Deliverable 8.5

Communication Toolkit

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Introduction

GEOEssential fully answers the scope of the ERA-Planet project "to foster and support the development of comprehensive and sustainable global Earth Observation (EO) information systems, which will contribute to GEOSS activity in the domain of urban areas and natural resources". ***GEOEssential*** transforms Essential Variables (EVs) into the derived products for which users have identified a specific need (Figure 1). Furthermore, it provides an interactive visualization capability that allows the user to explore the data, for example by displaying trends, and thus facilitates understanding of the data significance, in particular for monitoring the progress towards SDGs and other environmental policies.

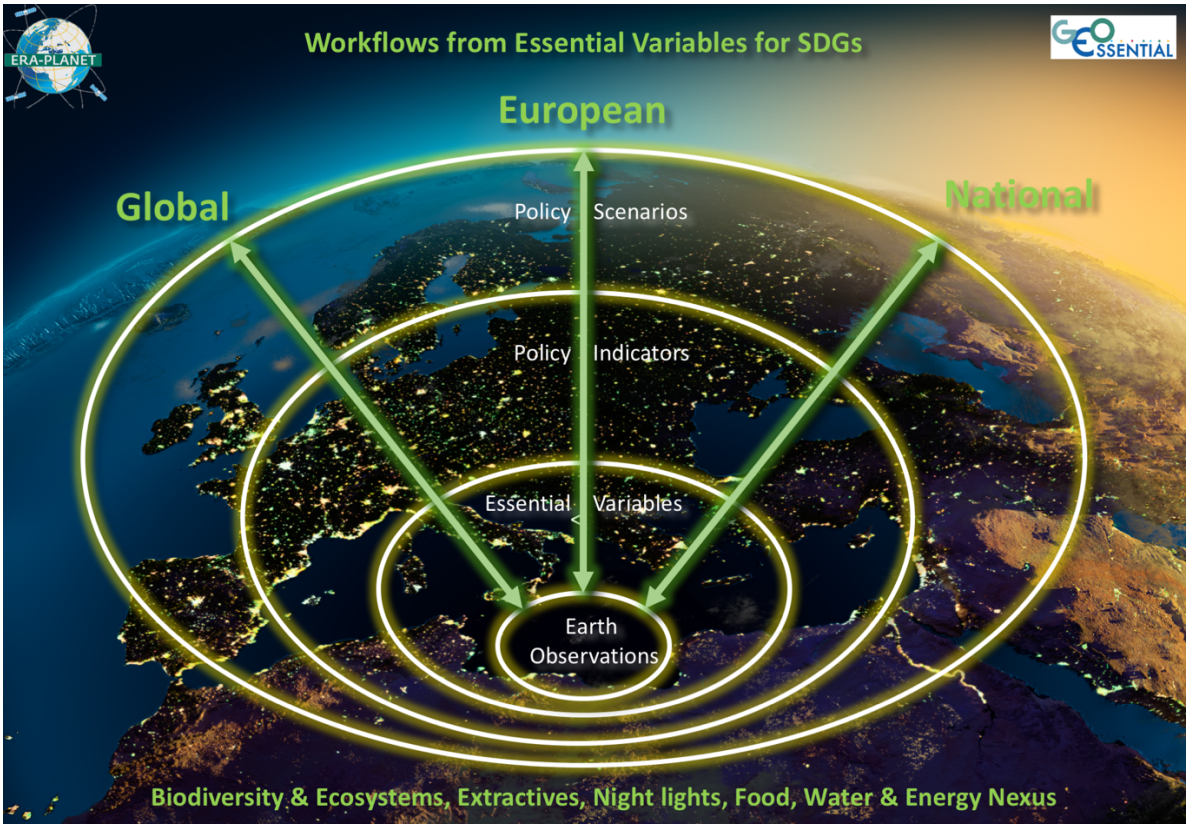

Figure 1 GEOEssential main objectives

The aim of this deliverables is to list the different communication and dissemination products and their targeted groups (Figure 2).

The project communication efforts will develop specific actions to capitalize on the project results for societal impacts, to ease the transferability to user communities, to establish feedback loops, to foster the use of open access portals and platforms for dissemination of data and knowledge, and to ensure linkage to the GEO 2015-2025 Work Plan, the Copernicus work programs, and the ERA-PLANET Dissemination work package.

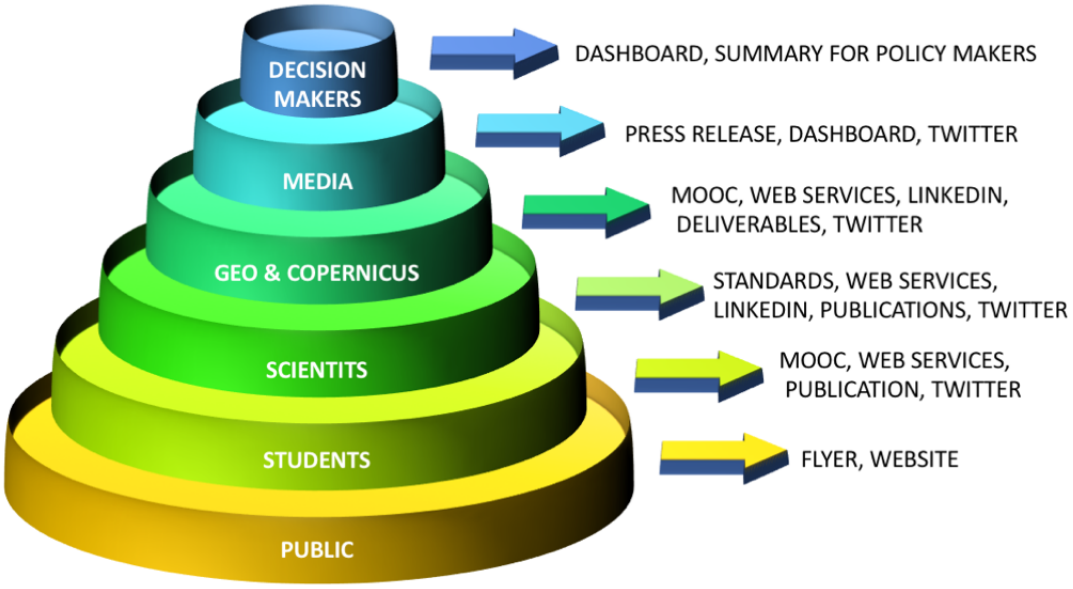

Figure 2 GEOEssential communication strategy

An important aim will be to support policy and relevant stakeholder groups for decision making with close links to relevant GEO and Copernicus tools, services and platforms. Specific dissemination and communication tasks have been prepared in this respect (Figure 3):

Task 8.1: Best practice Project portfolio. A portfolio of projects which conceive, develop, test, validate and deploy uses of Earth observations to support the tracking of and reporting on the environmental policies (e.g. SDGs), including integration with national statistical accounts for the indicators.
Task 8.2: Massive Online Open Course. A Massive Online Open Course (MOOC) on Informing Environmental policies with Essential Variables to assess progresses towards goals.
Task 8.3: Data and Information services. Advertise the EVs services to the GEO and Copernicus communities.
Task 8.4: Promotion of the *GEOEssential* Dashboard. A portfolio of material and events to promote the adoption of the ***GEOEssential*** Dashboard to expose interactively EVs, Indicators and Policy needs in the web.
Task 8.5: Contribution to standard definition process. Using the interoperability testbeds and experiences in ERA-Planet, collaborate with standards bodies in producing new standards, updates or best practices. Participate in geospatial standard bodies (OGC) discussions and interoperability experiments in relation with data provisions and processing.
Task 8.6: Contribution to EV definition process. Participate in international fora to help in making progress in the definition of EV and the data needed to get them.
Task 8.7: Scientific Dissemination. Participating to scientific conferences and preparing scientific papers.
Task 8.8: Represent a European contribution to GEO. Participate in the GEO Work program and the GEO Work Programme Symposium and Plenary.
Task 8.9: Communication activities. Website of the project, leaflet, press releases and, social media presence.

