Disaster Risk Reduction

This document is submitted by the Disaster Risk Reduction Working Group to the 17th Plenary for information.

1 INTRODUCTION

Since its establishment in June 2020, Disaster Risk Reduction Working Group (DRR-WG) has been working on developing and implementing a coherent and crosscutting approach within GEO to advance the use of Earth observations to support national DRR and resilience efforts. The DRR-WG promotes awareness of relevant global policy frameworks, such as the United Nations Office for Disaster Risk Reduction (UNDRR) Sendai Framework for Disaster Risk Reduction (SFDRR) 2015-2030. Serving as the primary GEO liaison to UNDRR, the DRR-WG also collaborates with other GEO Working Groups and activities across the GEO Work Programme relating the GEO engagement priorities.

Three co-chairs were selected by and from the DRR-WG members, which currently consists of 95 members nominated by GEO Members, Participating Organizations, and GEO Associates, representing governmental, intergovernmental, research, commercial sector, and non-governmental organizations in the Americas, Africa, Europe, and Asia-Pacific. Each co-chair leads a designated subgroup (SG) and is supported in their role by three deputy chairs for each sub-group.

- **Subgroup 1 – GWP Coordination**: led by Dave Borges (United States), supported by deputies: Fernando Belda (Spain), Tatiya Chuentragum (Thailand), and Godstime James (Nigeria);
- **Subgroup 2 – UNDRR Coordination for Sendai Framework Priorities**: initially led by Janet Edwards (Sweden), and replaced by Nathaniel K. Newlands (Canada) as of June 2021; he is supported by deputies: Abdullahi Aliyu (Nigeria), Nhilce Esquivel (Sweden) and John LaBrecque (IUGG);
- **Subgroup 3 – Climate Change and SDG Coordination**: Kene Onukwube (Nigeria), supported by deputies: Cheila Cullen (United States), Ghulam Rasul (ICIMOD), and Ramesh P. Singh (United States).

A full time DRR Coordinator, seconded by the Government of Japan to the GEO Secretariat, Rui Kotani, coordinates the DRR-WG while supported by a DRR consultant, Delali Sandra Kemeh. They communicate with the WG members, especially the three co-chairs, almost daily to actively support their coordination of the DRR-WG activities. Approximately one quarter of the 95 members have been active, and the Secretariat and the co-chairs have begun reaching out to non-active members to engage them. UNDRR is also now based in the same office as the GEO Secretariat, so a closer working relationship will also be possible here too.

2 TASK GROUP ACTIVITIES AND TARGETED OUTPUTS

The entire DRR-WG has met four times so far, including the most recent one on 28 September 2021. Normally, prior to the entire DRR-WG meetings, each SG has a meeting, so they have 3 to 4 meetings per year.

So far, the DRR-WG has launched ten tasks – that are intended to help developing countries address vulnerability, risk and exposure in collaboration with UNDRR – under the three working groups, working towards producing specific outputs (See Annex A). The current emphasis is on two fundamental tasks: Task 1.1 (Joint GEO Work Programme mapping on climate, DRR and capacity development) and 1.2 (EO Risk Toolkit) as the results of these tasks would serve as a basis for the rest of tasks, as described below.

3 ACCOMPLISHMENTS

The DRR-WG has made a few accomplishments in Task 1.2 (Development of EO Risk Toolkit and GAR Contributing Papers) and most notably in 1.3 (Outreach and engagement events/meetings), including in deepening strategic partnership with the United Nations Committee of Experts on Global Geospatial Information Management (UN-GGIM) Working Group on Geospatial Information and Services for Disasters (WG-Disasters).

First, in terms of recent events, GEO DRR-WG greatly contributed to one of the Parallel Sessions C of the GEO Virtual Symposium 2021 (22 June 2021). During the session titled "EO strategies, partnerships and services for disaster risk reduction," representatives from GEO Communities, including two DRR-WG co-chairs, DRR leads from the Regional GEOs, strategic partners (UN-GGIM) and a few other DRR-WG members provided insights on work programme activities, public/private partnerships, projects and activities underway to address gaps, user needs and efforts to transform data to decisions for disaster resilience.

The GEO DRR-WG was also represented at the 11th Session of the UN-GGIM on 23, 24, 27 August 2021. GEO DRR activities were highlighted in the UN-GGIM WG-Disasters 11th Session Report:

> *Moreover, the working group highlights awareness-raising and collaborative activities pursued with other complementary working groups and disaster programmes of national and international bodies, including the Committee on Earth Observation Satellites, the* ***Group on Earth Observations****, and the National Aeronautics and Space Administration of the United States of America. The working group indicates that its activities are aimed at identifying mutually beneficial areas of work to provide and expand on the availability of geospatial information and services that cover all dimensions of disaster risk, including hazard, exposure, and vulnerability.* (emphasis added)

Further, the GEO DRR-WG's efforts to develop the EO Risk Toolkit in partnership with UNDRR (Task 1.2) were recognized and encouraged during the 11th Session and in multiple member country intervention statements.

In an effort to increase coordination and collaboration with Regional GEOs, DRR-WG under Task 1.3 has approached relevant DRR groups of the Regional GEOs to highlight relevant work. Most recently, a blog post is getting produced to summarize outcomes from the AmeriGEO DRR session to be posted on GEO's main website.

Additionally, the following contribution papers have been accepted and will be included in the UNDRR Global Assessment Report on Disaster Risk Reduction (UNGAR) 2022:

- Earth Observations into Action: Systemic Integration of Earth Observation Applications into National Risk Reduction Decision Structures (highlighting GEO activities such as GEOGLAM, GSNL, GWIS, EO4SENDAI-MONITORING, GFRM as case studies; Task 1.2);
- Transdisciplinary application of Global Navigation Satellite System Radio Occultation (GNSS-RO) to characterize atmospheric hazards and model systemic risk (advocating applications of GNSS for atmospheric hazards and risks via GEODESY4SENDAI; Task 2.4);
- The GEO Indigenous Alliance: Perspectives, Opportunities and Challenges of Earth Observations for Disaster Risk Reduction.

Finally, GEO DRR-WG's renewed homepage has been launched in August 2021 with full descriptions of DRR-WG tasks, a member list with biographies, events, and relevant resource documents. The information will help members and GEO communities to better understand each other and clarify what this group with various experts have to offer.

