

GEO Community Activity – Earth Observation and Copernicus in support of Sendai Monitoring

Draft Implementation Plan

1. Background

At the Third World Conference on Disaster Risk Reduction in Sendai, Japan, in 2015, the United Nations adopted the “Sendai Framework for Disaster Risk Reduction (2015 – 2030)” (SFDRR). To measure global progress in implementing the Sendai Framework, seven global targets and 38 quantifiable indicators, including various sub-indicators, have been agreed on by the international community.

In the majority of states, however, the 38 Sendai indicators are currently not recorded in the way they should be reported to UNDRR. Monitoring the status and the degree of target achievement uniformly requires the use of various data sources, which should be consistent and comparable in time and space. Therefore, different potential data sources (e.g. official data, media reports, insurance data etc.) can be considered for the Sendai monitoring, if existent. However, these data sources do in any case cover all requirements, for example (i) datasets are not always available retroactively to the year 2005 (baseline), (ii) damage information might only be available for individual hazard types (e.g. floods), (iii) data was not collected uniformly or only for individual sectors. The data readiness review indicated that only 60% of reporting countries do actually have a database for disaster losses, and only 41% of the participating countries report to have data records for the entire baseline period. Besides, the availability of data varies among the different Sendai targets. The resulting data gaps could be closed by new technologies and in particular by satellite remote sensing and Earth observation (EO)¹ techniques in general.

In the aftermath of a disaster, satellite images of the affected areas can identify the spatial extent of an event and identify the degree of destruction. Such information is of potential value to support the reporting of Sendai indicators. However, such progress must be incorporated into the official procedures of the reporting agencies. In order to foster the uptake of this technology, the planned activity will explore how Earth observation can be used to support the Sendai indicator monitoring. It will investigate the potentials of satellite remote sensing and specifically Copernicus for deriving selected Sendai indicators (or components of it) and provide good practices guidelines.

This activity plans to identify opportunities and show practical implementation for EO to be used by national governments for the Sendai indicator reporting. It is intended that the outputs of the project enable national focal points for the Sendai Framework to provide better and more consistent methods and – where possible – value added products from remote sensing to support the Sendai moni-

¹ Earth observation (EO) is the science of measurement of all aspects of the Earth system, including its physical, chemical and biological processes. Historically, the term has been applied mostly to satellite-based remote sensing, but modern usage encompasses a much broader field of observing systems, including low-level EO (from aircraft and unmanned aerial vehicles), *in situ* measurements and sampling campaigns. A key characteristic of EO data is that they are very commonly reused many times in different scientific studies and decision-making processes.

toring process. Moreover, EO4SendaiMonitoring intends to improve and validate existing procedures and develop new methods based on satellite remote sensing in order to derive data and services for the Sendai monitoring.

It is expected that the activity's results will support national monitoring processes, e.g. by closing gaps in the data base, and will directly add to Sendai framework priority 1 "understanding of disaster risk", increase preparedness for disaster response and recovery and thus strengthen a countries' resilience towards disaster risks.

2. Vision and Mission of the GEO EO4SendaiMonitoring Community Activity

Vision:

Earth Observation is used by national actors in all countries to close data gaps in disaster loss databases and thus supports the monitoring of the Sendai Framework for Disaster Risk Reduction (SFDRR)

Mission:

The GEO EO4SendaiMonitoring community activity will promote the use of earth observation data and the collaborative development of EO datasets, analytical tools, and quality standards to support the implementation and the monitoring of indicators of the United Nation's Sendai Framework for Disaster Risk Reduction for the SFDRR's reporting period until 2030, as well as for the baseline period (2005-2015). The community activity seeks to connect EO data providers with end-users including, but not limited to, national SFDRR focal points, decision-makers, national statistical offices and researchers in order to facilitate knowledge transfer and to create EO products tailored to end-user needs.