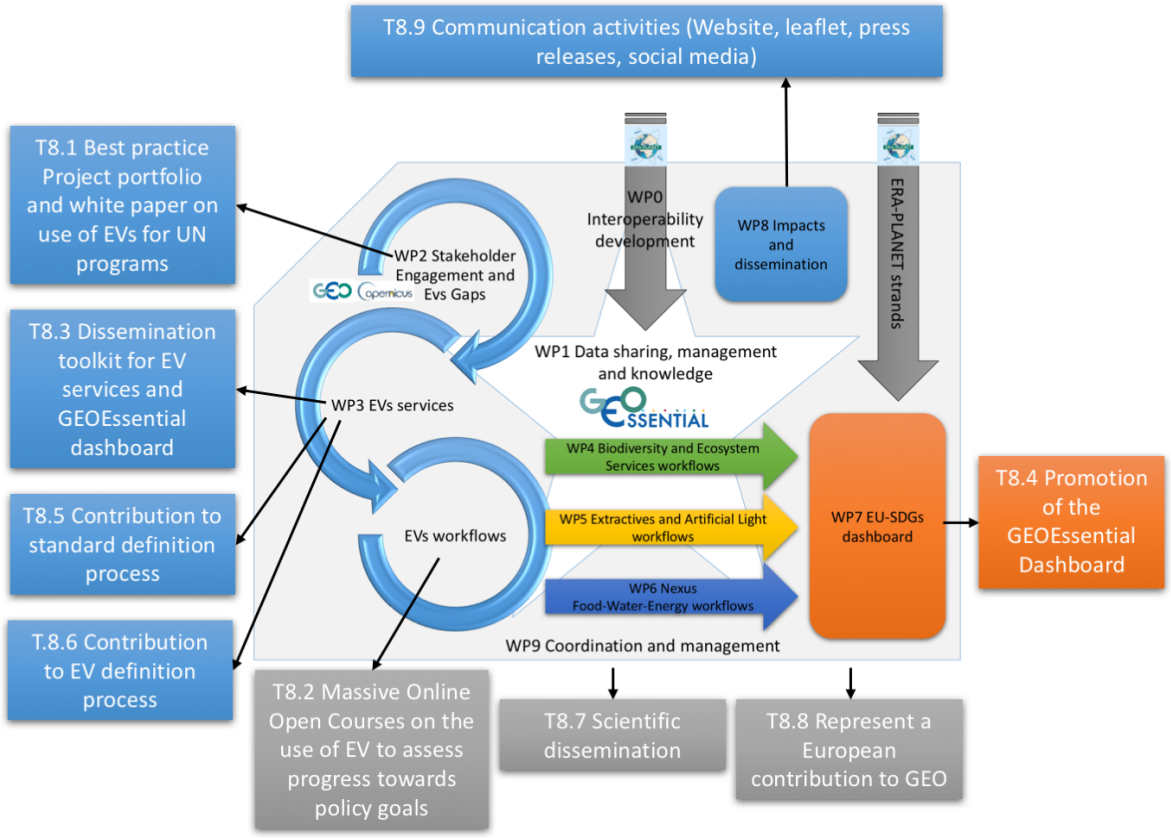

Figure 3 GEOEssential workflow and main dissemination products

Stakeholder groups

Decision makers

By further developing the concept of Essential Variables at global, European and national scales, the project will particularly target decision makers who are using indicators related to environmental policies at these various scales.

International policies:

Sustainable Development Goals (SDGs):

Sustainable development and broad human well-being can only be achieved through transformational pathways from the current unsustainable path toward a foundation of a sustainable development. Thus, reaching the Sustainable Development Goals (SDGs[1]) must take into account the **stable functioning of the Earth' life-support systems** and can only be sustained within a "safe operating space for humanity"[2]. This means addressing biophysical and social targets in ways that incorporate **synergies and tradeoffs**. For now, the Inter-Agency Expert Group on SDG Indicators provided a **first set of indicators** for consideration by the United Nations Statistical Commission. The International Council for Science has defined **five priorities for science** to measure progress towards the SDGs: design a set of practical indices;

[1] sustainabledevelopment.un.org
[2] www.stockholmresilience.org/research/planetary-boundaries

set up a monitoring program for these indices; evaluate the performance towards the targets; improve the observational infrastructures; and standardize the sources and quality of data. An additional prerequisite is that the SDGs are **aligned with existing international agreements** (e.g. UNFCCC for climate, Aichi targets for biodiversity).
The GEO 2015 Ministerial declaration "affirms that GEO and its Earth observations and information will support the implementation of, inter alia, the 2030 Global Goals for Sustainable Development"[3]. Nevertheless, this document concluded that GEO needs to initiate a process to define complimentary EO based indicators that increase the representation of environmental aspects in the monitoring of progress towards the targets and SDGs (Figure 4). Without such environmental indicators, it can be doubted that the efforts to reach the SDGs will be an effective road to more sustainability.

Biodiversity and ecosystems (IPBES, CBD):
Biodiversity and ecosystems and its services are **key for human well-being**, however, many species are threatened and biodiversity is still at risk. Data and indicators are still needed to properly assess the changes and knowledge gaps. Harmonized efforts at all scales are underway to integrate various data sources. There is an urgent demand to further develop and use frameworks and concepts such as **Essential Biodiversity Variables** that help to evaluate **long-term trends and change in species and ecosystems.** Hence, **variables and indicators** to analyze states and trends across time, space, communities and taxa will enable thorough assessments for the future and make data comparable. Hence, specific workflows will be implemented in the project in order to assess long-term change of biodiversity, e.g. of species distributions and the resilience of ecosystems and related use cases from local to global scale. Workflows are needed that include the **mapping of the data landscape**, the **generation of Essential Variables** and indicators **and strategies for supporting policy needs,** such as IPBES[4] and the CBD[5], but also the European Biodiversity Strategy[6] (Figure 4).

Food, Water and Energy Nexus:
In recent years, the **Nexus approach** has emerged as a key narrative to describe **complex interlinkages between food, water, and energy** in several international organizations as UNWater[7] and FAO[8] (Figure 4). This approach aims at moving resources management from silos to an **implementation of integrated and cost-effective measures** towards identification of shared benefits along specific value chains. Underlying the call to pursue a Nexus approach and the SDGs within the limits of planetary boundaries is the recognition that profound economic, societal and technical transformations are necessary. For example, much work remains to be done for economic indicators to reflect negative environmental externalities. The corresponding scientific challenges for gathering baseline data to document initial conditions, developing reliable metrics as indicators, monitoring essential variables, accounting for dynamic natural and human processes, incorporating trade-offs and synergies are considerable.