4 WORK IN PROGRESS

4.1 Current Priorities: Tasks 1.1 and 1.2

As mentioned earlier, results of Task 1.1 (*Joint GEO Work Programme mapping on climate, DRR and capacity development*) and 1.2 (*EO Risk Toolkit*) serve as a basis for other tasks; therefore, the two tasks are currently two top priorities for the GEO DRR-WG.

Task 1.1 on the joining mapping exercise includes a DRR section (Section 2) with 11 questions made by the DRR-WG (See Annex B). They are formulated to have a comprehensive understanding of how each GWP activity relates to DRR.

The questions of the mapping (Task 1.1) are designed in a way that the answers help DRR-WG tasks connect with relevant GWP activities. For example, one of the questions of the mapping asks the following to the GWP activities: "Are you aware if EO associated with your GEO activity is mentioned in any national DRR strategy?". The GWP activity leads who provide positive answers to this question will be contacted by the Task 2.1 group, who are assessing EO descriptions in DRR strategies of GEO members. The mapping results are also instrumental in identifying GWP activities with tools and services to be highlighted through the EO Risk Toolkit (Task 1.2).

The EO Risk Toolkit (Task 1.2) has been under development in close collaboration with UNDRR (as a GEO Participating Organization) and Esri (as a GEO Associate) to integrate available GEO DRR-related data, tools and services. The aim is to provide DRR users a one stop site with access to available open source DRR-related EO tools and services to be used at the country level. The target audience is potential users of the products, such as emergency responding agencies of national and local governments and development agencies so that they can easily find GEO products suitable for their operations. The initial contents for the Toolkit hubsite would be selected from the outputs of the GWP activities that are available in the prioritized countries of the UNDRR partners who are working on an initiative called the Global Risk Assessment Framework (GRAF). The GRAF aims at addressing information gaps on hazards, vulnerabilities and exposures in its pilot countries, such as Costa Rica, Bangladesh and Fiji. Tasks under

subgroups 2 and 3 will work with relevant GWP activities to produce contents of the EO Risk Toolkit (Task 1.2), such as policy briefs and case studies, primarily for the GRAF pilot countries.

The preliminary result and analysis (See Annex C) just came out in late September. The results show that over half (33) of the GWP activities align with the Sendai Framework and are DRR-related, and there are two takeaway points. First, these activities have strong alignment with the Sendai Framework as they identify themselves to support at least one of four Sendai framework priorities for action. However, secondly, the result showed rather weak connections with DRR users. It is because the activities do not necessarily work with DRR practitioners and Sendai focal points, and activity efforts tend not to be well-leveraged by the countries or not well mentioned in their national DRR strategies. Fortunately, more than half of the DRR-related GWP activities are willing to work with the EO Risk Toolkit. Therefore, GEO DRR-WG needs to ensure that the Toolkit is developed in a way to help GWP offerings better match with user needs. More detailed analysis of the mapping will follow and presented at various upcoming events (Task 1.3), The joint WG report on the mapping will be due in the early 2022 while results will be available in the form of a dashboard on the GEO homepage. Annex D: Earth Observations Risk Toolkit Concept Paper.

4.2 Upcoming events: Task 1.3

The GEO DRR-WG under Task 1.3 is preparing for two events: GEO Week on 22-26 November 2021 and the 7th session of the Global Platform for DRR (GP2022) on 23-28, May 2022.

The DRR-WG is contributing to four GEO Week sessions. First, a working group co-chair will speak at Session 3 of the GEO Plenary (*Joint Reporting on Climate Change, Capacity Development and DRR WGs* on 24 November) and report on the EO Risk Toolkit development plan and preliminary analysis of the mapping results. Secondly, Task 3.2 (Compendium with collection of texts and references on EO's role in SDGs) has been working on producing papers on some of sustainable development goals to provide inputs for the GEO Week Anchor Session One (*SDG Interaction* on 23 November). The papers on the goals will be used by the SDG Coordinator, who is organizing the Anchor Session to plan the contents of the event. Thirdly, the GEO Week's Youth Track (on 22, 24, 25, 26 November) is being shaped by contributions from some members of the DRR-WG and the DRR Consultant. The youth track is for young people to present their work, network, share knowledge and create links with the GEO community. Lastly, a side event by the DRR-WG is planned to inform the GEO Community about the development of EO Risk Toolkit hubsite and to get their feedback and help in identifying tools and services coming out of GWPs that are either available or in development.

The DRR-WG aims at developing enough contents of the EO Risk Toolkit and launching the hub site by May next year to be featured during UNDRR's GP2022. Meanwhile, DRR-WG has also begun its coordination and collaboration with Regional GEOs, in particular, AmeriGEO Disasters working group, who are a part of the Organizing Team of the Thematic Section 2 (TS2) on data of the GP2022.

Annex A: DRR Working Group Tasks Aligned to Subgroups

Task	Purposes	Outputs/Outcomes
SUBGROUP 1 ● Aims to develop and implement a coherent and crosscutting approach within GEO to advance the use of EO to support countries' DRR and resilience efforts. ● Works closely with SG2 and SG3 to understand real requirements at the national level and communicate these requirements to relevant activities within the GWP.		
1.1	Highlighting aspects of the GWP related to DRR, and describe key elements and locations of each activity	**Joint GWP Mapping** on climate, DRR and capacity building
1.2	Promoting sharing of data and knowledge to improve DRR, including through good practices and impact	**EO Risk Toolkit** and GAR Contributing Papers
1.3	Promoting awareness of relevant global policy frameworks across the GWP	Outreach (i.e., renewed homepage) and engagement events/meetings, i.e. Parallel Session C, GEO Virtual Symposium 2021 and a side event during GEO Week 2021
SUBGROUP 2 ● Leverages the efforts of SG1 and uses the combined resources of SG2 to promote the dissemination and use of EO to strengthen DRR capabilities according to country needs as identified by UNDRR		
2.1	Increasing the use of EO data for local and national DRR strategies	Assessment of EO descriptions in DRR strategies of GEO member countries
2.2		Policy briefs and use cases on the use EO to create disaster loss data for DRR strategies and for reporting on the Sendai Monitor Global Indicators
2.3		EO-leveraged data collection tools to visualize vulnerability and exposure to be used in DRR strategies
2.4	Increasing the use of GNSS-enhanced EO data through consortia	Global Assessment Report (GAR) on DRR Contribution Paper, policy briefs and new partnerships with ITU
2.5	Increasing the use of EO data to show trends over time and hot spots while predicting and analyzing future risks	Use cases and workshops
SUBGROUP 3 ● Leverages SG1 efforts to provide an overview of links, and actionable opportunities, between disa reduction, climate change, SDGs, and urban activities. Serves as primary link to CC-WG, SDG an related activities		
3.1	Developing EO links between DRR, CC and SDGs, notably for adaptation, early warning and resilience	Policy briefs on EO use in handling various types of natural hazards, such as flooding, landslides, wildfire and snow melt aligned with activities in the GEO work programme
3.2		Compendium with collection of texts and references on EO role in SDG targets and indicators in relation to the SFDRR and the Paris Agreement

Annex B: DRR Section of the Joint GWP Mapping

Section 4: Disaster Risk Reduction

1. Please indicate any/all thematic disaster risk reduction areas your GEO activity addresses.

Please select **all** that apply.