3. Objectives of the GEO EO4SendaiMonitoring Community Activity

Earth Observation in general provides several opportunities to support monitoring the target achievement of the Sendai Framework for Disaster Risk Reduction. The sheer volume of data provided by satellite missions and the variety of earth observation products created by earth observation programmes leads to an ever growing archive of information that can be used to support SFDRR monitoring. Within the vast amount of different data sets and data sources, guidance on how to derive SFDRR indicators from EO is lacking. By bringing end-users and data providers together, the GEO EO4SendaiMonitoring community activity aims to co-develop:

1. A **user guide/ "good practice guidance"** on how to integrate EO in the monitoring for the Sendai Framework. This includes an evaluation of the utility of remote sensing which assess the suitability and acceptability of different remote sensing technologies/data/EO products to integrate into monitoring processes of Sendai National Focal Points.
2. A **pilot tool** that showcases how to use EO to derive a specific Sendai indicator (most certainly it will focus on the assessment of economic damages caused by floods, especially in the agricultural sector). Application of this tool in different environments (e.g. developed/developing countries) can be discussed.
3. Foster the **integration of SFDRR indicators in existing platforms** and the product portfolio of data providers to ensure consistency, coherence and comparability in the SFDRR monitoring.

4. **capacity building and knowledge transfer** material e.g. trainings (based on the outcomes of the activity) to share the information with other civil protection and disaster management agencies **(to be discussed)**

Specific activities under objective 1 include:

- Developing guidelines and good practice guidance on how to integrate the use of EO data in Sendai framework monitoring
 - Assessment of the feasibility of EO for the SFDRR monitoring
 - Evaluation of the utility and acceptability of EO techniques/methods/data and specifications (e.g. resolution, time series etc.) to integrate in the SFDRR monitoring processes. Development of an assessment matrix that evaluates possible measurement techniques per Sendai indicator, with regard to critical variables, measurement tools, confidence/skill.
 - Comparison of nations heavily monitored and nations with moderate or lacking observations, aiming to identify/evaluate the applicability/suitability of methods in countries with differences in data availability.
 - Creation of an inventory of SFDRR indicators and possible derivation methods
 - Based on the developed evaluation matrix, an inventory/mapping of Sendai Indicator and their specific measurement requirements is created
 - Good practice guidance report
 - Undertake a stock-taking review and summary of the feasibility of different methods and procedures to derive Sendai indicators from earth observation
 - Development of a guideline that includes concepts, methodologies, data sources and standards and limitations for the derivation of specific (yet to be defined) Sendai framework indicators or sub indicators from Earth observation data.
 - Focusing on data products that are readily available to be used by national Sendai Focal Points and fostering EO/statistical integration into the national Sendai monitoring

Specific activities under objective 2 include:

- Development of EO monitoring tool to derive Sendai framework indicators on a national level
 - Specifications / concept for a pilot tool is developed
 - The specifications and end-user demands for a pilot tool to integrate EO in the Sendai framework monitoring are assessed
 - One or more demonstrators are developed
 - Development of a prototype tool. This may include data processing, and analysis chains to identify economic damages caused by flooding in agriculture and potentially critical infrastructure. It will also include the documentation of methodology and validation of the tool
 - Tendering and contracting the development of the pilot tool.
 - Creation of tender documents and awarding the contract to develop a pilot tool to assess economic damages caused by flooding based on satellite remote sensing data

- Developed pilot tool is presented in a workshop; codes shared with the project partners
 - The pilot tool for the assessment of economic damages caused by floods using satellite-based EO is delivered and presented into a final technical workshop. Developed methods and codes are shared with the project partners.

Specific activities under objective 3 include:

- Foster the integration of SFDRR indicators in existing data platforms and the product portfolio of data providers
 - Sendai indicators as part of the Copernicus Emergency Management Service
 - Integrating the derivation of specific Sendai indicators in the portfolio of the Copernicus Emergency Management Service, especially as part of the Risk & Recovery module
 - Explore possible other platforms that could update their product portfolio and integrate Sendai monitoring related specifications and products to ensure consistency in methodology and standards, as well as coherence and comparability in the SFDRR monitoring.