[3] http://www.earthobservations.org/min_declaration.php
[4] https://www.ipbes.net
[5] https://www.cbd.int
[6] http://ec.europa.eu/environment/nature/biodiversity
[7] http://www.unwater.org/water-facts/water-food-and-energy
[8] http://www.fao.org/energy/water-food-energy-nexus

Extractives industry:

As part of the **abiotic natural capitals** that we must also manage, the extractive sector - especially in fragile states - has a great potential to **support country development**, but this potential might be hindered by **lack of data availability and transparency**. Being able to geographically integrate data layers from the extractive sector, as well as environmental and risk data, and to access this data from an online spatial data infrastructure (SDI), can play a critical role by **disseminating trust and authoritative information**. Ensuring access to this data in a transparent way can support reforms in **natural resources governance**, promote **equitable benefits sharing**, **enhance confidence in government** and help support due diligence and risk identification for **international investments to the extractives sector** as represented in the Extractive Industries Transparency Initiative[9]. In order to support a long-term and integrated vision and not to duplicate efforts, it is critical to develop workflows that allow to monitor this information through time, to integrate the various phases of an extractive project and to integrate information of ongoing initiatives (Figure 4).

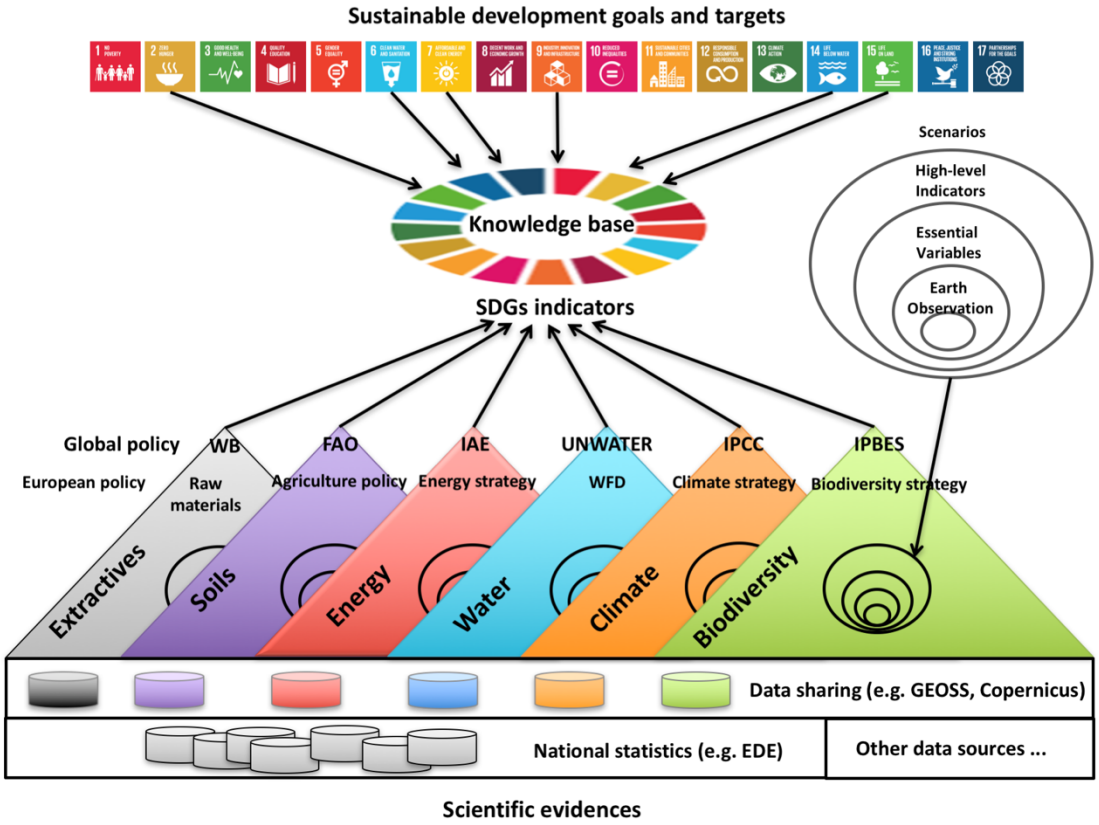

Figure 4 GEOEssential pyramids to inform international policies and the SDGs through EVs

European policies:

The key European policies targeted by the project are listed below. ***GEOEssential*** will particularly focus on demonstrating the feasibility of developing European indicators based on Essential Variables workflows.

[9] www.eiti.org

- Water Framework Directives (WFD[10]) and the related Water Information System for Europe (WISE[11])
- Biodiversity strategy 2020[12] and the related Biodiversity Information System for Europe (BISE[13]).

National policies:

GEOEssential will also demonstrate the use of EVs at national scales to develop indicators for different countries.

- In Italy, Germany, Spain, Greece and Austria according to the above described EU policies.
- In Switzerland, according to the national Biodiversity strategy 2020[14] and the Water policies in place[15].
- In Ukraine, according to national policies.

Earth Observation communities

GEO - www.earthobservations.org

GEOEssential links the thematic analysis with the horizontal objectives of **ERA Planet Strand-2** in agreement with the **GEO 2016-2025 Strategic Plan** for implementing GEOSS. The project will connect to the following 2017-1019 **GEO Work Programme (GWP)** through:

- **Flagships**: GEO Biodiversity Observation Network (GEO BON), GEO Global Agricultural Monitoring (GEOGLAM) and Global Forest Observation Initiative (GFOI);
- **Initiatives**: Earth Observations for Ecosystem Accounting (EO4EA), Earth Observations in Service of the 2030 Agenda for Sustainable Development (EO4SDG), GEO Global Ecosystem Initiative (GEO ECO), GEO Global Water Sustainability (GEOGLOWS), GEO Wetlands, GEO Vision for Energy (GEO-VENER), and;
- **Community activities**: Access to climate data in GEOSS, Earth2Observe, Earth Observations for Managing Mineral Resources, Earth Observations for the Water-Energy-Food Nexus, Land Cover and Land Cover Change.

The project is also significantly contributing to the **Foundational Tasks f**or the Development of GEOSS and GCI operations (Advancing GEOSS Data Sharing Principles, GEOSS Common Infrastructure (GCI) Operations, User Needs and Gap Analysis) and Community Development (Capacity Building). The GEO Secretariat engages itself to support ***GEOEssential*** outreach activities through its stakeholder engagement and communications activities.

