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Background paper on "Geospatial Support through partnership and collaboration for Hurricane Beryl 2024: Jamaica Case Study" (version 2)



Prepared by:

UN-GGIM Working Group on Geospatial Information for Disaster Risk Management

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> UN-GGIM Working Group Disasters Background

The United Nations Committee of Experts on Global Geospatial Information Management (UN-GGIM) at its fifth session in August 2015 strongly welcomed the study entitled "Improving Geospatial Information Policy, Processes and Services to Support Emergency Responses" and acknowledged that the Committee was well placed to raise the awareness of Member States on the need for geospatial data in support of disasters, to support the development and promotion of common standards, protocols and processes for improving data quality and interoperability, and to promote the development and implementation of related policies. In addition, the Committee under decision 5/110 supported the proposal to establish a Working Group to further develop and implement a strategic framework that would be:

- i) Focused in a practical manner;
- ii) Aligned with the outcome and follow-up to the Sendai Framework for Disaster Risk Reduction 2015- 2030 and its implementation;
- iii) Able to take into consideration the special needs of developing countries, especially with respect to capacity building and knowledge sharing and;
- iv) Broadly representative of different regions of the world and taking into account regional experiences

The vision of the UN-GGIM Working Group on Geospatial Information and Services for Disasters (UN-GGIM WG Disasters) is for "Accurate, timely and reliable geospatial information and services are available, in a coordinated way, to decision-makers and operational leads prior to, during and post disasters".

Given Decision 14/108, the Working Group was renamed the UN-GGIM Working Group on Geospatial Information for Disaster Risk Management (UN-GGIM WG GI4DRM) with a renewed focus on access and utilization of integrated geospatial information that supports all aspects of disaster risk management.

In order to advance the implementation of the Strategic Framework on Geospatial Information and Services for Disasters, the Working Group encourages the creation and strengthening of connections between national mapping/geospatial information agencies and national disaster agencies. Each country has its own approach or mechanism for strengthening these connections and the application scenarios for utilizing geospatial information for disaster risk management. As such given the Working Group's workplans for the periods 2024-2025 and 2025-2026, special focus has been placed on creating a forum and promoting mechanisms to facilitate the connecting of National Mapping (NMA), National Geospatial Agencies (NGA) and National Disaster Agencies (NDAs) for Strategic

Framework implementation, and the advancement of national disaster and emergency support mechanisms.

> Introduction

The Caribbean subregion and wider Americas region are significantly impacted by tropical systems during the annual North Atlantic Hurricane Season. Hurricane Beryl devastated the Americas in July 2024 as a Category 5 Hurricane. Countries such as Carriacou and Petit Martinique (Grenada), Union Island and Canouan (St. Vincent and the Grenadines), Jamaica, in addition to sections of the Yucatan Peninsula and the Gulf Coast of the United States of America experienced extensive damage. Given the level of devastation, the impacted countries significantly relied on existing partnerships and collaborations, to assist with assessment, monitoring and response initiatives. The impact of Hurricane Beryl also led to the forging of new partnerships and collaborations that enabled the harnessing of geospatial human resources, technologies and information to support the monitoring, response, restoration and provision of relief supplies.

Given the level of devastation, the Caribbean Small Island Developing State (SIDS) of Jamaica significantly relied on previously forged partnerships and collaborations, while engaging and benefitting from new strategic and critical partnerships and collaborations. This galvanized the pooling and harnessing of needed geospatial human resource expertise, in addition to existing geospatial technologies and information from government and nongovernment organizations, thus facilitating a more strategic, coordinated and efficient monitoring, response and restoration mechanism.

