were interviewed to gain additional development insights.	
	Funding	-Maximize the impact of the funding granted in the market. -Use components developed for GEO-CRADLE to be included in other initiatives such EuroGEOSS.	High
DIMENSION	Best practises	Communication on this process should be performed at R&D workshops and advertised on web platform using the process.	Medium
	Performance research & Communication	-Results should be published in scientific journals and presented to researchers, users, in conferences. Such work should be extended to other countries and/or the experience will be valorised within new R&D project. -Pilots should be promoted in scientific publications of users composed of both public and private entities. -Results disseminated in relevant workshops, conferences and publications.	Medium

Exploitable actions

The continuity of the project's activities could be shown as either through renewed funding, regional coordination schemes e.g. GEO community activities and initiatives, or other exploitation scenarios role of key actors in the region as multipliers/amplifiers.

5.2. Lessons learnt

During the lifetime of the GEO-CRADLE project there were a series of challenges, which were always perceived as a possibility for growth, revaluation and improvement. Whenever project members concluded a task and saw an opportunity for doing things better, lessons learnt were implemented.

The following key points were extracted from discussions that took place during the project and are formulated here as recommendations that would be useful for future EU projects or activities:

Table 15: lessons learnt/toolbox implementation GEO-CRADLE

GEO-CRADLE	Lesson learnt	Implementation
Enhancement of coordination of EO activities at the national level.	Cross-project integration of ideas, tools & outcomes.	-Setting strategic framework of collaboration in the Region as part of the GEO-CRADLE Roadmap. -A regular exchange of ideas, as well as a cross-linked project infrastructure resulted in innovative problem-solving methods. Tasks were dealt with from a multi-perspective approach. -Establishment of GEO national offices to act as boosting mechanisms (process already launched for Albania).
Promotion of awareness activities via regular and ad-hoc organization	-Targeting broader users. -More efficient engagement of stakeholders and end users.	-Within the GEO-CRADLE project, a wide range of users has been considered. -Product development and communications should be driven by the user base.



of national, regional and international EO workshops.		-A formal meeting with National organizations to discuss and have a consensus on the governance and financial capacity aspects. The outcome of these meetings should be framed in a concept note and send it to the decision makers.
-Links with GEO global Initiatives and Flagships.	Versatility of pilots.	-To ensure a wide-ranging impact of project pilot, four major sectors were selected: (i) Adaptation to Climate Change (ii) Improved Food security – Water Extremes Management (IFS-WEM) (iii) Access to raw Materials (iv) Access to Energy. -Initiative across regional thematic areas (ESA thematic exploitation platforms, EUROGEOSS pilot projects).
-Promotion of GEO's data sharing and management principles.	Continuous analysis of markets and their needs. -Enhance data accessibility and processing of information through the DataHub	-Consortium partners examined target groups and markets during project phases in order to adapt the pilots. -Cultivate creative and innovative ways to facilitate public data-sharing engagement.
Improved human capacity to develop value-added services.	IPR.	-Generation of opportunities from an industrial point of view. -IP guidelines were published within the project. -Industry involvement in the entire life cycle and embedded in the governance of the R&I projects (IPR issues).

5.3. Conclusion

The GEO-CRADLE project is coming to its end, with partners (and associated stakeholders) very satisfied with its achievements. This is demonstrated by the fact that many are willing to maintain contact and participate within joint actions beyond the end of the funding period. The project has created a very strong and committed partnership over the past 34 months, which has been both effective and built on partnerships.

It has been very challenging to successfully meet the objectives of the project especially if we consider that GEO-CRADLE runs over a very diversified and less developed environment in relation to the EO which comprises of the regions of North Africa, Middle East and Balkans.

From the early beginning of the project we set clear goals and defined the proper procedures to effectively address the following goals:

- 1) Identifying common needs and regional priorities; [by travelling through the countries and speaking with the stakeholders and identifying common needs and priorities in all the three regions]
- 2) Fostering the regional cooperation and integration of monitoring capabilities and skills, and facilitating the networking of stakeholders; [by creating the network of the stakeholders]
- 3) Defining coordination and support actions that are beneficial from societal and market wise point of view, and also realistic and in line with the domestic priorities and user needs; [by initiating coordination and support actions that are for the benefit of the societies and the market, and also realistic and in line with the domestic user needs, and in line with global policies for SDGs, and city/citizen/business resilience]



- 4) Proposing/setting up large scale regional initiatives in Earth Observation (space based and in-situ) relating to capacity building and delivery of services and innovative information in the thematic areas of the project such as: Adaptation to Climate Change, Improved Food Security – Water Extremes Management, Access to Raw Materials, Access to Solar Energy [by proposing and setting up large scale initiatives relating to capacity building and service delivery in the selected thematic areas]

The knowledge generated by GEO-CRADLE will be kept available for others to learn from and to possibly replicate the best practices that the project partners were able to collect from their experiences. Partners have access to presentations, reports and publicity material that will continue to be shared at local events and online. In the same way that GEO-CRADLE was able to benefit from expertise from previous projects such as BalkanGEONet, BRAGMA, OBSERVE... the work undertaken here will be built upon by other projects in the future. A good collaboration with GEO-CRADLE will help further dissemination and exploitation beyond the end and the scope of the project.

