Geospatial Information for Climate Resilience – What Does UN-GGIM Do?

A Discussion Paper

Ordnance Survey

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Acknowledgements

This Discussion Paper has been developed as a Background Document to Agenda item #9. Geospatial information for sustainable development and climate resilience at the Thirteenth Session of the UN-GGIM Committee of Experts.

Is has been developed as a collaboration between Ordnance Survey of Great Britain and the Bureau and Secretariat of the Committee of Experts. The content is based on existing literature on the topic as well as discussions and outputs from UN-GGIMs Expert and Working Groups, Thematic Networks and Observers.

Lead author: James Norris, Ordnance Survey of Great Britain.

A Side Event and plenary discussion will be held on this topic during the Thirteenth Session. Please provide additional feedback on this discussion paper to ggim@un.org, cc to mark.iliffe@un.org, by 30 September 2023.

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We have never been better equipped to solve the climate challenge – but we must move into warp speed climate action now.

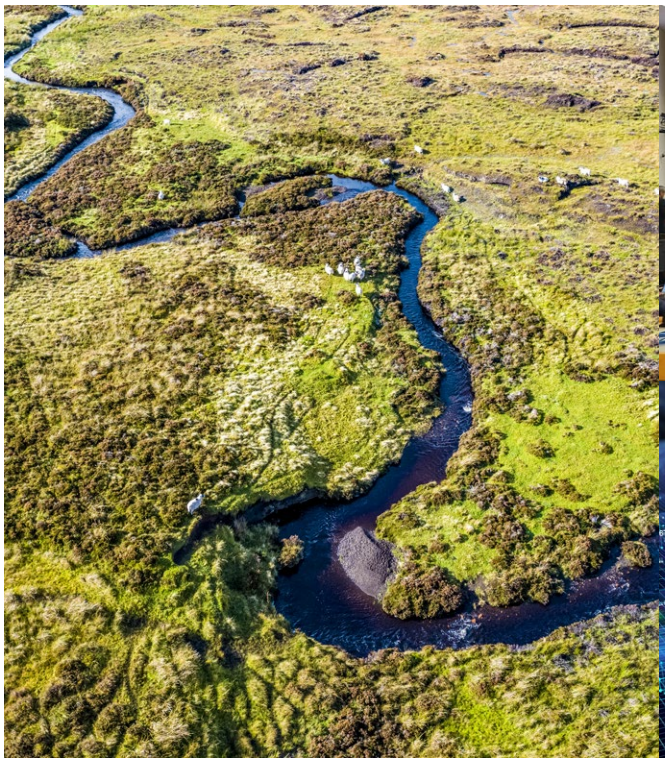
Antonio Guterres,
Secretary-General of the United Nations

Executive Summary

As the main 'threat' in the Triple Planetary Crisis[i] (alongside air pollution and biodiversity loss), climate change is the most pressing issue the world has today; it has already significantly impacted how the world consumes energy, food, and water, fundamentally transforming our planet's land, oceans, and biodiversity. Our changing climate is increasing the fragility of the most vulnerable countries, making adaptation and mitigation even more difficult, leaving those that are already the furthest behind in terms of development further behind still. Strengthening climate resilience is essential for all countries, however it is especially crucial for developing countries, as they are most affected by the intensification of extreme weather events caused by climate change. These events can severely damage infrastructure, agriculture, and public health systems, resulting in high economic and social costs. Developed countries may also experience high costs, but they are often catastrophic for developing countries, emphasising the urgent need to increase resilience.

Without climate change mitigation and adaptation actions, the impacts of climate change are predicted to impact 80% of the world's poorest, who will be living in fragile contexts by 2030 and put 720 million people at risk of being pushed into extreme poverty by 2050[ii]. With diminishing global resources, an expanding global population and a world that is still reeling from the still ongoing shocks of COVID-19 - among many other issues of global concern - the need for good evidence-based decisions is greater than ever, and the need for accurate, trusted, geospatial information is greater than ever.

As the basis for understanding what is happening where, when, and why, geospatial information is crucial towards identifying how communities are, and could, be impacted by climate change. With this knowledge we can take action. Whether it's assessing the impact of climate change, determining loss and damages, or developing effective mitigation strategies, these efforts are intrinsically tied to a geographic location. In this respect, geospatial information will be crucial in assisting decision-makers to make suitable decisions that align with government priorities and support national adaption plans and mitigation policies.



As the apex body for global geospatial information management, the United Nations Committee of Experts on Global Geospatial Information Management (UN-GGIM) has considered the importance of geospatial information to combat the climate challenge since its inception. Recently, through its decisions 12/108, 12/109, 12/110, and 12/111 it has underscored the importance of leveraging its functional groups towards positioning the global geospatial community to focus on climate change. Moreover, at this present thirteenth session, UN-GGIM will consider climate resilience under a new agenda item "Geospatial information for sustainable development and climate resilience".