[10] ec.europa.eu/environment/water/water-framework
[11] water.europa.eu
[12] http://ec.europa.eu/environment/nature/biodiversity/strategy
[13] http://biodiversity.europa.eu
[14] https://www.bafu.admin.ch/bafu/en/home/topics/biodiversity.html
[15] https://www.bafu.admin.ch/bafu/en/home/topics/water.html

COPERNICUS - www.copernicus.eu

GEOEssential boasts strong links to the Copernicus programme. The data used for the development of workflows are mainly based on the Copernicus space and in-situ component. These data will be analysed in terms of data access, processing and quality control with focus on EVs estimation based on EO-data. Besides existing data, upcoming Copernicus missions and infrastructure, including contributing mission, will be evaluated. Furthermore, the project will analyse the existing Copernicus services in terms of data access and products gaps for EVs that are required for the ***GEOEssential*** workflows (topics: Biodiversity and Ecosystem, Food-Water-Energy-Nexus, Extractive industry and Light monitoring).

INSPIRE - inspire.ec.europa.eu

The INSPIRE Directive is creating a European spatial data infrastructure for EU environmental policies and policies that impact the environment. This Infrastructure will share environmental information across public sectors and organisations, and assist in policy-making across boundaries. The Directive addresses 34 spatial data themes needed for environmental applications. The Directive was signed in May 2007 and should be fulfilled by 2021 in various stages.

OPEN GEOSPATIAL CONSORTIUM - www.opengeospatial.org

The Open Geospatial Consortium (OGC) is an international not-profit organization active in making open standards for the geospatial community. OGC has created a consensus process for freely available standards that are used in Environment, Defence, Health, Agriculture, Meteorology, Sustainable Development and many more. OGC members come from government, commercial organizations, NGOs, academic and research organizations.

ENEON - www.eneon.net

ENEON is the European Network of Earth Observation Networks, funded by the European Union under the H2020 ConnectinGEO project mainly including non-space networks to better coordinate them, with the aim of providing better observations for resolving interdisciplinary problems, to improve the European in-situ participation in GEO and to support of the implementation and monitoring of the UN SDG.

Scientists

GEOEssential is targeting scientists in the Academia and the public sector who are interested on building and/or using Essential Variables for their research and applications.

Students

The project will be targeting students at Masters and PhDs levels who would like to better understand the complex world of Earth Observation and become more active in this field. The project will also care about providing material useful for active professional who need to complement their knowledge with new technologies and approaches such as through the

ongoing education programmes “Geomatics for a Sustainable Environment” [16] hosted at the University of Geneva.

Private sector

The project will strive to identify private sectors partners interested in the use of EVs as for instance in the field of Extractives[17] and through the European Association of Remote Sensing Companies[18].

Public

The general public is also targeted by ***GEOEssential*** in order to contribute to inform about the sustainability issues at stake at various scales. The website and the dashboard will be particularly useful to popularize the main findings of the project. In this time of fake-news, finding new ways of informing directly the general public on the state of the environment from Earth Observations is becoming more and more important.

Media

GEOEssential does not have great expectations concerning the communication towards media. However, efforts will be made to communicate about the main outputs of the project in local and international media through press release and dedicated videos as it was done for instance with the FP7 enviroGRIDS project in the Euronews Futuris “Maps colouring the Black Sea” [19]. Earthzine[20] is probably the best adapted media support for the type of research that the project will do (Figure 5).

Figure 5 Earthzine – Fostering Earth Observation & Global Awareness

[16] www.unige.ch/formcont/casgeomatics
[17] www.eiti.org
[18] www.earsc.org
[19] www.youtube.com/watch?v=o4_8CBMlNDo&feature=youtu.be
[20] www.earthzine.org

Dissemination products

WEB SITE – www.GEOEssential.eu

Stakeholder groups: All ***GEOEssential*** stakeholder groups

Objective

According to our work plan, the project should undertake a series of communication activities to directly engage with different target groups, present the project to the broader R&D community of the sector, develop mutual channels for knowledge transfer and collective learning, and obtain relevant feedback from local market actors for the development and implementation of target group-adapted solutions (Table 1). Among these activities the Website plays an important role and is a major communication channel.

Table 1: Dissemination tools, channels, contents and targeted audiences

Tools [Channel]	Content	Targeted audiences
Web pages [**Website**]	Main portal of the project [www.GEOEssential.eu]. Links to other key national and regional websites of agencies and EO associations or clusters.	Public
Documentation [**Website**]	Accessible repository for all public results, i.e. downloadable tools and datasets (where possible), including the public deliverables. Publication of training material (tutorials, etc.). The press echo documents the collective dissemination via local and regional press, radio and TV features, newsgroups/newsfeeds, and the internal channels of key disseminators.	EO experts, scientists, stakeholders
Communication kit, [**Website**]	General background info on the project, partners and objectives. Corporate visual identity (logo, layout templates). Project factsheet, brochure, PowerPoint standard presentation and roll-up/posters.	Public, EO experts, scientists, stakeholders
Press releases, newsletter, news, videos, [**Website**, Social Media]	Update news on all ongoing activities, progress and important achievements of the project, plus early announcements of upcoming events of the project and in the sector. E-newsletter is foreseen twice a year. Twitter and LinkedIn newsgroups are feed on a regular basis. Project events, launches of pilot projects, and interesting individual stories of target groups used as headliner/topic.	Public, media, stakeholders
MOOC [**Website**]	MOOC on Earth Observation knowledge: Remote sensing and In Situ data, Essential Variables, Indicators, Policy needs	Scientists, EO experts, students

Publications [**Website**]	A scientific publications strategy in international open access peer-reviewed journals will be prepared from the main outputs of the projects	EO experts, scientists, stakeholders
Data and knowledge [IPR]	An Intellectual Property Right agreement will be included in the Consortium Agreement to allow for, collectively and individually, pursue market opportunities arising from the project. A Dissemination and Data management plan will be elaborated in WP8.	Project participants, private sector

Methodology

GEOEssential web presence has been developed using the open source solution, Wordpress CMS (content management system) and takes advantage of the open community support that guarantees the longevity and future proof of use, update and sustainability, which is an important requirement from the European Commission.

www.GEOEssential.eu displays and handles a modern design architecture which is optimized to work on multiple devices, browsers, and systems using a customized fully responsive free theme (Figure 6, Figure 7).

The website is highly reliable with image optimization of its elements and it supports the scalability that provides fast loading of the content to user. It is optimized for search engines tools and integrates connectivity and sharing with social media networking sites.

Security tools and supporting plugins are setup and used to extend functionality and maintenance and to enhance the reporting activity and traffic measurement of the website use.