- ☐ Avalanche
- ☐ Biological Hazards
- ☐ Chemical Hazards
- ☐ Cold Wave
- ☐ Cyclone
- ☐ Drought
- ☐ Earthquake
- ☐ Environmental Hazards
- ☐ Epidemic and Pandemic
- ☐ Extraterrestrial Hazards
- ☐ Flood
- ☐ Geohazards
- ☐ Heat Wave
- ☐ Insect Infestation
- ☐ Landslide
- ☐ Meteorological and Hydrological Hazards
- ☐ Nuclear, Biological, Chemical (NBC)
- ☐ Societal Hazards
- ☐ Storm Surge
- ☐ Technical Disaster
- ☐ Technological Hazards
- ☐ Tornado
- ☐ Tsunami
- ☐ Volcano
- ☐ Wildfire
- ☐ Other (please specify):

2. Does your GEO activity focus on one or more of the following disaster phases?

Please select **all** that apply.

- ☐ Prevention of future risks
- ☐ Reduction of existing risk
- ☐ Mitigation
- ☐ Preparedness / Early Action
- ☐ Response
- ☐ Recovery

3. Does your GEO activity work with any of the designated Sendai Framework national focal point institutions in any of the countries you are actively working within?

- ◉ Yes
- ○ No

Please provide agency name and/or POC.

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4. Are you aware if EO associated with your GEO activity is mentioned in any national DRR strategy?

- ○ Yes
- ○ No

5. Does your GEO activity work with any other DRR practitioner (private, public or civil society) or DRR institution/agency in the country?

Examples include domestic, international, public and private sector (i.e., civil protection agencies, meteorological agencies, CEOS, WMO, WFP, UNOOSA/SPIDER, WB/GFDRR, etc.)

- ◉ Yes
- ○ No

Please specify.

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6. Does your GEO activity directly align with and/or support the Sendai Framework?

- ◉ Yes
- ○ No

7. Does your GEO activity align with or support one or more of the four Sendai Framework Priorities for Action?

Please select **all** that apply. View a description of Priorities here.

- ☐ Understanding disaster risk
- ☐ Strengthening disaster risk governance to manage disaster risk
- ☐ Investing in disaster risk reduction for resilience
- ☐ Enhancing disaster preparedness for effective response, and to "Build Back Better" in recovery, rehabilitation and reconstruction

8. Does your GEO activity directly support one or more of the seven Sendai Framework Global Targets?

Please select **all** that apply. View a description of Targets here.

- ☐ Target A. Global disaster mortality
- ☐ Target B. Number of affected people
- ☐ Target C. Economic loss in relation to GDP
- ☐ Target D. Damage to critical infrastructure and services disruption
- ☐ Target E. Number of countries with national and local DRR strategies by 2020
- ☐ Target F. International cooperation to developing countries
- ☐ Target G. Availability and access to early warning systems and DRR infromation

9. Does your GEO activity directly support any of the 38 Sendai Framework indicators?

Please select **all** that apply. View a description of Indicators here.

☐ A-1	☐ A-2	☐ A-3	☐ B-1	☐ B-2
☐ B-3	☐ B-4	☐ B-5	☐ C-1	☐ C-2
☐ C-3	☐ C-4	☐ C-5	☐ C-6	☐ D-1
☐ D-2	☐ D-3	☐ D-4	☐ D-5	☐ D-6
☐ D-7	☐ D-8	☐ E-1	☐ E-2	☐ F-1
☐ F-2	☐ F-3	☐ F-4	☐ F-5	☐ F-6
☐ F-7	☐ F-8	☐ G-1	☐ G-2	☐ G-3
☐ G-4	☐ G-5	☐ G-6		

10. Are you aware if any countries are directly leveraging your GEO activity efforts to inform national Sendai Framework monitoring / reporting?

- ○ Yes
- ○ No

11. The GEO DRR WG, in partnership with UNDRR, is developing an Earth Observation Risk Toolkit. Would your GEO activity be willing to work with GEO DRR WG to include your capabilities in the new EO Risk Toolkit?

EO informed insights are needed to support evidence-based decision making to reduce disaster risk, e.g. early warning systems. GEO DRR WG intends to aggregate all GEO activities related to DRR into this EO Risk Toolkit, linking to existing tools and developing associated use cases.