In this discussion paper, developed as a collaboration between Ordnance Survey of Great Britain and the Bureau and Secretariat of UN-GGIM, the actions that UN-GGIM could take to enhance the role of geospatial information within climate change mitigation and adaptation efforts are identified and discussed. Taking a forward-looking approach, this paper provides a series of recommendations and potential actions for UN-GGIM to consider as it seeks to contribute and address the impact of climate change on our world.

This discussion paper is submitted as a background document to the Report on "Sustainable Development and Climate Resilience" at the thirteenth session of UN-GGIM, convened in New York on 2-4 August.

Introduction

Climate change, the long-term shift of temperature and weather patterns is changing our world, and not for the better. The accumulation of greenhouse gases in the Earth's atmosphere, primarily from burning fossil fuels, is leading to rising global temperatures, changing weather patterns, rising sea levels, and more frequent and severe disasters. These changes are already significantly impacting ecosystems, economies, and communities worldwide and, if left unchecked, will have even more devastating consequences for our future.

The Paris Agreement, adopted in 2015, represents a landmark international agreement to limit global warming to below 2°C above pre-industrial levels, but human activities have caused around 1.1°C of warming to date, and those impacts are already being felt in every region. Recent United Nations Climate Change Conferences (COPs) have underscored the need to fight the climate emergency, agreeing on the need for adaptation and mitigation (COP26 – Glasgow Climate Pact[iii]) and establishing a loss and damage fund for countries most vulnerable to the climate crisis (COP 27 - Sharm el-Sheikh Implementation Plan[iv]).

To build long-term resilience countries and communities need to build systems that can prevent or better manage risk. This can include taking actions such as investing in resilient infrastructure that can withstand climate impacts, and improving economic and social opportunities that can reduce underlying vulnerability to hazards. This ability to withstand risk, and recover from disasters, in a manner that is transformative and bounces forward, is at the root of resilience.

Geospatial information is a critical component of the national infrastructure and knowledge economy; a blueprint of what happens where, and the means to integrate a wide variety of government services[v]. The role of geospatial information as foundational data acting as lens to understand and mitigate the impact of our changing climate cannot be understated. Simply, geospatial information is at the intersection of human and physical geography and provides the basis to understand the impacts of climate change on our society and environment and mobilise investments for climate resilience supporting actions to achieve a net-zero[vi] increase of greenhouse gas emissions in our

atmosphere. For example, geospatial information directly empowers geodesists to measure sea level rise and is the basis for modelling different climate scenarios, among many other cases.

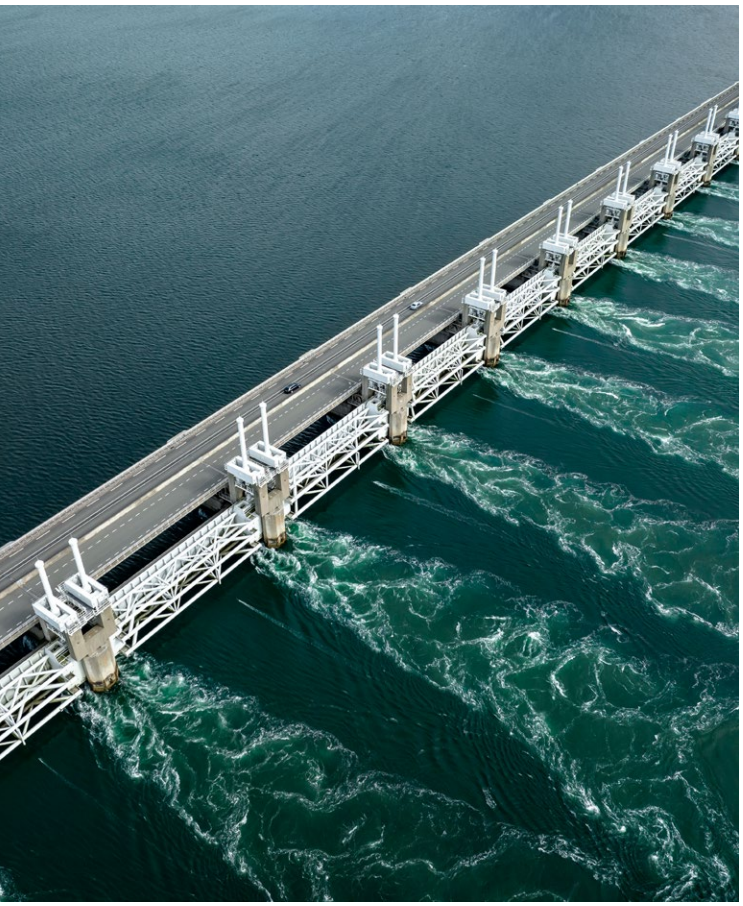
The opportunity of how geospatial data can be applied to climate challenges was explored by Ordnance Survey of Great Britain, in a set of discussion papers that consider 'how' National Mapping and Geospatial Agencies (NMGAs) or National Geospatial Information Agencies[l] (NGIAs) could make positive institutional changes to strengthen climate resilience. This paper was designed to help organisations to prepare for discussions at COP26[vii] and became the subject of at the Cambridge Conference 2022[viii]. These papers, grounded by the United Nations Integrated Geospatial Information Framework (UN-IGIF), provide a timely examination of how trusted foundational geospatial data produced by NMGAs can help countries reflect and model the changes and impacts of climate change in the real world. Importantly, these are just one example of NMGAs acting in this area[ix].