Publication date: October 2017

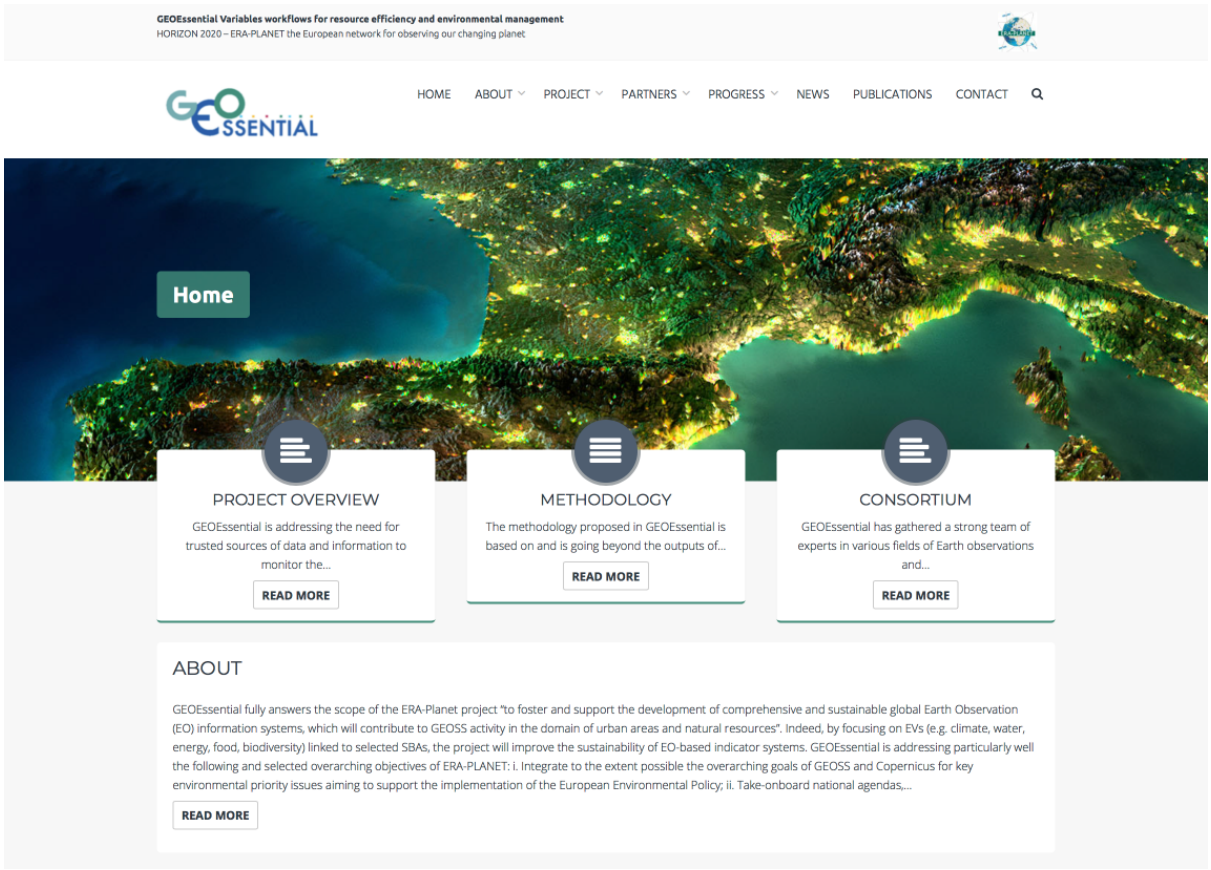

Figure 6 ***GEOEssential website***

For Publication part of the website, besides the direct linking to the publisher sites, we have developed a "ResearchGate" project as a repository of project-related publications.

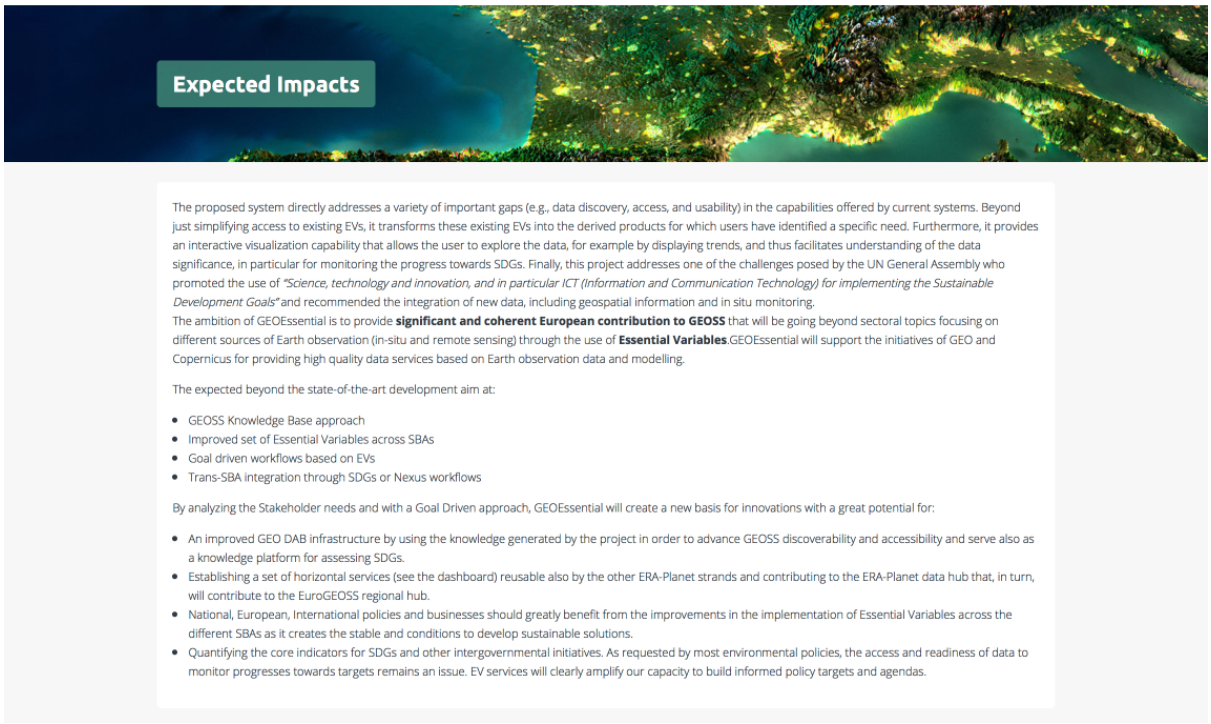

Figure 7 GEOEssential website details on the impact section

FLYERS

Stakeholder groups: GEO community

Objective:
Present the ERA-PLANET project and sub projects at the GEO plenary 2017 in Washington.
Present the ***GEOEssential*** details.

Content: ERA-PLANET summary and zoom on the four projects. ***GEOEssential*** main parts.

Publication date:
October 2017 for ERA-PLANET flyer (Figure 8)
December 2017 for GEO-ESSENTIAL flyer

Figure 8 ***ERA Planet flyer***

SOCIAL NETWORKS

Twitter – www.twitter.com/GEO_Essential

Stakeholder groups: All ***GEOEssential*** stakeholder groups

Objective:
Inform about the activities and highlights of the project and its partners. Follow the recent trends on EO for informing policy agendas such as the SDGs. Provide dynamic contents to the GEOEssential website.

Content:
Tweets and retweets made by the coordinator about activities of the project, partners and closely related topics, especially around GEO and Copernicus activities, ERA-PLANET, and of course Essential Variables (Figure 9).
@GEO_Essential should be used in all tweets refereeing to the GEOEssential.
@eraplanetgeo is the name of the ERA-PLANET twitter feed.
@iCUPE_PO is for the Integrative and Comprehensive Understanding on Polar Environments project of ERA-PLANET.
@SMURBSproject for the SMart URBan Solutions for air quality, disasters and city growth of ERA-PLANET
#IGOSP for the Integrated Global Observing Systems for Persistent Pollutants of ERA-PLANET.