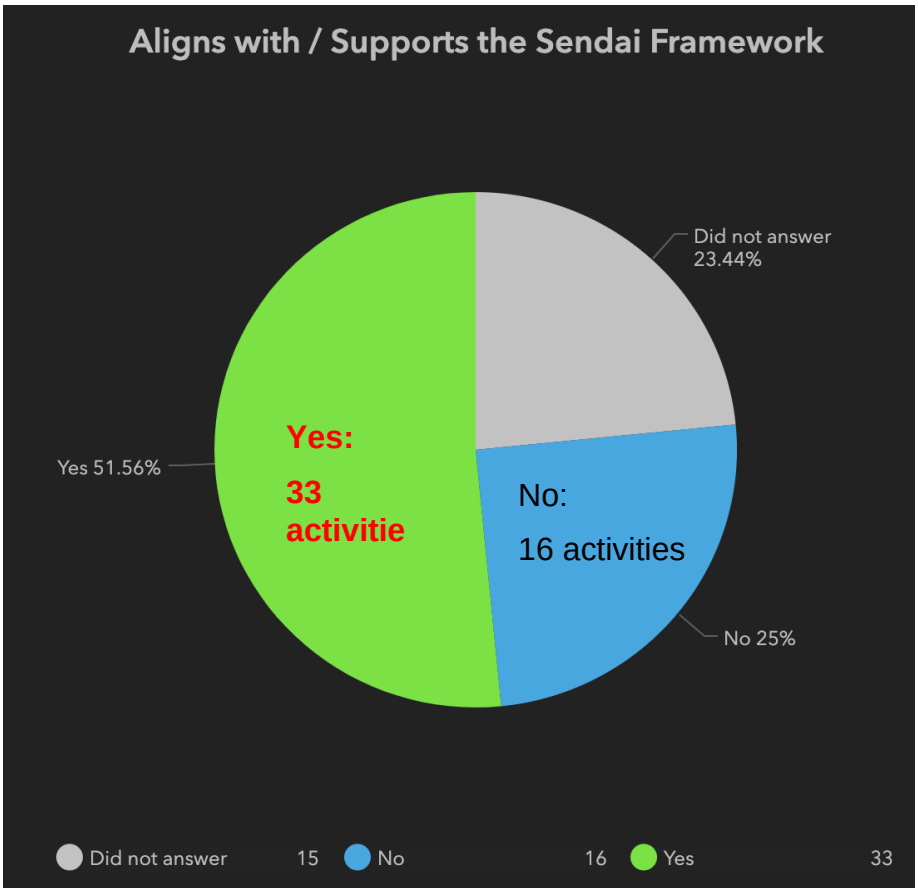
- ○ Yes
- ○ No

Annex C: Preliminary Results of the DRR Section of the Joint GWP Mapping

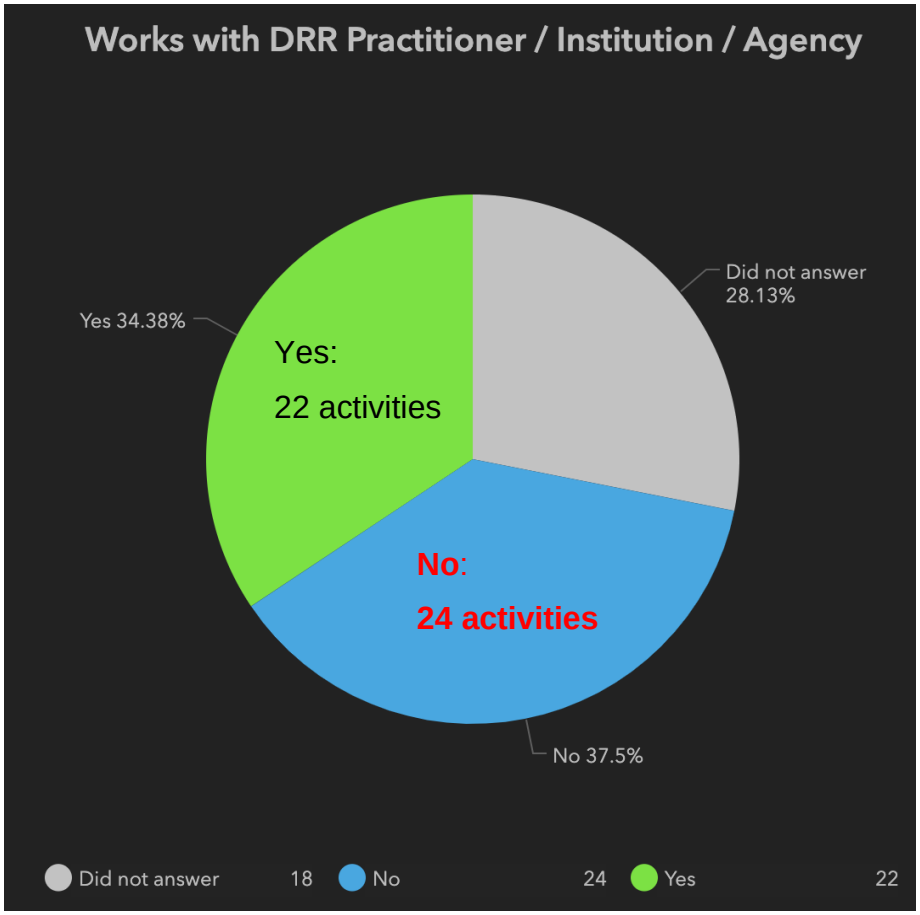
1 STRONG ALIGNMENT WITH SFDRR

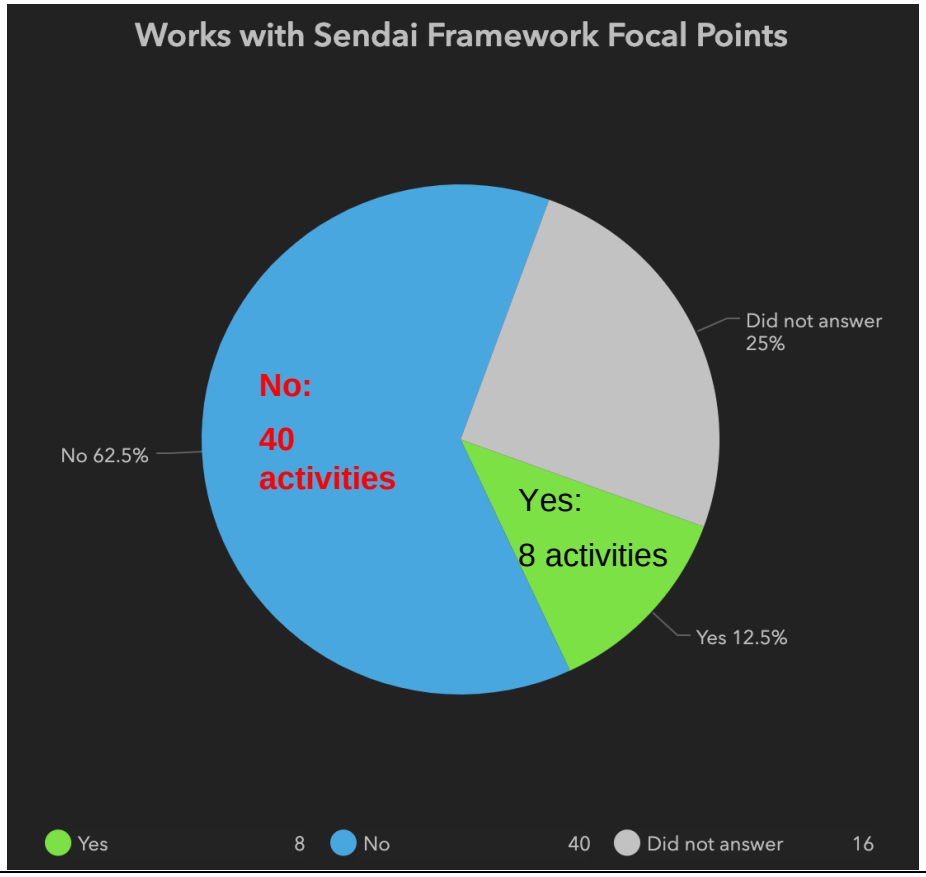
GWP Activities' Alignment with or Support for UNDRR Sendai Framework Priorities for Action