At the global level, the importance of geospatial information to combat climate change has been a consistent theme of UN-GGIM since its inception. This can be seen through its preparatory papers by representatives of Member States[x], in its successive programme reviews[xi] and reports on Future Trends[xii], or through the substantive work of its relevant

functional groups. Recently, through its discussions and decisions during the Twelfth Session (12/108, 12/109, 12/110, and 12/111) the Committee of Experts underscored the importance of leveraging its functional groups towards positioning the global geospatial community to climate change.

In addition to the examples of activities at the national and global level, it is recognized that climate resilience is a topic that many organizations are looking at addressing. These include many of UN-GGIMs observer organizations, thematic networks, and discussions during side events.

l These terms are used interchangeably within this document and represent the broad and different institutional arrangements used by countries for the national geospatial architecture.



In fulfilling UN-GGIM's role to promote international cooperation in the field of global geospatial information and the demand by Member States to leverage UN-GGIM's convening power, UN-GGIM placed "Geospatial information for sustainable development and climate resilience" on the provisional agenda for this present thirteenth session of UN-GGIM. Guided by the principal question 'what are the future actions should the Committee take to enhance and promote the use of geospatial information for climate resilience – what should the Committee do now and how', this discussion paper builds on existing discussions such as how the UN-IGIF is relevant for countries when considering strengthening their national geospatial information arrangements and also considers:

- A set of actions for UN-GGIM to take that articulate, communicate, and demonstrate the opportunity and need for geospatial information in global resilience efforts that promotes fundamental datasets and themes of geospatially integrated climate data, so that they are accessible and reusable by countries;
- The need to strengthen the coordination and use of geospatial information for climate action;
- How UN-GGIM's frameworks and policies already help translate geospatial trends into local action and identifies the gaps that prevent us from realising the Paris Agreement; and,
- How NGIAs as key stakeholders in the national environment for climate resilience, can elevate their national role to enhance global coherence and cooperation.

Geospatial Information for Climate Resilience

Within the confines of national government structures there needs to be more integration across the various national data information systems and platforms, particularly statistical (socio and economic) and geospatial (environmental). It is clearly demonstrated from our current progress on SDG 13 – Climate Action, that countries are simultaneously struggling to measure and monitor progress, and we know from global data that the climate crisis is worsening. There must be collective action to institutionalise inclusive mechanisms that leverage the most effective data and analytical techniques so that a wider range of stakeholders have the capacity to be involved in implementing the 2030 Agenda and subsequent evidence-based policy and decision-making.

But, we are not starting from scratch and there is cause for hope. The discussions during the Cambridge Conference 2022 and the development of the "How to Guide for Applying Geospatial Information to Climate Challenges[xiii]" provided a series of opportunities for national mapping and geospatial agencies to support their governments to act actions to tackle climate challenges these were focused on two areas for NMGAs to:

- Take an active leadership role as advocates for location data in their countries, understanding its value in supporting government priorities, and showcasing the real benefits it can bring to national adaptation and mitigation policies. NMGAs should act as drivers of change, empowering organisations and individuals to use location data in new ways and to actively respond to the current and future needs of citizens.

- Recognize that a changing climate is a global issue that affects all nations differently. Adaptation and mitigation strategies need to be based on best-available national data and considered in the global context. In recognition of this, the Committee should work with others, not alone, creating new networks, and move to using internationally agreed standards to enable the use of trusted data for adaptation and mitigation strategies.

In setting the discussions against the three strategic priorities of the UN-IGIF (Governance, Technology, People) the opportunities can be realized by UN-GGIM or Member States and made relevant to national situations.