Figure 9 ***GEOEssential Twitter account***

Publication date: October 2017

LindedIn - www.linkedin.com/groups/12070724

Stakeholder: ***GEOEssential*** partners and invited stakeholders
Objective: Share interesting information among partners.
Content: Interesting news and job offers shared by the project partners (Figure 10).

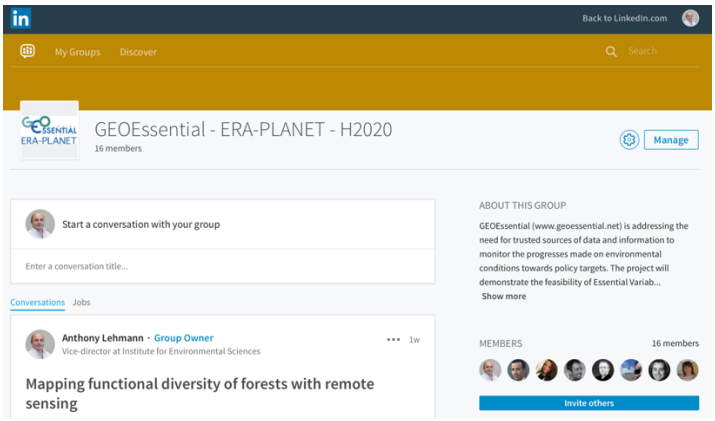

Figure 10 ***GEOEssential LinkedIn group***

Publication date: October 2017

EVs WEB SERVICES

Stakeholder groups: Scientists, GEO & Copernicus experts

Objective: These outputs are built on the results of the EVs gap analysis. The analysis of existing services will be done against defined targets and needs, with specific focus on cross-domain functionalities of EVs. Specific EVs will be analyzed in terms of cross-domain operationality for future services and modelling purpose. Data (satellite & in-situ) will be evaluated in terms of availability, processing and quality standards regarding needs for EV estimation and usability.

Content:

- GAP analysis report of products services and platforms;
- Report for cross-domain EVs development;
- Strategy paper for improving RS and in-situ data combination for EO based products and services, including standards; and
- Status report of European data processing tools and platforms and future developments.

Publication date: throughout the project

EVs WORKFLOWS

Stakeholder groups: Scientists, GEO & Copernicus experts

Objective: The heart of ***GEOEssential*** is the development of specific workflows on the following domains.

Content:

- **Biodiversity and Ecosystems**: The biodiversity indicators measure and reflect the structure and composition of species and ecosystems, while ecosystem functioning indicators capture the causes or/and outcomes of a process. Workflows will be developed to create input and evaluation data sets for process-based models of ecosystem functioning, which have a huge potential for ecosystem functioning and services assessment.
- **Extractives**: The project will enhance the UNEP/World Bank geospatial platform MAP-X for the extractive sector (mapx.org) and will provide dedicated developments to make it fully interoperable with the GEOSS. Data workflows will be based on the use of Copernicus services, products and data, e.g. satellite imagery (Sentinel). Essential variables and workflows will be operationalized through MAP-X and made available through interoperability protocols to ***GEOEssential*** Dashboard.
- **Light pollution**: Artificial light is perhaps the most dramatic signature of human activity available via remote sensing. The objective is to develop a prototype online tool for non-specialists to access and analyze trends in night lights data for user-

selected areas (yearly for DMSP, 1992-2013, monthly for VIIRS DNB April 2012-present) across Europe. Use of the tool for the specific case of trends in light from oil and gas extraction in the Arctic will be demonstrated within ERA-PLANET's strand 2.

- **Nexus**: The project will establish the EV workflow for how the FWE EVs will be derived via multiple EV Services. This will include multiple data streams (e.g. remote sensing, in-situ, citizen science (geo-wiki.org), social media and more). Multiple case studies will be selected representing the FWE nexus across Europe, to demonstrate operationally the functioning of the FWE nexus (see Subtasks below). This workflow will also generate the policy-monitoring indicators from the EVs.

Publication date: throughout the project

MOOC on Earth Observation for a Sustainable Future

Stakeholder groups: GEO & Copernicus, Students

Objective

Are you part of these people that prefer learning from facts than believing the nosiest? Do you think that new technologies could help us reconnect with the reality about the state of our environment? Would you like to contribute to a better understanding of our planet and its sustainability? Are you interested to concretely contribute to the Sustainable Development Goals at various scales? If the answer to these questions is yes, you should be interested to follow this exclusive MOOC on Earth Observation for a Sustainable Future.

Indeed, with this course you will learn at your pace with internationally recognized experts about the main technological, human and institutional challenges facing the transformation of Earth observation from remote sensing and in-situ data, in connection with national statistics, into relevant policy indicators. The MOOC will focus on the conservation of Biodiversity and Ecosystems, the assessment of Water resources in a changing Climate, and the mitigation of Urban and other Human activities such as extractives. Not only will you discover a very active and international field of activity, but you will also be able to learn how to concretely contribute by bringing your own data into action.

Following this MOOC, we can guarantee you that you will have a completely new and fresh understanding of the limitless capacities of Earth observations to help us understand the reality of our unique planet in order to guide more sustainable decision-making.

Content

Module 1: Observing from Space and on Earth
Module 2: Creating knowledge from data through Essential Variables and Indicators
Module 3: Preserving Biodiversity and Ecosystems
Module 4: Assessing water resources under climate change
Module 5: Building smart cities and mitigating human activities
Module 6: Governing data sharing from local to global scale
Module 7: Building your own spatial data infrastructure

Publication date: Spring 2019

PUBLICATIONS

Deliverables

Stakeholder groups: Students, Scientists, GEO & Copernicus experts

Objective: Detailed information on project outputs

Content and publication date: According to the project plan and table below (Table 2):
Type: R = Report, P = Prototype, DEM = Demonstrator, O = Other
Dissemination level: PU = Public; PP = Restricted to other programme participants (including the Commission Services); RE = Restricted to a group specified by the consortium (including the Commission Services); CO = Confidential, only for members of the consortium (including the Commission Services)