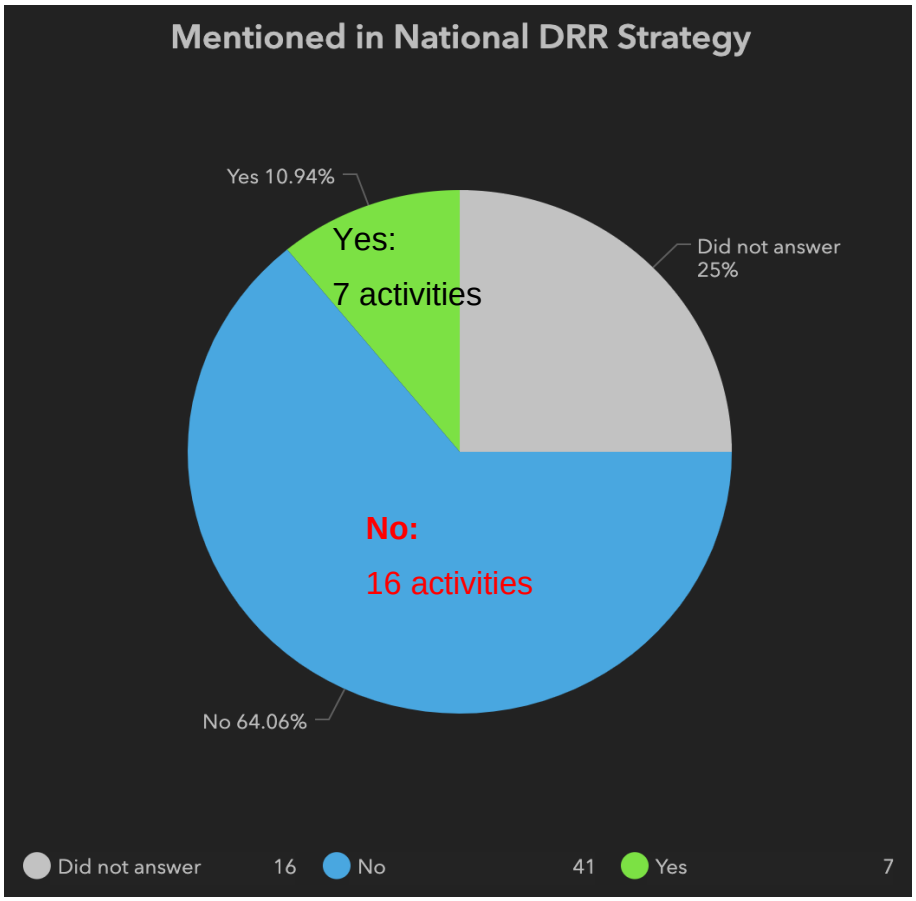
	Understanding Disaster Risk	Strengthening governance & management of Disaster Risk	Investing in Disaster Risk for resilience	Enhancing disaster preparedness for effective response, recovery, rehabilitation, and reconstruction
Total	30	14	7	23
Flagship	0	0	1	1
Initiative	12	6	3	7
Regional GEO	3	2	0	2
CA	15	6	3	13