It should, of course, be remembered that the project has created beneficial impact during its lifetime; for partners, those who have interacted with Pilots, workshop attendees, interested stakeholders within the project's target audience, as well as people that have downloaded regional datasets from the GEOSS or interacted with the database at the GEO-CRADLE portal. The reception has been positive, and the project has made and will continue to make a difference.

The network of interested stakeholders is large and varied and by maintaining continuous dissemination action towards them it is hoped that they will be happy to be engaged in future.

GEO-CRADLE understood the EO sector and identified priority areas for high-impact feasibility studies that will help in stimulating demand-driven uptake. e.g. Sustainable agriculture [Balkans], dust monitoring [North Africa and Middle East], Mine Activities Monitoring [Turkey, Cyprus, Greece].

SUMMARY TOOLBOX CHAPTER

A well-thought-out sustainability plan that is based upon a strong fundament of commitment, knowledge of target audiences, and markets, as well as potential use-case scenarios and business strategies, is an effective instrument to secure created tangible and intangible value. In this direction the recent upgrade of GEO-CRADLE from GEO Community Activity to GEO Initiative is very important.

Within this deliverable we aimed to empower different stakeholders, promote the use of (G)EO in the NAMEBA region, engage each community of actors, collaborate with them, ensure GEO-CRADLE legacy of our actions and create new ways of promoting the pilots in the countries. The Roadmap and the Sustainability Plan will be crucial to achieve all these goals.

Three axes have been identified to ensure the sustainability of GEO-CRADLE:

- First of all, the findings of the project (Pilots, maturity indicators) are the solid basis towards the sustainability.
- Second, the variety of partners and networks including policy and decision makers are also the keys to ensure the long last of the project.
- Finally, the legacy of the GEO-CRADLE project will be assured by a proactive consortium and stable funding sources that will allow the project to expand.

The **sustainability strategy** has been built i) on the direct involvement of end-users ii) on the partners' well-established networks and communities; GEO and Copernicus. The involvement of these communities was essential to support the effects of the project impact, consequently streaming (successful transfer of project results to appropriate stakeholders and decision-makers) and multiplication (convincing other end-users to adopt or apply the outputs of the project).



The **outcomes** of the GEO-CRADLE sustainability can be summarised as follows:

- Definition of the exploitation building blocks (IPR, assessment of maturity indicators of countries, attitude from partners towards exploitation of pilots, active communication of project results);
- A knowledge base setting the scene for the exploitable project results;
- Exploitation Business Models for pilots identifying the proper entry point onto key markets and detailing the strategy and tactics for market entry;
- A Roadmap aimed at driving the full deployment until full market uptake of the project results and the timescale of exploitation.

The main **expected impacts** of the exploitation activities are:

- A smooth progress of GEO-CRADLE, which was recently recognized as a GEO regional initiative, and the pilots' progression towards: TRL of 4 to an expected final TRL of 7 and the provision of the necessary knowledge base for further progressing until TRL 9;
- The active engagement of groups of users, partners who will ensure both an actually user-driven deployment process and an active support to further adoption and uptake.

The **toolbox path**: Exploitable results identify 8 major components:

- 1) roadmap
- 2) regional datahub
- 3) pilots
- 4) network
- 5) maturity indicators
- 6) funding
- 7) best practises and
- 8) performance research & communication

This exploitability of results has been discussed with the consortium partners in dedicated workshops and interviews. The main expected impacts at the level of the pilots can be summarised in the refinement of the business strategy and the identification of the most proper exploitation routes (including, for instance, further research, licensing, etc.). The scope of the proposed activities is strongly motivated by the need to sustain and scale up the results achieved during the implementation of the 34-month H2020 GEO-CRADLE project. In that regard, the details of our proposal are strongly informed by the lessons learned during this period, and by the outcomes of various exchanges between the project consortium and key stakeholders (most prominently GEO Secretariat, EC DG RTD and DG GROW, ESA and several actors in the countries within the Region of Interest).

Partners indicated the importance of continuation with the results; specially keeping the network alive and staying in touch with the other partners but also look for new projects and partners following on from the current project.



6. Annexes

6.1. Templates

Figure 8: GEO-CRADLE individual exploitation plan

Please describe briefly the current situation and the change you expect as a result of the project. Please make sure you fill in the yellow parts and the cells containing indicative examples.