Table 2: List of deliverables

No.	Deliverable name	WP	Leader	Type	Level	Month
D8.6	Project Website	8	AUTH	O	PU	1
D8.3	Dissemination toolkit	8	AUTH	R	PU	3
D8.5	Communication toolkit	8	AUTH	R	PU	3
D6.1	Description of FWE EVs	6	CREAF	R	PU	6
D9.1	Stakeholder groups	9	UNIGE	R	RE	6
D0.2	Data Management Plan	0	CREAF	R	PU	6,18,36
D3.1	Existing EV services	3	CREAF	R	PU	9
D1.1	Knowledge services architecture	1	CNR	R	PU	10,24
D1.3	Modelling and processing services	1	UNIPD	O	PU	12,24
D1.4	Semantic services	1	UNICAL	O	PU	12,24
D1.5	Data handling guidelines	1	SRI	R	PU	12,24
D1.6	Data Fusion guidelines	1	UNIPD	R	PU	12,24
D2.1	Stakeholders	2	IIASA	R	PU	12
D2.2	EVs list	2	UFZ	R	PU	12
D6.2	Description of workflow	6	IIASA	R	PU	12
D8.1	EVs for UN programs	8	AUTH	R	PU	12
D9.2	Quality and Risk	9	UNIGE	R	CO	12
D7.1	Selection of the EVs	7	SGN	R	PU	13
D0.1	Data and Information interoperability	0	CNR	P	PU	14,30
D5.1	EVs for extractives and artificial light	5	UNIGE	R	PU	17
D2.3	EVs Gap analysis	2	CREAF	R	PU	18
D4.1	EVs for Biodiversity and Ecosystems	4	CREAF	O	PU	18
D5.4	Artificial light trends analysis	5	GFZ	P, R	PU	18
D9.3	Mid-term progress report	9	UNIGE	R	CO	18
D9.4	Cooperation with other projects	9	UNIGE	R	PU	18
D1.2	Knowledge Base services Platform	1	CNR	P	PU	18,30
D0.3	Report on Interoperability	0	CNR	R	PU	18,36
D3.2	Cross-domain EVs	3	GFZ	R	PU	21
D3.3	Existing Cal/Val Standards	3	FZJ	R	PU	24
D9.5	Dissemination plans	9	UNIGE	R	CO	24
D3.4	Existing processing platform	3	GFZ	R	PU	27
D7.2	GEOEssential Indicators Toolbox	7	CREAF	O	PU	28

D6.3	FEW Integration	6	IIASA	DEM	PU	30
D7.3	Dynamic maps and graphs on EVs	7	UNIGE	O	PU	30
D7.4	EVs and policy indicators toolbox	7	UNIGE	O	PU	30
D4.2	Distribution of plant species	4	GFZ	P	PU	32
D4.3	Resilience map and report	4	CNR	R	PU	32
D4.4	Contributions to relevant policy processes	4	MfN	R	PU	32
D4.5	Dataset for process-based models	4	SGN	R	PU	32
D5.5	Outputs to the Dashboard	5	UNIGE	O	PU	32
D4.6	Outputs to the Dashboard	4	UNIGE	O		33
D6.4	Outputs to the Dashboard	6	UNIGE	O	PU	33
D0.4	Report on contribution to ENEON	0	CREAF	R	PU	36
D5.2	Methodology for monitoring the footprint of open mines	5	UNIGE	R	PU	36
D5.3	Improved MAP-X platform	5	UNIGE	R	PU	36
D7.5	GEOEssential Dashboard and report	7	UNIGE	O	PU	36
D7.6	Upscaling of the dashboard at a global level	7	CNR	R	RE	36
D8.2	MOOC	8	UNIGE	O	PU	36
D8.4	Scientific publications	8	UNIGE	O	PU	36
D9.6	Final project report	9	UNIGE	R	PU	36

Research Gate - https://www.researchgate.net/project/GEOEssential

Stakeholder groups: Students and Scientists

Objective: Share the publications of the project

Content: All scientific publications and deliverables of the project (Figure 11).

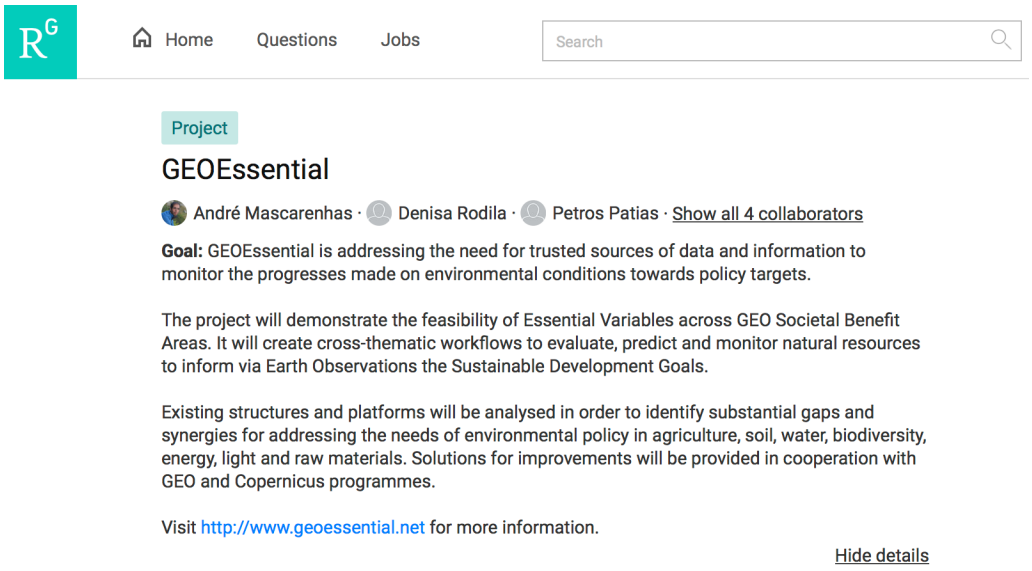

Figure 11 GEOEssential ResearchGate project

Publication date: November 2017

Special issue on Essential Variables

Stakeholder*:* professionals in research, industrial, and academic environments

Objective*:* The objective of the proposed Special Issue is to to introduce and discuss how GEOSS should share more knowledge and less data. Addressed themes include: Essential Variables, Environmental Indicators; Environmental and socio-economic indexes; GEOSS Knowledge Base concept and implementation; towards a GEOSS Social Ecosystem; sharing Workflows to generate knowledge from EO data and models (e.g. the GEO Model Web).

ConnectinGEO is under the umbrella of GEOSS and the EU funding with the aim of linking existing coordinated Earth observation networks with the science and technology (S&T) communities, the industry sector and the GEOSS and Copernicus stakeholders.
The goal is to facilitate a broader and more accessible knowledge base to support the needs of the GEO Societal Benefit Areas (SBAs) and their users. A broad range of subjects from climate, natural resources and raw materials, to the emerging UN Sustainable Development Goals (SDGs) will be addressed.
A tangible outcome of the project is a prioritized list of critical gaps within the European Union in observations and the models that translate observations into practice relevant knowledge. The prioritized list also includes the research activities required to address these gaps. All this has to increase coherency in European observation networks, increase the use of Earth observations for assessments and forecasts and inform the planning for future observation systems.

GEOEssential is addressing the need for trusted sources of data and information to monitor the progresses made on environmental conditions towards policy targets. The project will demonstrate the feasibility of Essential Variables across GEO Societal Benefit Areas. It will create cross-thematic workflows to evaluate, predict and monitor natural resources to inform via Earth Observations the Sustainable Development Goals. Existing structures and platforms will be analysed in order to identify substantial gaps and synergies for addressing the needs of environmental policy in agriculture, soil, water, biodiversity, energy, light and raw materials. Solutions for improvements will be provided in cooperation with GEO and Copernicus programmes.
The methodology proposed in GEOEssential is going beyond the outputs of the ConnectinGEO project that identified key gaps in the definition of GEO EVs. The main idea is to build demonstration workflows that will be using EVs served by the GEO infrastructure to derive policy relevant indicators.

Content*:* The special issue will include high quality papers submitted essentially from authors belonging to the ConnectinGEO and GEOEssential consortium, with some external special guests that have collaborated with the project.