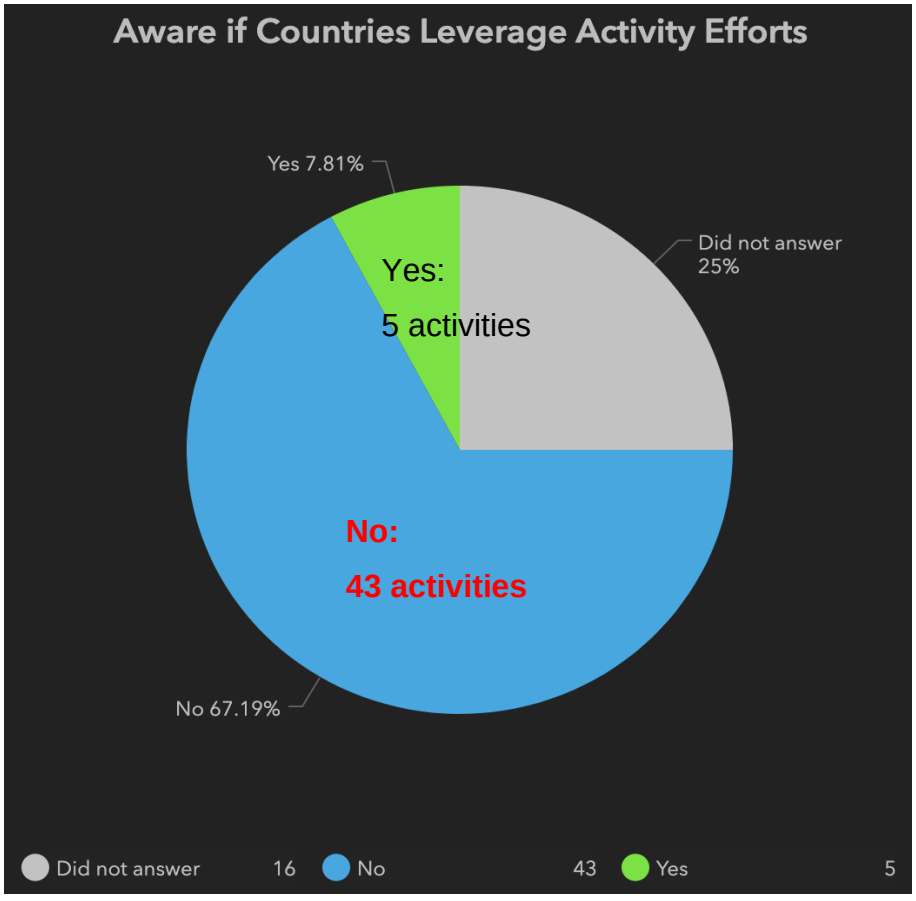


2 WEAK COORDINATION/COLLABORATION WITH DRR USERS

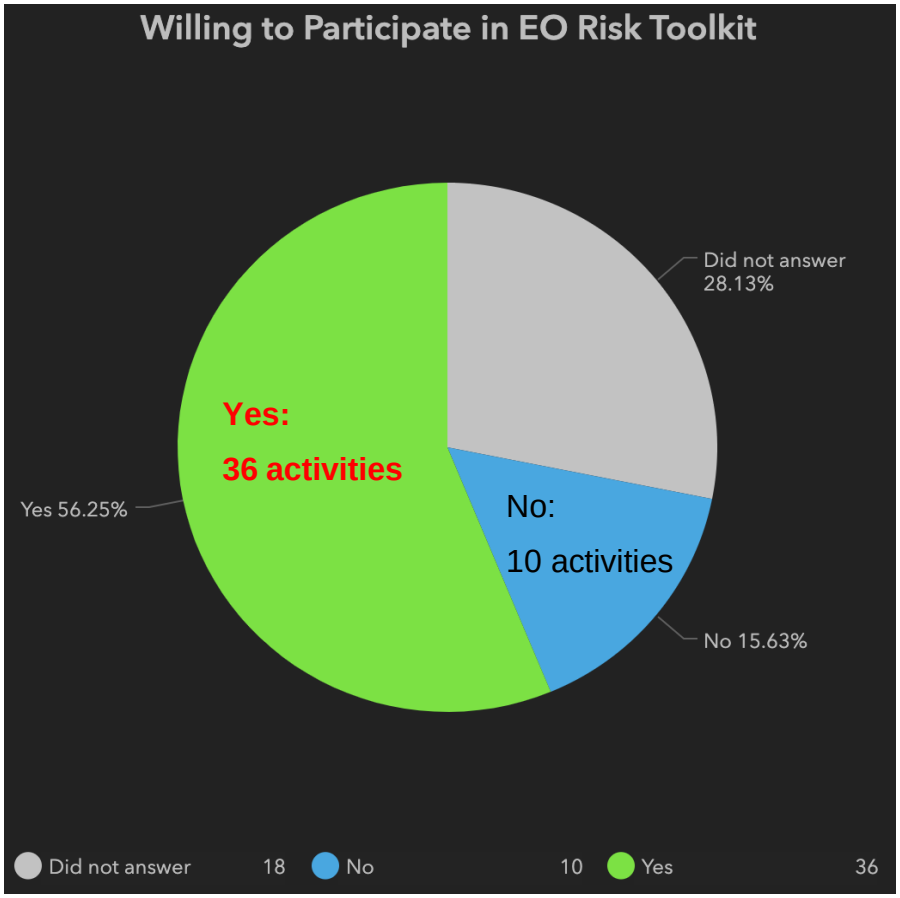





Mentioned in National DRR Strategy
Yes 10.94%
Yes:
7 activities
Did not answer
25%
No:
16 activities
No 64.06%
Did not answer 16 No 41 Yes 7


Aware if Countries Leverage Activity Efforts
Yes 7.81%
Yes:
5 activities
Did not answer
25%
No:
43 activities
No 67.19%
Did not answer 16 No 43 Yes 5

3 GWP ACTIVITIES WILLING TO WORK WITH EO RISK TOOLKIT



Annex D

Earth Observations Risk Toolkit Concept Paper

1 EXECUTIVE SUMMARY

The Group on Earth Observations (GEO) Disaster Risk Reduction Working Group (DRR WG) is developing an Earth Observations (EO) Risk Toolkit in collaboration with the United Nations Office for Disaster Risk Reduction (UNDRR) flagship initiative Global Risk Assessment Framework (GRAF) and Esri. The Toolkit will provide Disaster Risk Reduction (DRR) users with access to open source EO tools and services to fill knowledge gaps on hazards, vulnerabilities and exposure at country level. Target audiences include national disaster management authorities, development and humanitarian actors and Sendai National Focal points who can use and benefit from GEO products that are suitable for their work. The expected contents of the toolkit are 1. use cases highlighting concrete examples of usage of products offered by the GEO communities, in particular, the GEO Work Programme activities; 2. policy briefs for policy-makers, funders and operational agencies, and 3. tools, technical guidance and methodologies. This work will also be done through collaboration with other key partners, such as the United Nations Committee of Experts on Global Geospatial Information Management (UN-GGIM)'s Working Group on Geospatial Information and Services for Disasters (WG-Disasters). The Toolkit will launch at the Seventh Session of the Global Platform for Disaster Risk Reduction (GP2022) in May 2022.

2 BACKGROUND

In December 2018, the GEO Programme Board led an inclusive and iterative process to develop the 2020-2022 GEO Work Programme (GWP). This Work Programme was approved at the GEO-XVI Plenary, November 2019 in Canberra, Australia. The current GWP contains more than 60 individual activities, organized thematically and geographically. Over half (33) of these GWP activities include elements of DRR by aligning with the Sendai Framework for Disaster Risk Reduction 2015-2030 supported by UNDRR. However, there was no overarching coordination body to facilitate internal communication regarding DRR activities or effectively communicate DRR capabilities to GEO members, other stakeholders and partners.

The GEO DRR WG was established to develop and implement a coherent and cross-cutting approach within GEO to advance the use of EO in support of national disaster risk reduction and resilience strategies, policies, and programs. The guiding member state agreements facilitated and guided by the UN are the Sendai Framework, the Agenda 2030 for Sustainable Development (SDGs) and the Paris Agreement. The GEO DRR WG supports the translation of the Canberra Declaration and the GEO Strategic Plan into concrete actions within the GWP. The WG coordinates DRR-related activities across the GWP in coordination with the GEO Secretariat and works to improve the GEO community's ability to reduce existing risk and avoid the creation of new risk, ultimately supporting countries to embark on risk and climate resilient development pathways.