Governance

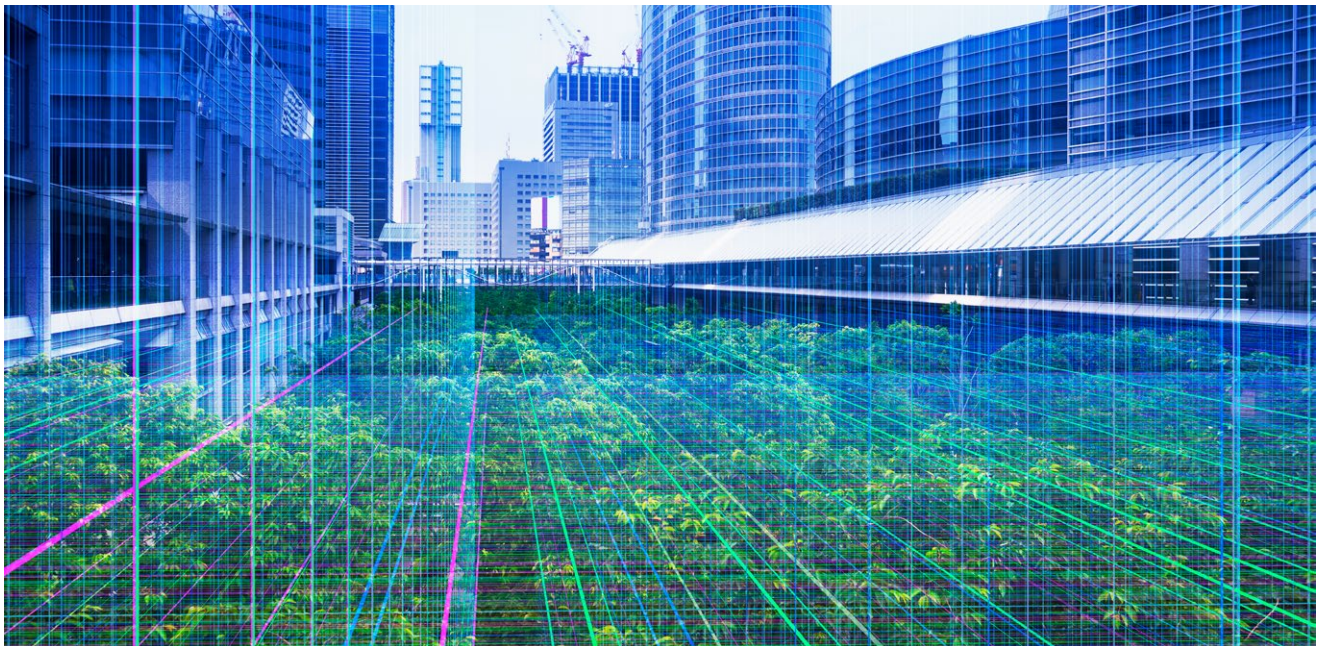
The key principles for Governance include making the case for geospatial information to act as a fundamental dataset which other industries and partners, and public sector users can rely on to provide global consistency in climate responses. This also requires significant leadership and capacity to coordinate across a country's institutional situation. It is vital that NGIAs are seen as institutions that can provide the trusted and authoritative view of the way our world is changing and that this perspective is built into the fabric of a country's climate response. Moreover, there are the opportunities in finding effective and collaborative models for working with the private sector by establishing mutually beneficial relationships that enable both public and private investment on climate resilience.

Technology

Technology (inclusive of the Data Strategic Pathway) has moved the discussion towards focusing on the tools to help describe our world as it is today. Producing data is not enough, the focus should be on how to put information into context in order to share knowledge. With ever better sensors, there is also an untapped potential inherent in Earth observations – not just from satellite systems, but from the variety of different sensors that will be needed to measure and monitor our complex climate situation.

People

Governance, Technology (and Data) are all supported by People. Key principles include taking ownership of the problem and providing active leadership – both at an organisational level and also at government level. Focusing on education and capacity building for users of data as well as developing staff to be able to answer those questions. Through connecting effectively with other data professionals, making geospatial information part of the toolkit of data scientists, and better communicating the impact and the value of better use of geospatial data, the Committee will be able to help government better understand the impact of climate change.



The Role of UN-GGIM's frameworks and policies

At the global level, the importance of geospatial information to combat the climate challenge has been a consistent theme of UN-GGIM since its inception. Most recently this can be seen through its discussions and decisions during the Twelfth Session (12/108, 12/109, 12/110, and 12/111) the Committee of Experts it has underscored the importance of leveraging its functional groups towards positioning the global geospatial community to climate change.

Application of geospatial information related to land administration and management (Decision 12/109)

Effective land administration ensures preparedness and resilience, participatory and inclusive land use planning, monitoring of land-cover change[xiv] , sustainable resource management, building back better, and the protection of our planet's natural resources and environment for future generations. The importance of land administration and management as a tool for sustainable development and protecting our planet's natural resources and climate is key strand of many international frameworks from the SDGs to the New Urban Agenda. Effective land administration that caters for all people is a cornerstone to promote preparedness and resilience to climate change issues, support biodiversity, conservation, and ecosystem sustainability. Through the Framework on Effective Land Administration (FELA), countries have the means to advocate for greater flexibility and innovation in land administration and management. The FELA also notes that addressing the climate crisis requires more integrated information on land tenure, land value, land development, land use and land change to effectively administer and manage land.

Geospatial information and management for disasters (Decision 12/110)

At times of crisis accurate and timely data is needed to support decision making. It is often the case this data is not available to those who most need it resulting in significant time and resources being spent by multiple organizations to collect similar data. In developing the Strategic Framework on Geospatial Information and Services for Disasters (and subsequent adoption by the Economic and Social Council in 2018), Member States have a resource to ensure the availability and accessibility of quality geospatial information and services across all phases of disaster risk management, with a focus on the availability of data at times of acute need during sudden onset disasters.