This background document entitled "Geospatial Support through partnership and collaboration for Hurricane Beryl 2024 - Jamaica Case Study," highlights the efforts of Jamaica and the benefits reaped for national disaster and emergency response through the forging of partnership and collaborations for providing geospatial support. An over 20 years strategic partnership and collaboration was forged between the Land Information Council of Jamaica (LICJ) through Jamaica's National Spatial Data Management Branch (NSDMB) (as the National Geospatial Agency) under the Ministry of Economic Growth and Job Creation (MEGJC), in collaboration with Jamaica's Office of Disaster Preparedness and Emergency Management (ODPEM) (as the National Disaster Agency) under the Ministry of Local Government and Community Development. This strategic partnership and collaboration has been key in providing national geospatial support in response to various disasters such as

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tropical storms, hurricanes, droughts, bushfires, floods, landslides, chikungunya virus outbreak and the coronavirus pandemic.

Hurricane Beryl's impact on Jamaica provides a unique case study to examine how partnership and collaboration between a National Geospatial Agency (NGA) and National Disaster Agency (NDA) has provided invaluable and integral geospatial support for various disasters over the past 21 years.

NERGIST Background

Jamaica's National Emergency Response Geographical Information Systems Team (NERGIST) is a group of GIS professional volunteers who undertake damage assessment and analysis prior to and post meteorological, geological and other disaster events. Overtime the team has evolved into



NATIONAL EMERGENCY RESPONSE GIS TEAM

providing additional geospatial support to the Office of Disaster Preparedness and Emergency Management (ODPEM) and the National Emergency Operations Centre (NEOC), in response to any major disaster event impacting Jamaica. These geospatial professionals volunteer from a variety of government entities, academia and private sector entities that form the Land Information Council of Jamaica. The administrative, human capacity development and deployment activities of the team are coordinated by its secretariat, the National Spatial Data Management Branch.

The team has been actively supporting the ODPEM's national disaster and emergency response efforts from 2004 after the devastating impact of Hurricane Ivan (Category 4) on Jamaica. The official establishment of NERGIST was formally approved by the Cabinet of Jamaica on 28th June 2010.

The Cabinet of Jamaica further approved that the guidelines governing the operations of the emergency response team pre, during and post emergency and disaster events be sensored so that geospatial data collected by Ministries, Agencies and Departments (MDA's) during post disaster events be geo-referenced and shared with the government members of NERGIST.

Genesis of NERGIST

Hurricane Ivan was the ninth tropical cyclone of the 2004 North Atlantic Hurricane Season, passed offshore along the south coast of Jamaica (between 10 and 11 September), as a strong Category four system, resulting in significant storm surges, coastal flooding, torrential rainfall, and extensive wind damage. The impact resulted in 17 deaths, over 18, 000 left homeless, and a total direct and indirect damage of J\$35.9 billion (US\$ 595,000). Of that total, direct damage was calculated at J\$22.23 billion and indirect at J\$13.7 billion. Given the level of devastation experienced, the LICJ established a partnership with the ODPEM to provide geospatial mapping support to the National Emergency Operations Centre (NEOC), through a team of GIS volunteers from across the Government of Jamaica. The NSDMB as Secretariat for the LICJ has been coordinating the deployment of Jamaica's National Emergency Response GIS Team (NERGIST) over the past 20 years, in collaboration with the ODPEM. The team of volunteers is comprised of GIS professionals primarily from the public sector, with support from the private sector and academia.

Impact of Hurricane Beryl on Jamaica

Jamaica was recently impacted by Hurricane Beryl just, which passed offshore along the south coast on July 3, 2024) as a category four North Atlantic Hurricane system. Hurricane Beryl followed a similar path to Hurricane Ivan, and became the earliest category four/five system on record, developed during the first month of the North Atlantic Hurricane Season. It made history by developing from a tropical storm into a major hurricane in just over 12 hours2. Hurricane Beryl caused torrential rainfall, extensive wind damage, coastal flooding, inland flooding, landslides, and rockfall throughout the island, with significant concentrations occurring along the southern and western parishes. At least two deaths have been confirmed, in addition to thousands of downed trees, utility poles, and lines, extensive damage to roads and bridges, loss of electricity, potable water supply, and telecommunications. Thousands were left homeless and remain in emergency shelters, with damages, initially, estimated at J\$30 billion to increase significantly after the completion of detailed post disaster assessments.