The GEO DRR-WG has also been focusing on coordination and collaborating with partners, such as UN-GGIM WG-Disasters and Committee on Earth Observation Satellites (CEOS) Working Group Disasters (WGDisasters), who also align with the Sendai Framework. In fact, GEO activities were highlighted in the UN-GGIM WG-Disasters 11th Session Report:

> *Moreover, the working group highlights awareness-raising and collaborative activities pursued with other complementary working groups and disaster programmes of national and international bodies, including the Committee on Earth Observation Satellites, the Group on Earth Observations, and the National Aeronautics and Space Administration of the United States of America. The working group indicates that its activities are aimed at identifying mutually beneficial areas of work to provide and expand on the availability of geospatial information and services that cover all dimensions of disaster risk, including hazard, exposure, and vulnerability. (emphasis added)*

Meanwhile, another key strategic partner of the GEO DRR WG, UNDRR, has been working to improve risk analysis around interconnected and systemic risks at the country level, and GEO has begun working closely with the UNDRR team. Based on the premises of its Global Assessment Report 2019, UNDRR looks at a multiplier effect that Climate Change has on the vulnerability and risk landscape through its flagship initiative called the Global Risk Assessment Framework (GRAF). After its launch in 2019, the GRAF has been working on offering risk assessment services to its pilot countries among the UN Member States. Priorities are given to the Least Developed Countries (LDCs), Small Island Developing States (SIDS) and middle-income states that are prone to repeated loss and damage from disasters.

Example needs from GRAF pilot countries:

- Bangladesh: earthquakes and flood impacts on livelihood, especially the 2nd order effect, i.e. impact on economy and electricity in monetary value;
- Costa Rica: common hazards such as flood, extreme wind, landslides, volcanic eruptions and wildfires and their impact on five sectors: energy, water, house, transportation and agriculture.

The other five pilot countries are Somalia, Sudan, eSwatini, Pakistan, and Fiji, and more countries are expected to be added as the second batch of pilot countries early next year. Enhanced relationships between GEO and UNDRR are increasingly important as they can be leveraged to jointly contribute to emerging international collaborative efforts, such as the Risk-informed Early Action Partnership (REAP) and the Anticipation Hub. Anticipation Hub, to which GEO joined in October 2020, is a partnership of over 40 organizations, including UNDRR, the World Meteorological Organization (WMO) and the Risk-informed Early Action Partnership (REAP). REAP is a new partnership to expand early action financing and improve early warning systems and the capacity to act on the risks they identify. The Anticipation Hub is a platform to facilitate knowledge exchange, learning, guidance, and advocacy around anticipatory action supporting practitioners, scientists, and policymakers. It is a joint initiative of the German Red Cross (DRK), International Federation of Red Cross and Red Crescent Societies (IFRC) and the Red Cross Red Crescent Climate Centre. These partnerships to which both GEO and UNDRR are part of, also prioritize SIDS, including the Caribbean countries.

3 HIGHLIGHTING THE NEED AND BENEFIT

Within the GEO community, there is no comprehensive understanding of how GWP activities support DRR activities, what tools and services they have developed or are developing or how

they contribute to data collection for national reporting on the Sendai Framework's global indicators which are tracking progress towards achieving the Sendai Framework global targets.

Further, the extent to which EO currently supports national disaster risk reduction and resilience efforts is neither well known nor well documented (Sendai Framework indicator E-1: Number of countries that adopt and implement national disaster risk reduction strategies in line with the Sendai Framework, G-5: Number of countries that have accessible, understandable, usable and relevant disaster risk information and assessment available to the people at the national and local levels.).

EO informed insights are essential in evidence-based decision making. A collection of cases in which EO is used to support DRR activities in a well-curated environment has the potential to accelerate the uptake of EO tools and services by countries and other entities to improve data-driven decision making in the future. In particular, the EO uptake can be targeted to prioritized countries of strategic partners for the GEO DRR-WG, such as UNDRR and UN-GGIM WG Disasters. For example, through the partnership with the UNDRR GRAF team, who is the main partner of the toolkit development, contents of the EO Risk Toolkit can be well aligned to the needs and benefits of DRR users in the GRAF pilot countries in an integral part of the GRAF portal called National Risk Information Portal (NRIP). The DRR users include user ministries such as emergency response agencies of the national and local governments as well as the UN agencies working on the development and humanitarian assistance in the pilot countries.

4 OBJECTIVES

Objectives of the Earth Observations Risk Toolkit include:

1. Highlight EO tools informed by Open knowledge practices and amplify existing solutions in a holistic manner. This would encompass data collection to decision making which encourage reproducibility and scalability;
2. Leverage relevant technology solutions (GEO Knowledge Hub, open geospatial, etc.) that are informed by expert communities as well as established global frameworks (e.g. UNDRR GRAF, UN-SPIDER Programme of the UN Office for Outer Space Affairs, UN-GGIM WG-Disasters Strategic Framework on Geospatial Information and Services for Disaster Risk Management);
3. Serve as a collective source and repository of information on efforts by the EO communities through the GEO network with useful and accessible information on websites with access to open source Earth observation tools and services;
4. Generate use cases, policy briefs and technical guidance/methodologies based on GWP outputs to contribute to the integration of EO into development processes, humanitarian operations and public policies relevant to DRR for prioritized countries of GEO DRR-WG's strategic partners. In doing so, feedbacks on the toolkit contents can be easily obtained, i.e. through the GRAF pilot countries by leveraging the work of the UN Resident Coordinators Offices (RCOs) and the UN Country Team (UNCT);
5. Facilitate the use of EO to monitor progress in the implementation of the Sendai Framework and other post - 2015 frameworks relevant to DRR.

Essentially, the aim of the Toolkit is to provide DRR users with useful and accessible information on a website with access to open source Earth observation data, tools and services to fill knowledge gaps on hazards, vulnerabilities and exposures at country level. The information is intended to help DRR practitioners at all levels to build capacity and to improve the contextual

applications of existing and emerging EO technology to monitor hazards, exposure and risks, vulnerability, disaster risk financing, etc. To reach out to DRR practitioners, GEO DRR WG works closely with its strategic partners, who work side by side with target users. For example, through collaboration with the UNDRR GRAF team and being an integral part of its National Risk Information Portal (NRIP), the toolkit can be easily guided by and address documented national level stakeholder requirements in line with the work done by the UN agencies, to whom GRAF is designed to contribute. GRAF engages with RCOs responsible for coordinating all UN agencies in that country through UNCT, represented by all heads of UN Offices coming together under a 5-year strategy of the country negotiated with the government to focus on both the development and humanitarian assistance. In other words, collaboration with the GRAF team enables GEO to understand the needs of the governments and the UN agencies on the ground.