Integration of geospatial, statistical and other related information (Decision 12/108)

Statistical data is at the heart of measuring and monitoring progress of global development agendas such as Agenda 2030 for Sustainable Development, the Sendai Framework for Disaster Risk Reduction and the Paris Agreement on Climate Change. These global agendas have complex data requirements, needing traditional and new data inputs, and a redefined approached to data integration to empower outputs that can be analysed, shared, then understood by decision makers at national regional and global level. Work on geo-statistical integration is anchored by the Global Statistical Geospatial Framework (GSGF) and guided by the Expert Group on the Integration of Statistical and Geospatial Information.

As of April 2023, the Expert Group has focused its efforts on the implementation and operationalization of the GSGF in support of climate resilience and other efforts requiring geo-statistical integration.

Marine geospatial information (Decision 12/111)

The development of the Operational Framework for Integrated Marine Geospatial Information Management (UN-IGIF-Hydro) Part One provided the high-level overview of the of the Operational Framework. Part Two provides specific details for the nine Strategic Pathways and how the Integrated Geospatial Information Framework (IGIF) relates to the hydro domain. By developing and strengthening understanding of the watered surface of the Earth and investing in hydro-specific actions Member States (and others) will be able to access and use data for multiple challenges such as addressing climate challenges.

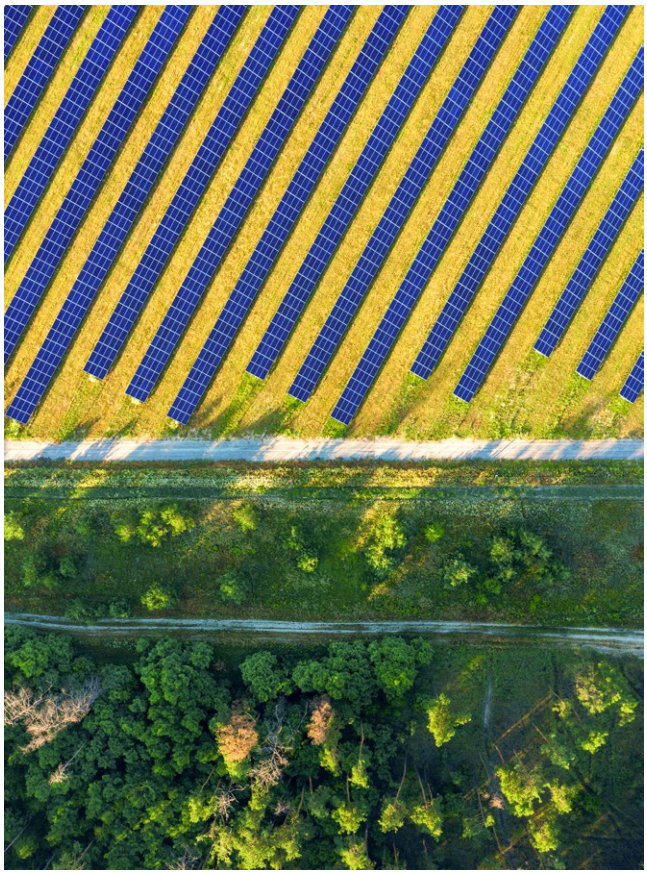
Global coordination

UN-GGIM has already identified the need to advocate and raise awareness of the potential of geospatial information for climate resilience – in effect, through the creation of the agenda item that this background report is under. UN-GGIM has long advocated for geospatial information to tackle global issues, inclusive of climate change, stressing that it also underpins the entirely of the national data ecosystem. Our interconnected world means that the national data ecosystem does not stand in isolation. Countries rely on international transfers of geospatial information: Earth Observations are captured from space and then used around the world; and global weather forecasting relies on shared data that helps countries (and others) track and model global weather systems.

While there are several separate forums discussing climate resilience activities at the international level, there is presently no focused discussion taking place on the specific issue of geospatial information and climate resilience, except the action that UN-GGIM is taking now. There are many actors, of which UN-GGIM has a significant role – necessitating coordination and coherence with other complementary communities and helping to help identify and address common issues.

Within the United Nations System

Whist much of the current climate resilience focus is on the Paris Agreement for Climate Change, there are other frameworks and agreements under the purview of the United



Nations system which rely on geospatial information for measuring, monitoring, and adapting to and reversing the effects of a changing climate. This includes the Secretariat of the United Nations Framework Convention on Climate Change (UNFCCC) who are the parent organization for the 2015 Paris Agreement, The United Nations Convention to Combat Desertification (UNCCD) which was established in 1994 to protect and restore our land and ensure a safer, just, and more sustainable future, and is the only legal binding framework set up to address desertification and the effects of drought, and the UN Global Biodiversity Framework under the UN Convention on Biological Diversity (UNCBD). In effect, each of these parts of the UN System have different requirements but all need accurate, trusted, foundational geospatial data for effective delivery and monitoring.

