

Executive summary:

Name: Understanding the Impacts and Value of Earth Observations (GEOValue)

Acronym: GEO-VALUE

Overview:

The goal of this task is to develop overall capacity, methods and case studies to facilitate the way we understand, measure and promote the value of Earth observations, helping to justify the investments which are made. Case studies are being used to understand and measure the benefits, whilst story-telling is increasingly being used to promote the results. The goal is to provide clear benefits assessments of individual products or services and impact assessment of programmes. Whilst assessing the benefits and impacts is the primary goal, results lead also to a deeper understanding of the use of Earth observations which can help further market studies and promotional activities.

A body of knowledge is being assembled and consolidated by the GEOValue Community, which can be strengthened by bringing in new players both geographically and in terms of multi-disciplinary skills. In the period 2020-2022, GEOValue will continue to collect case studies, develop a framework for analyses, promote the methods being used and encourage others to apply them to existing and new programmes. The results will be an assembly of accessible case studies and methodologies in a structured repository to guide practitioners. Links will be developed with a number of GEO Flagships and Initiatives in order to assist them in analysing their impact.

Planned Activities (2020-2022):

- Identify and consolidate representative case studies for collaboration and baseline analyses (continuous);
- Develop a framework to help structure analyses and provide options of appropriate methods to assess the case or programme value;
- Compile a knowledge base (a structured inventory and repository) of methods and cases;
- Provide access to webinars on the value of Earth Observation (EO) data, information, and applications;
- Organize international events to bring together economists and scientists, policy analysts and decision makers to look at methodologies, use cases and applications (e.g. Montreal Q3 2020);
- Engage with other GEO Programme activities to provide guidance on methodologies and prepare case studies
- Organise sessions or presentations at conferences;
- Publish in open literature of peer reviewed articles, workshop proceedings, and other GEOValue material.

Contributors:

GEO Members: Canada, EC, South Africa, USA

GEO Participating Organizations: EARSC, ESA, ESIP, IEEE

Points of Contact:

- Francoise Pearlman, IEEE – jsp@sprintmail.com (co-lead)
- Erin Robinson, ESIP - erinrobinson@esipfed.org (co-lead)
- Geoff Sawyer, EARSC – geoff.sawyer@earsc.org (co-lead)

Purpose

The goal of this task is to measure and promote the value and impact of Earth observations, leading to a better understanding of their benefits and helping to justify the investments which are made largely by public authorities to support them. Hence the primary targets for the outputs from GEOValue are the public and private stakeholders responsible for making budgetary and policy decisions.

To improve the ability to understand, measure and promote the benefits and impacts of Earth observation, a sequence of activities called a value chain is considered, starting with the collection and provision of data, transformation to value-added information, application of the information and the subsequent decisions. This value chain defines a flow for organizing the material, performing analyses, and generating outcomes. Each component of the value chain needs to be clearly defined, being expressed in terms of both qualitative and quantitative measures as appropriate. Various socioeconomic methods are used to understand and measure the benefits and impacts of information on individual and societal decisions.

The GEOValue community addresses the value chain through participation of specialists in many different disciplines, including natural sciences, social sciences, economics, policy and decision making. This international community is working on a number of activities leading to the development of papers for publication, presentation of results, co-organization of workshops, and participation to international symposiums and other events such as the side events to GEO plenaries. It also considers the appropriate communication tools to convey messages in a readily understandable form, such as evidence-based story-telling, to policy makers. Building upon the rigorous analyses, story-telling techniques will be used to make it easier to share the findings with others who are interested in, but not necessarily familiar with the intricacies of socioeconomics processes.

To date, benefits and impacts have mostly been assessed in economic terms – i.e. numbers of dollars or euros – but increasingly, it is being recognized that this links to other dimensions of value: socio-economic, socio-environmental, regulatory, innovation and entrepreneurship, scientific advances. These 5 dimensions, as described in the GEOValue workshop of July 2019 hosted by ESA, define the organisational structure for the GEOValue Community Activity. For the work in these five areas, practical use cases will build upon prior developments carried out by the European Commission and European Space Agency funded projects, the efforts supporting NASA Earth Science applications, the USGS and NOAA economic analyses and other case studies that are currently under examination.

The Community Activity will extend the tools used to develop the case studies into impact assessments for programmes. We anticipate that this multi-year effort will support a range of GEO activities including GEO Flagships and other GEO Initiatives.

Background and Previous Achievements

A community of international geoscience experts joined with economists to address the value of information in the early 2010's. This group, which was originally known as the Socio-Economic Benefits (SEB) community, and later changed its name to the GEOValue community to reflect the broader interests of its members, met every 12 to 18 months, alternating between Europe and the US.