Similarly, the GEO DRR WG can leverage strategic partnerships with others, notably the UN-GGIM WG-Disasters. UN-GGIM WG-Disasters brings partners involved in DRR and/or Emergency Management together to ensure that quality geospatial information and services are available and accessible in a timely and coordinated way to support decision-making and operations within and across all sectors and phases of disaster risk management. Therefore, the WG members include a mixture of disaster management agencies and geospatial information agencies, i.e., of Jamaica.

5 TARGET AUDIENCE

Target audience are not only GEO Members, Participating Organizations, Associates and Observers, but also UN Member States (non-GEO members), which include UNDRR GRAF pilot countries. Special attention will be given to user government agencies, such as Sendai national focal points and national and subnational disaster risk reduction/management agencies. It is also important to create contents that are useful for the humanitarian actors and development support agencies of the UN partners working in the countries where strategic partners have connections, i.e. the GRAF pilot countries where UNDRR can tap in through the UNCT network. GEO DRR WG will strategically reach out to those who can use and benefit from GEO products that are suitable for their work.

6 KEY CONTRIBUTORS

GEO DRR WG, GEO Secretariat, UNDRR, Esri, Sendai national focal points, GEO Work Programme Activities Leadership, UN-GGIM WG-Disasters.

7 RELEVANT EXPERT CONTRIBUTORS

GEO Data Working Group, GEO Knowledge Hub Development Team, GEOSS Infrastructure Development Task Team (GIDTT), GEO Earth Observations for the Sustainable Development Goals (EO4SDG), GEO Climate Change Working Group, GEO Capacity Development Working Group, Committee on Earth Observation Satellites (CEOS) Working Group Disasters, the United Nations Platform for Space-based Information for Disaster Management and Emergency Response (UN-SPIDER), Anticipation Hub, REAP.

8 TOOLKIT COMPONENTS AND CONSIDERATIONS

The expected contents of the toolkit are use cases of data, tools and services developed by the GEO Work Programme (GWP) activities, policy briefs to promote such use, and technical guidance/methodologies for the actual users, as described below in detail.

- Use Cases that illustrate a standard processes and concrete examples of usage of products offered by the GEO community;

The creation of several mature and relevant use cases will serve as the foundation of the EO Risk Toolkit. A standardized use case template will be developed that logically moves a stakeholder with minimal technical background in EO through a workflow from data sources, methodology/standard processes, technology solutions leveraged to specific end user needs addressed and/or policy implications. A United Nations Global Assessment Report 2022 Contributing Paper titled, Earth Observations into Action: Systemic Integration of Earth Observation Applications into National Risk Reduction Decision Structures, contains several tangible examples from the GEO Work Programme that could be leveraged immediately as initial use cases. The first two examples are scheduled to be the use cases of GEOGloWS Global Streamflow Forecasting in Honduras and the GWIS Country Profile of Paraguay.

- Policy briefs for policy-makers, funders, humanitarian/development aid agencies and operational agencies to move towards the use of EO tools, services and methods.

The above-mentioned use cases will be leveraged to create another main content of the toolkit: policy briefs. While referencing the use cases, the policy briefs will be formulated to promote target readers with decision-making capacity, such as policy-makers, funders, key user organizations to take up the use of EO tools for disasters, especially in the GRAF pilot countries. For example, policy briefs would make a case for policy-makers to integrate these risk management capabilities in the relevant policies, such as local and national DRR plans. Meanwhile, the policy briefs would also convince decision-makers to start or enhance the efforts to implement the EO risk tools, services and methods within the national disaster management systems. Policy briefs will be an easy-to-read concise document, which cover points such as rationale for action on the problem, proposed policy options (including the use of EO Risk tools) and policy recommendations. The toolkit policy briefs are likely to be organized thematically to address issues such as increasing risk knowledge about exposure, vulnerability, the creation of new systemic risks etc. rather than technical data specifics. The underlying risk concepts inherent in the Sendai Framework demand solutions that address hazards, exposure and vulnerability in a unified context. Therefore, the EO Risk Toolkit intends to broaden existing efforts that often focus exclusively on a particular natural hazard rather than systemic and interconnected risks. This approach reflects the GRAF promulgated by UNDRR to assist UN member states to better access and apply risk information from various sources.

- Technical guidance/methodologies for the actual users to help them use the data, tools and services.

Building on the use cases and policy briefs, technical guidance/methodologies provide step-by-step description of how to use EO tools mentioned by the two prior documents. It is a user-guide for specific EO risk tools to help technical users implement the risk warning tools and services within the national disaster management systems.

9 PLANS AHEAD

The launch of the EO Risk Toolkit will occur during the Seventh Session of the Global Platform for Disaster Risk Reduction (GP2022) in May 2022. Towards this target, GEO DRR Working Group co-chairs will share the plan to request initial feedback from the GEO community, including GWP leads, members and associates during GEO-17, at Plenary Session 3 on November 24 and dedicated side events on November 25 and 26. GEO DRR WG will incorporate received feedback into ongoing Toolkit technical development activities and establish a core team to manage content development in December and January 2022. The core team is likely to consist of GEO Secretariat, GEO DRR WG chairs, subgroup activity leads, members with subject matter expertise, UNDRR, Esri and strategic partners like UN-GGIM WG-Disasters. In the first quarter, a user feedback group will be created. Initial target audience testing will be conducted in March and April before the anticipated May 2022 launch.

EO RISK TOOLKIT DEVELOPMENT PLAN: Concept Development & Initiation

DETAILS	2021			2022					
	Q4			Q1			Q2		
	October	November	December	January	February	March	April	May	June
Update Concept Paper									
Initial Feedback from the GEO community on sample contents during GEO Week 2021									
Initial Toolkit Hub Development									
Core Team Review									
User Feedback Group Creation & Review									
Target Audience Testing									
Public Launch during the 7th Session of the GP2022									

Additional Resources

- GEO Disaster Risk Reduction Working Group blog: The EO Risk Toolkit: providing DRR users with access to open source EO tools and services (October 13, 2021)
- UNDRR Global Risk Assessment Framework (GRAF)
- GEO Knowledge Hub
- UN-Habitat Earth Observations Toolkit for Sustainable Cities and Human Settlements
- Integrating Disaster Risk Reduction and Climate Change Adaptation in the UN Sustainable Development Cooperation Framework