Across other domains and communities

Several other domains, often complementary, to the geospatial community already underline the importance of geospatial information for climate resilience, these include:

Disasters

United Nations Office for Disaster Risk Reduction (UNDRR) GAR Special Report on Mapping Resilience for the Sustainable Development Goals 2023[xv] grounds the importance of geospatial information, and data generally, as a key driver for urgent action;

Standards

The Open Geospatial Consortium (OGC) have established a Climate Resilience Domain Working Group[xvii] to act as a focal point for OGCs activities on developing open geospatial standards to achieve climate resilience on a global scale;

Earth Observations

The Group on Earth Observations (GEO) Global Heat Resilience service aims at building an open-access, integrated service to allow all cities globally to better understand health-related risks from heat, improve coordination and communication in advance of and during extreme heat events, better manage health-related risks from heat and become more resilient;

Statistics

The Statistical Commission's work on developing the System of Environmental-Economic Accounts[xviii] (SEEA) as a statistical framework that highlights the interrelationships between the economy and the environment. Geospatial information also has an indispensable role for providing data that can be used to produce, measure, and monitor progress against statistical indicator frameworks; and,

Hydrography

The International Hydrographic Organisation is the steward for worldwide collection of bathymetric data through its Data Centre for Digital Bathymetry[xvi]. This data on ocean depth data is used to generate a precise image of the seabed, including features such as canyons, seamounts and volcanoes. These physical elements have an impact on a variety of ocean processes like currents and ocean circulation as well as habitats for marine species. Ultimately, better data on the seabed topography helps improve our ability to model climate change;

Surveying

The International Federation of Surveyors (FIG) has established a Climate Resilience Task Force to elevate the work that FIG is already doing, and to strengthen the surveying profession's ability to act and mitigate climate change impacts.

Some of these domains already have strong engagement within UN-GGIM, primarily through the Committee's Thematic architecture, but also representation through its functional groups.

Recommendations for UN-GGIM's Consideration

There is overwhelming demand within the climate change community for better geospatially integrated data. Some NGIAs are already leading national efforts to operationalise and implement geospatial information in this regard, but we can, and must, do more to ensure that all countries benefit from geospatially enabling national and global climate change and resilience activities. Across UN-GGIM's recent decisions the Committee has underscored the importance of leveraging its functional groups towards positioning the global geospatial community to climate change.

At the national level, NGIAs must take a leading role in encouraging other national institutions, civil society, the private sector and other stakeholders to focus on localized, tangible effects of climate change. In this regard, NGIAs can help to prevent climate-related issues from overburdening Member States and provide clear, actionable data, knowledge and guidance for action. This approach can also serve to prioritize the integration of women and marginalized groups, who face particular climate risks, and, where applicable, indigenous people, whose expertise can help identify country-specific issues and priorities to be identified and actioned. Globally, through this discussion paper and subsequent discourse, UN-GGIM is demonstrating how it is taking a global leadership role and taking proactive steps to ensure the effective use of geospatial information to build and strengthen climate resilience.

It is crucial to dismantle the barriers and divisions that hinder progress; the keyword is 'integration'. There is a vital importance of data acknowledged by all, and through the discussion paper, the geospatial community is initiating efforts to collaborate with the broader climate resilience community. It is essential to foster collaborative endeavours that unite communities to avoid fragmentation and break down silos. The maturity of the UN-GGIM's frameworks, anchored by the UN-IGIF, demonstrates the very means, the 'what', countries can use to realize this ambition. The SDGs Geospatial Roadmap[2] communicates

2 The SDGs Geospatial Roadmap communicates simple and actionable guidance to the Inter-Agency and Expert Group on the SDG Indicators (IAEG-SDGs), Member States and Custodian Agencies to enable them to take advantage of geospatial information for the SDGs.

the 'why'. National Geospatial Information Agencies are the 'how' that brings everything together. How can the collective knowledge and experience of UN-GGIM be leveraged? How best to establish a common approach to meet the information challenge? How can we establish and strengthen interlinkages between relevant communities and organizations seeking similar outcomes? In this regard, there are a series of options and recommendations that the Committee could explore.

In considering the options and recommendations the Committee of Experts is encouraged to consider how to align activities within existing commitments and to ensure that any new activities are appropriately resourced.

OPTION 1

Establish a dedicated task team (or some such similar group) of experts, under the purview of the Committee of Experts, with representation from other potentially relevant ECOSOC subsidiary bodies and members of the United Nations system responsible for climate change and resilience to help provide leadership in this area. Such a task team could seek to establish and strengthen interlinkages between geospatial, statistical, climate and other relevant communities/ organizations seeking similar outcomes. Such organizations could include intergovernmental bodies such as UNCBD, UNDRR, UNFCCC, the Group on Earth Observations and other international standards-based groups;

OPTION 2

Develop a discussion paper "The UN-IGIF for Climate Change and Resilience" that, expands on the relevant initiatives under the purview of the Committee of Experts in detail (inclusive of the UN-IGIF, Global Statistical Geospatial Framework, Framework for Effective Land Administration, Strategic Framework on Geospatial Information and Services for Disasters, among other key resources). Such a discussion paper could be accompanied with national experiences; or,

OPTION 3

Convene an international forum that brings together members of the geospatial and climate resilience communities that focuses on the role of geospatial information for climate resilience would help to establish an effective outreach programme.