The initial work focused on space-based data and was expanded to enable policy experts and decision makers to understand how to approach the measurements of value in setting EO space policy and in developing natural resources and undertaking environmental and natural hazards decisions. Meetings, generally workshops, included a combination of presentations and working papers leading to discussions about the participant's research work and subsequent conclusions. These were often complemented by tutorials about the methodologies being used. Proceedings were generally published as an outcome of each workshop.

Examples of work carried out on this subject include the workshop held in Washington DC as a side-event to the [2017 GEO plenary Demonstrating the Value of Earth Observations—Methods, Practical Applications, and Solutions](#) - and the subsequent Value of Information analysis under the [Sentinel Benefits Study \(SeBS\)](#). These have been complemented by AGU and EGU sessions on the topic, and the publication of a book entitled “GEOValue – the socioeconomic Value of Geospatial Information”, edited by Jamie Kruse, Joep Crompvoets, and Françoise Pearlman, CRC Press, 2017. For further information on past activities, see the workshop tab from the GEOValue website at <http://www.GEOValue.org>.

The activities in Europe built upon work done by JRC regarding INSPIRE. In the US, the decision of releasing Landsat data without charging the users was another key event in the process. This inspired the Free and Open Data Policy for Copernicus and Sentinel data which has opened the question regarding the value of the public investments and led to the activity to look at the value of the data. A direct result was the Sentinel Benefits Study (SeBS) led by the European Commission and ESA and executed by EARSC. For more information, see <http://www.EARSC.org/sebs>.

Examples of some recent activities include:

- Workshop on “Demonstrating the Value of Earth Observations: Methods, Practical Applications and Solutions”, Washington October 23rd-24th 2017. Proceedings published.
- Workshop on advancing the understanding and measurement of the societal benefits of Earth Observation., hosted by ESA July 1-3 2019. Proceedings published¹.
- Side event to the GeoWeek plenary in Canberra. “The Value of Earth Observation”. November 4th – 5th 2019.
- Development of a peer reviewed paper on “10 simple rules for measuring and increasing/improving the value of Earth science data” (submitted for publication, 2019)

Key Activities

GEOValue is working on a number of activities leading to the development of papers for publication, presentation of webinar series, co-organization of workshops, and participation in international symposiums and other events including GEO plenaries. The plan, for the 2020 – 2022 period, subject to the availability of resources, includes the following items:

- Identify and consolidate representative case studies for collaboration and baseline analyses (continuous);

¹ Pending the development of the GeoValue web-site, proceedings and presentations can be found along with other material at www.earsc.org/sebs.

- Develop a framework to help structure analyses and provide options of appropriate methods to assess the case or programme value (mid-2020);
- Compile a knowledge base (a structured inventory and repository) of methods and cases (2020);
- Provide access to webinars on the value of EO data, information, and applications (Q2 2020);
- Organise international events to bring together natural, social and economic scientists, policy analysts, and decision makers to look at methodologies, use cases and applications; next workshop is planned to be held in Canada in 2020.
- Organise sessions or provide presentations at major conferences (such as AGU and ESIP winter meeting in the US and EGU in Europe, ESA Living Planet etc.)
- Publish in open literature of peer reviewed articles, workshop proceedings, and other relevant materials.
- Update and maintain a GEOValue website.

Relationship to GEO Work Programme Activities

Measuring value, assessing benefits and analyzing impact of activities is a cross-cutting task which can be applied to many of the GEO programme activities. To date, this has not been actively pursued but will be considered as a priority to engage selectively with them. Under this Community Activity, methodologies will be accessible which can be used for the overall analysis and support GEO programme activities for application to projects.

Governance

The GEOValue community is a community of volunteers with shared interests including scientists and analysts with experience or interest in the valuation of benefits derived from Earth observation, economists and environmental assessment experts interested in exploring the challenges posed by the estimation of Earth observation benefits, and policy specialists interested in understanding how to approach the measurement of value in setting Earth observation policies for developing natural and environmental resources, and taking decisions relative to societal challenges. Representatives from other communities facing similar challenges may join when relevant.

The community is lead by a coordinating committee under the leadership of the project co-leads. As specific activities are identified, other community members may join with members of the coordinating committee to form informal working groups with focus on a specific topic or task.

The co-leads are currently:

- Françoise Pearlman, IEEE – jsp@sprintmail.com
- Erin Robinson, ESIP - erinrobinson@esipfed.org
- Geoff Sawyer, EARSC – geoff.sawyer@earsc.org

Data Policy

All reports and other materials published under the GEOValue activity will be fully open and available in the repository. The repository will be a resource open to all users.