Publication date*:* Autumn 2018

PRESS RELEASE

Stakeholder groups: Media

Objective: Inform about key outcomes and products of the project

Content: Simplified articles when publications or products from the project become available. Videos about the project activities

Publication date: when justified

SUMMARY FOR POLICY MAKERS

Stakeholder groups: Policy Makers

Objective: Inform policy makers about the concept of and existing Essential Variables and how they can be transformed into useful indicators.

Content: Summary of results from the project deliverables

Publication date: December 2018, December 2019

DASHBOARD

Stakeholder groups*:* professionals in research, industrial, and academic environments; decision-makers; general public.

Objective*:* The main objective of the ***GEOEssential*** Dashboard is to demonstrate the data value chain from EVs to indicators (e.g., SDG); and that EO, when matched with appropriate tools and services, can contribute to filling the gap between science and policy for decisions, management and reporting.

Content*:* (1) component to discover and access EVs; (2) Indicator toolbox; (3) thematic workflows; (4) web-based visual interface; (5) pilot studies using different technologies (e.g., Data Cubes).

Publication date*:* A first draft version will be released for the GEO Plenary XV in Kyoto (November 2018)

Technology readiness levels

The identified project research gaps are addressed in ***GEOEssential*** with a logical Work Package structure that can be described at different technology readiness levels (TRL) as defined by the European Commission[21] and in Table 3.

Table 3 Technology readiness levels of the different GEOEssential work packages

Work package	Initial/Expected TRL	Definition	Comments
0 - Interoperability and Data Sharing and Management development	TRL7/TRL8	System complete and qualified	- GEOSS interoperability and data management technology is going to be used. This is working in a production environment. - Geospatial User Feedback tool application - Workflow management, fusion, modelling and processing tools - New semantic services - Coordination of transversal in-situ activities - Current KET to in-situ data discovery and sharing implementation and test
1 - Knowledge management service	TRL3/TRL6	Technology development in a relevant environment	- Business processes and workflow definition and implementation, starting from a set of already existing artefacts that are from TRL3 and 6
2 - Stakeholders and gap analysis	TRL6/TRL7	System prototype demonstration in an operational environment	- List of unified EVs - Gap analysis database with new gaps and with covered gaps removed
3 - GEOSS and Copernicus EVs services	TRL3/TRL6	Technology development in a relevant environment	- New EVs services - Inherent cross-thematic EVs
4 - Biodiversity workflows	TRL2/TRL5	Technology validated in relevant environment	- Determination of essential EVs - Development and automation of data workflows - Transfer to dashboard
5- Extractive workflows	TRL2/TRL5	Technology validated in relevant environment	- Determination of essential EVs - Development and automation of data workflows - Transfer to dashboard
6 - Nexus workflows	TRL2/TRL5	Technology validated in relevant environment	- Determination of essential EVs - Development and automation of data workflows - Transfer to dashboard
7 - *GEOEssential* dashboard	TRL1/TRL3	Proof of concept	- Innovative Dashboard - Indicators toolbox (SDG, …) - Contribution to demonstrate the link from EV to SDG indicators

[21] http://ec.europa.eu/research/participants/data/ref/h2020/wp/2014_2015/annexes/h2020-wp1415-annex-g-trl_en.pdf

			- Dynamic/near real-time system - Linked with Knowledge Base Infrastructure (WP1)
8 - Dissemination and Impacts	TRL3/TRL7	System prototype demonstration in an operational environment	- New MOOC on Earth Observations - Contribution to the EVs definition process - Promotion of an innovative Dashboard

Open data strategy

As much as possible, particular attention will be put on **Data management plan (see Deliverable 0.2)** of the project to make sure that all the outputs are freely available to other users according to GEO data sharing principles and the EU Open Data and H2020 guidelines[22].

Furthermore, the consortium will participate as much as possible to the necessary paradigm shift towards open science as called for by the EU commission[23] (Figure 12).

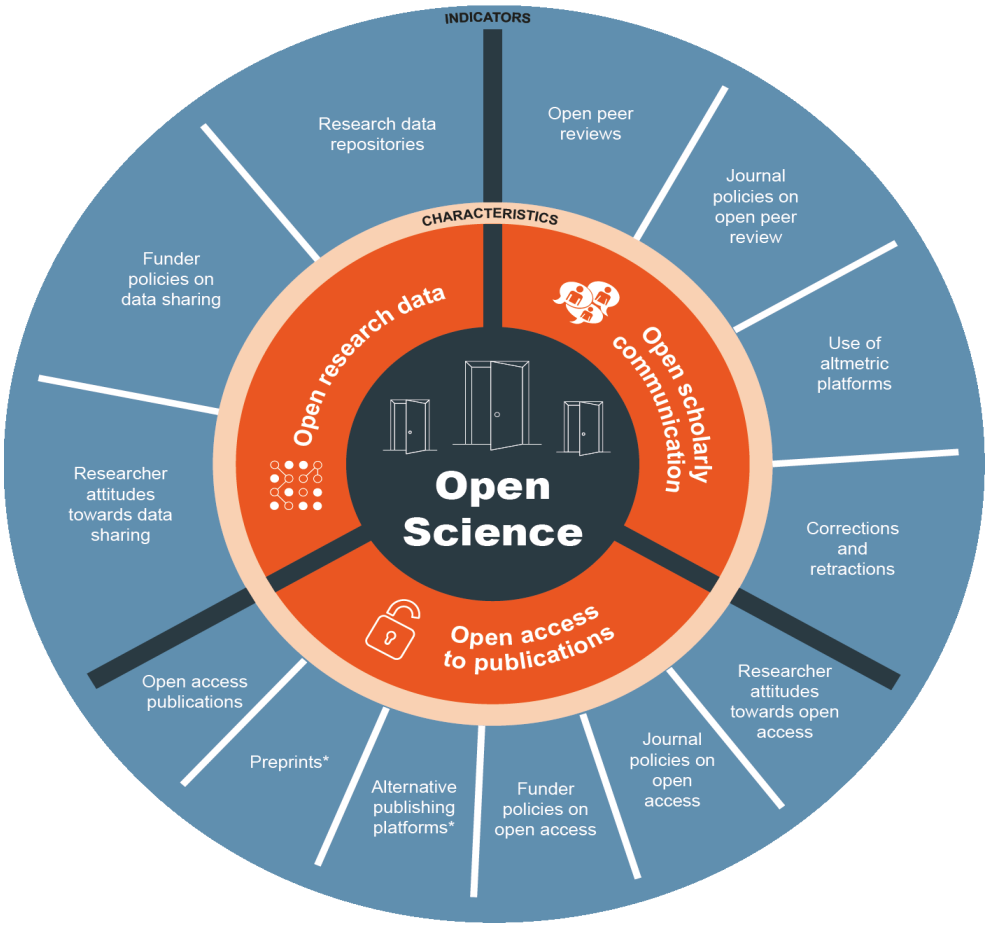

Figure 12 Open Science "Wheel", describing key Open Science characteristics and indicators.

[22] http://ec.europa.eu/research/participants/data/ref/h2020/grants_manual/hi/oa_pilot/h2020-hi-oa-pilot-guide_en.pdf

[23] https://ec.europa.eu/research/openscience/index.cfm