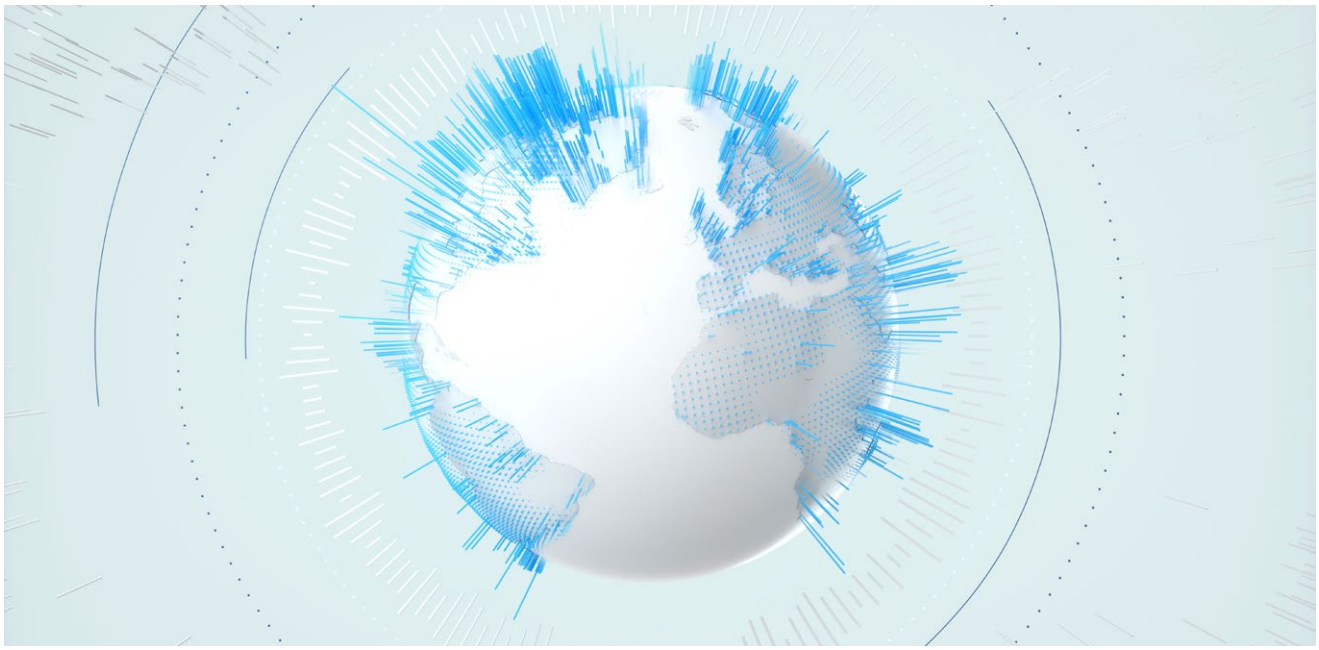
Summary

The communities most at risk, including those in Small Island Developing States, the least developed countries, and conflict-affected regions, bear the greatest burden of a changing climate. The combination of extreme temperatures, unpredictable rainfall, and rising sea levels not only diminishes crop yields, but also destroys vital infrastructure and displaces entire communities. These factors further amplify the instability in regions already affected by other cascading crises.

While climate policies and the transition to green energy offer opportunities for effective peacebuilding and the inclusion of marginalized groups such as women, Indigenous communities, the economically disadvantaged, and youth, they can also have destabilizing effects if not properly managed; we need the right - geospatially integrated, data. Failing to confront the challenges posed by climate change and the resulting inequalities head-on, through ambitious efforts to mitigate and adapt, as well as through the implementation of strategies to address loss and damage, supported by sufficient climate finance, will have catastrophic consequences for the planet, as well as for development, human rights, and our shared goals of sustainable development.

Across the various communities that have a role in helping combat climate change, each has its own views on how this can be best achieved, and each brings different and relevant expertise to the table. It is important that a collaborative effort be made to avoid having two or more approaches duplicate and nullify mutual efforts. Here geospatial information can provide the authoritative and trusted foundation for decision-making; in 'going to warp speed', UN-GGIM must work to bring other communities together.

As a global community, the Committee is in the midst of several significant transformations. In June 2022, ECOSOC enhanced UN-GGIM's mandates through its resolution 2022/24[xix] on "Enhancing global geospatial information management arrangements" and updating the Committee's Terms of Reference. In its work, UN-GGIM is already taking proactive steps to help define and shape the global geospatial community to embrace innovations and the future; we must continue to be practical.