Specific activities under objective 4 include:

- Capacity Building / knowledge transfer / cooperation
 - Increase the involvement of partner countries, organisations and national Sendai focal points
 - Identify interested partner countries for cooperation, including workshops and trainings as well as co-development of specific user-demands and techniques
 - Identify other relevant GEO activities to build on already existing platforms, guidelines and collaborations
 - Knowledge transfer through international cooperation
 - Develop a concept of transferability of results in an international context e.g. via innovative and fit-for-purpose training materials and learning modules as well as develop curricula and repository of information that can be tailored to the specific needs of partner countries.
 - International workshop
 - Organize workshops with international cooperation organizations, partner countries and the earth observation community on the use of available EO tools, datasets, products and methods for deriving specific indicators that can contribute to monitoring the SFDRR target achievement

4. Relationship to GEO Engagement Priorities and to other Work Programme Activities

This activity will support the implementation of the Sendai Framework for Disaster Risk Reduction in general, especially the framework's priority areas of action 1 (Understanding disaster risk) and 4 (Enhancing disaster preparedness for effective response). By the derivation of Sendai indicators with satellite remote sensing and/or the Copernicus data and services, the activity supports the Sendai monitoring process, helps to understand and identify the disaster risks a country is facing and, thus,

enables policy makers to increase preparedness for disaster response and recovery and ultimately strengthen disaster resilience.

The Community Activity will also inform the achievement and measurement of the SDG targets. By enabling countries to strengthen their disaster resilience through better and more consistent data on disaster risk and damage, the activity will contribute to the achievement and measurement of SDGs 1.5 (End poverty), 11.5, 11.b (Resilient Cities) and 13.1 (Climate action). This activity will also support the objective of the Paris Agreement and its aim to strengthen resilience towards the adverse effects of climate change. By providing data and analyses on disaster risks in general, the activity will address the pillars of climate change adaptation and loss and damage associated with the impacts of climate change. The derivation of information from earth observation data for Sendai indicators can contribute to a comprehensive risk assessment and management and enhance a countries capacity to develop national adaptation plans or disaster risk management strategies.

Linkages to initiatives and activities from GEO Work Programme 2017 - 2019:

GEO Initiative:

- Data Access for Risk Management (GEO-DARMA)

GEO Community Activity:

- Earth Observations for Disaster Risk Management (EO4DRR)
- Earth Observation for Sustainable Development Goals (EO4SDG)

5. Governance

The community activity is led by the German Federal Office for Civil Protection and Disaster Assistance (BBK), Bonn, Germany. The activities will be initiated and orchestrated by the national coordination for the CEMS at BBK, in close cooperation with the German National Focal Point for the Sendai Framework for Disaster Risk Reduction (also at BBK). It is also planned to cooperate with UN-SPIDER to enhance and transfer knowledge on the integration of EO data in the Sendai reporting activities on an international level. It is envisaged to include development cooperation agencies, such as GIZ, in the activity to transfer generated knowledge and procedures (e.g. good practice guidance) to support national governments of developing countries through bilateral cooperation to include EO in their Sendai monitoring processes. The activity aims to engage especially with end-users and other stakeholders to determine knowledge gaps and requirements in order to ensure development of appropriate products and linkages with relevant institutions.

As the activity focuses on developing guidelines, methodologies and procedures, as well as sharing knowledge and information for governmental end-users, interested organizations and governments are welcome to share their experiences. Support by other GEO members is very welcome; specifically this activity is open for exchange of knowledge and drawing from existing examples and projects of other member of PO.

6. Data Policy

The activity aims to use data from the European Copernicus Earth Observations Programme, which guarantees open and (cost)-free access to earth observation data. Developed methods and procedures comply with the GEOSS Data Sharing Principles and the GEOSS Data Management Principles. Options to make developed methods and procedures of this community activity available via DIAS platforms or GitHub are being examined. Developed methods and workflows will be made available

through this activity; however, confidential information (e.g. confidential geodata) to test methods and generate indicators in Germany cannot be published.

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