PARTNER	Organisation Name	e.g. NOA	
	Organisation Type	e.g. Research Institute, SME, etc.	
	Country	e.g. Greece	
Main role in GEOCRADLE	Describe your role in the project (leader of Task XX, Contributor to Tasks XX and YY, etc.)		
Ambition for GEOCRADLE	Describe how you expect GEOCRADLE to contribute to your activities, help you build capacity, expand your business, etc.		
IMPACT	Current	Delta after GEO-CRADLE	
Business or thematic sectors	In which business or science sectors are you active? e.g. modelling in agriculture, emergency management, water quality...	Impact of GEO-CRADLE in your activities in these sectors or the expansion of your activities in new sectors	
Customer/User profile	Who are you helping with your work? Service Providers, Research Institutes, Public Institutions (e.g. EEA, EC)	Impact of GEO-CRADLE in reaching out to more users or new users	
Products and services (incl. their websites if available)	This includes both services such as e.g. solar irradiation nowcasting AND services like capacity building in EO...	Impact of GEO-CRADLE in the development of your services	
USERS	Currently engaged and/or benefited	Potentially to be engaged and/or benefit in the future	
List of users (incl. their websites if available)	1. 2. 3.	1. 2. 3.	
Specific feedback / Comments	If applicable, please describe specific feedback on GEO-CRADLE (good or bad) received by users you have been in contact with.		
EXPLOITATION	GEO-CRADLE activities currently exploited	GEO-CRADLE activities to be exploited in the future	
Which GEO-CRADLE components do you (plan to) exploit?	1. 2. 3.	1. 2. 3.	
Concrete examples of exploitation (incl. at national level)	List examples of how you exploit GEO-CRADLE and its individual activities		
FUNDING	Funding schemes targeted		
List of funding schemes targeted (at national or international level)	1. 2. 3.		
Ideas and Recommendations for Exploitation	Share any ideas or recommendations you have for the exploitation strategy of GEO-CRADLE		
Reporting	Describe how outcomes will be documented and shared (inform, planning and document results)		
Time Frame	Enter the period of time over which you wish to implement the sustainability activities		

6.2. Definitions

- Sustainability: The sustainability of the project implies use and exploitation of results in the long term. It will define and implement the sustainability scheme guaranteeing the long-term exploitation of the project results and the sustainability of the expected impacts across the various project activities.
- Exploitable results: The utilisation of the project results in further research activities other than those covered by GEO-CRADLE, or in developing, creating and marketing any pilot, or in creating and providing a service.



6.3. References and relevant projects

The following references and projects were supervised as preparatory activities during the course of this deliverable.

Projects:

- ACTRIS (Aerosols, Clouds, and Trace gases Research Infrastructure Network)
- AfriGEOSS (AfriGEOSS initiative, developed within the GEO framework)
- BalkanGEONet (Balkan Geo Network, towards inclusion Balkan countries into GEO)
- BRAGMA (Bridging Actions for GMES and Africa)
- ConnectinGEO (Coordinating an Observation Network of Networks Encompassing satellite and IN- situ to fill the Gaps in European Observations)
- eominers (EO-MINERS: Earth Observation for Monitoring and Observing Environmental and Societal Impacts of Mineral Resources Exploration and Exploitation)
- EOpower (Earth Observation for Economic Empowerment)
- IASON (International Action for the Sustainability of the Mediterranean and the Black Sea Environment)
- InGeoCloudS (INspired GEOdata CLOUD Services)
- Geomind (Geophysical multilingual internet-driven information service)
- OBSERVE (Strengthening and development of Earth observation activities for the environment in the Balkan area)
- PanAfGeo (Pan-African Support to the EuroGeoSurveys-Organisation of African Geological Surveys (EGS-OAGS) Partnership)

Article references:

- Europeana Space
- GEO-CRADLE Publications
- How to achieve sustainability
- Openup H2020 project

GEO-CRADLE Publications

- All published work conducted in the course of the GEO-CRADLE Project is presented/available on this page.

6.4. Workshops

GEO-CRADLE has successfully organised a series of regional workshops (12), dedicated side events (3) and national networking activities (2) in the North Africa, Middle East & the Balkans. The stakeholders' engagement in the region has provided:

- supporting knowledge sharing - capacity building
- providing participants with a unique cross-sector networking opportunity (e.g. an enhanced cooperation between academia and industry)
- identifying the potential local challenges and needs that can be addressed by Earth Observation
- enhancing growth and innovation in the geo-information sector
- enabling more informed decision making

Table 16: GEO-CRADLE Regional Workshops

GEO-CRADLE Regional Workshops		
Date	Location	Photo
14/7/2016	Novisad, Serbia	
17-18/10/2016	Rabat, Morocco	
19/10/2016	Timimoun, Algeria	
16-17/11/2016	Limassol, Cyprus	
3/1/2017	Chişinău, Moldova	
2/2/2017	Abu Dhabi, United Arab Emirates	
24/3/2017	Sofia, Bulgaria	
9/5/2017	Bucharest, Romania	
25/5/2017	Cairo, Egypt	



14/9/2017	Tel Aviv, Israel	
7/12/2017	Tunis, Tunisia	
15-16/3/2018	Istanbul, Turkey	
4-5/6/2018	Thessaloniki, Greece (3rd South-Eastern Europe GEO Workshop)	
Dedicated Side Events organised by GEO-CRADLE		
Date	Location	
26/4/2017	Brussels, Belgium (Improving EO services industry involvement in EU space programmes and initiatives)	
19-21/6/2017	Helsinki, Finland (11th GEO European Projects Workshop)	
29/10-3/11/2018	Kyoto, Japan (GEO WEEK 2018)	
National Networking Activities by GEO-CRADLE partners		
Date	Location	
27/4/2016	Cairo, Egypt	
26/9/2016	Tirana, Albania	



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