In a world where increasing risk is reducing our resilience, more theoretical discussions will not add value to the work of UN-GGIM. The Triple Planetary Crisis requires quick and decisive action. UN-GGIM is perfectly placed to take a leadership role and provide the focus, anchored by the UN-IGIF, on a "geospatial approach" to build climate resilience.

By advocating for the adoption of the geospatial approach, it is possible to help bridge the existing geospatial digital divide within countries and provide mutually beneficial outcomes to other areas, including other SDGs. This approach entails NGIAs redefining their role within the national data ecosystem and providing leadership in the realms of governance, technology, and people. With NGIAs assuming a prominent role in addressing climate change, they can enhance climate resilience and prevent further marginalization of vulnerable communities, thus safeguarding those who are soon to face risks. NGIAs have a vital role in the fabric of the national response to climate change, as the integrators across the public and private sectors and as the providers of accurate, trusted, authoritative geospatial information that provides the foundation of understanding and adapting to how our world is changing and modelling our future scenarios.

In closing, UN-GGIM has made significant achievements in the area of geospatial information and climate resilience already. Now, UN-GGIM, in-line with its revised mandates, can support Member States to take a leading role within the global climate change and resilience discussions. By leveraging the opportunity and mandates provided to it, UN-GGIM can now bring its convening power to enhance and communicate the vital role of geospatial information for climate resilience.

Endnotes

i Triple Planetary Crisis https://unfccc.int/blog/what-is-the-triple-planetary-crisis

ii Climate Action Pathway: Climate Resilience - https://unfccc.int/sites/default/files/resource/ExecSumm_Resilience_0.pdf

iii FCCC/PA/CMA/2021/10/Add.1, Glasgow Climate Pact - http://undocs.org/FCCC/PA/CMA/2021/10/ADD.1

iv FCCC/PA/CMA/2022/L.21, Sharm el-Sheikh Implementation Plan - http://undocs.org/FCCC/PA/CMA/2022/L.21

v IGIF Part 1 (2nd Edition) https://ggim.un.org/IGIF/documents/Part_1_UN-IGIF_Overarching_Strategy_Second_Edition_27Feb2023.pdf

vi UNFCCC Net-Zero coalition - https://www.un.org/en/climatechange/net-zero-coalition

vii Applying Geospatial Information to Climate Challenges - https://www.ordnancesurvey.co.uk/documents/cambridge-conference/statement-paper-climate-challenges.pdf

viii Cambridge Conference 2022 https://www.ordnancesurvey.co.uk/cambridge-conference/2022-event and the 'how' guide https://www.ordnancesurvey.co.uk/documents/cambridge-conference/how-guide-cambridge-conference-22.pdf

ix Other resources include New Zealand's "Key Datasets for Resilience and Climate Change" - https://storymaps.arcgis.com/stories/b4dd46f15cea4234a098b4c8caae5b3d

x "Global issues, such as climate change, food and energy crises, peace operations and humanitarian assistance, all require strong support for geographic information management on a global scale". Comments on Global Geospatial Information Management. G Scott, 2010, Second Preparatory Meeting of the Proposed United Nations Committee of Experts on Global Geographic Information Management, New York, 10-11 May 2010 https://ggim.un.org/meetings/2010-NY/documents/papers/GGIM%20Notes%20GScott.pdf

xi 2016 Programme review E/2016/47 https://ggim.un.org/documents/E_2016_47_E.pdf; 2022 Programme Review E/2022/68 https://ggim.un.org/documents/E_2022_68_e.pdf

xii Future Trends in Geospatial Information Management: the five to ten year vision - https://ggim.un.org/UN-GGIM-publications/

xiii how-guide-cambridge-conference-22 (ordnancesurvey.co.uk)

xiv As required by the United Nations Framework Convention on Climate Change https://treaties.un.org/doc/Treaties/1994/03/19940321%2004-56%20AM/Ch_XXVII_07p.pdf

xv UNDRR GAR Special Report 2023 Mapping Resilience for the Sustainable Development Goals https://www.undrr.org/gar/gar2023-special-report

xvi IHO Data Centre for Digital Bathymetry (DCDB) https://www.ngdc.noaa.gov/iho/

xvii OGC Climate Resilience Domain Working Group https://www.ogc.org/blog-article/fair-climate-services/

xviii System of Environmental-Economic Accounts https://seea.un.org/

xix Specifically, "To compile and disseminate best practices and experiences of national, regional and international bodies on geospatial information related, inter alia, to integrated geospatial information management, legal instruments, management models and technical standards, thus contributing to the establishment of national geospatial and statistical frameworks and data infrastructures, while allowing for flexibility in the development of geospatial activities according to national priorities" E/RES/2022/24 – Enhancing global geospatial information management arrangements - https://ggim.un.org/documents/E_RES_2022_24_e.pdf

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A Side Event and plenary discussion will be held on this topic during the Thirteenth Session. Please provide additional feedback on this discussion paper to ggim@un.org, cc to mark.iliffe@un.org, by 30 September 2023.