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NERGIST Support to Jamaica's NEOC

Jamaica was declared a National Disaster Area on 2 July 2024, and the National Emergency Operations Centre (NEOC) was subsequently activated at level three at the ODPEM. Thereafter, NERGIST was activated to provide geospatial support to the NEOC on July 3, 2024, given the impending passage of Hurricane Beryl. Upon activation, NERGIST provided in-house mapping of the status of emergency shelters, in addition to incidents mapping across the island, given wind, rain and coastal flooding related damages that were experienced. After the passage of Hurricane Beryl on July 3, 2024, at least sixteen (16) NERGIST team members from eight (8) government organizations were dispatched to affected parishes to conduct initial damage assessments (IDA) across the eight (8) most affected parishes.

These assessments were conducted using computer tablets and smartphones fitted with an ArcGIS Survey 123 mobile GIS survey tool and also Global Navigation Satellite System (GNSS) hand-held units. The dispatched teams conducted IDAs with the support of twenty-six (26) additional representatives from the St. Patrick's Rangers (a non-government organization comprised of disaster youth volunteers) and unmanned aerial vehicle teams from the Jamaica Fire Brigade (JFB) and Jamaica Defence Force (JDF).

Incidents maps were thus prepared for each affected parish and included in the daily situation reports produced by the NEOC to guide monitoring, response, restoration and relief efforts.

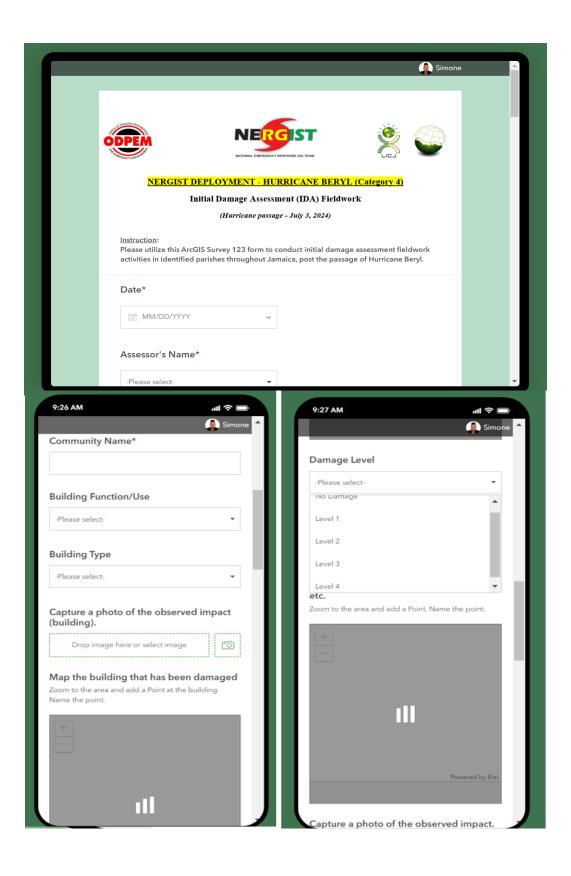
NERGIST Deployment for Hurricane Beryl (July 3-12, 2024)	
NERGIST Member Organizations	Quantity Deployed
Ministry of Economic Growth & Job Creation (MEGJC) - National Spatial Data Management Branch (NSDMB)	3
MEGJC - Urban Renewal and Development Branch (URDB)	1
MEGJC - Land Administration & Management Branch (LAMB)	1
National Land Agency (NLA)	3
National Water Commission (NWC)	1
National Works Agency (NWA)	1
National Housing Trust (NHT)	3
Agriculture Land Management Division (ALMD)	3
Subtotal	<u>16</u>
Supporting Deployment Teams	
Office of Disaster Preparedness & Emergency Management (ODPEM)	2
St. Patrick's Rangers	2
Jamaica Fire Brigade UAV Team	4
Jamaica Defense Force Drone Team	16
Subtotal	<u>24</u>



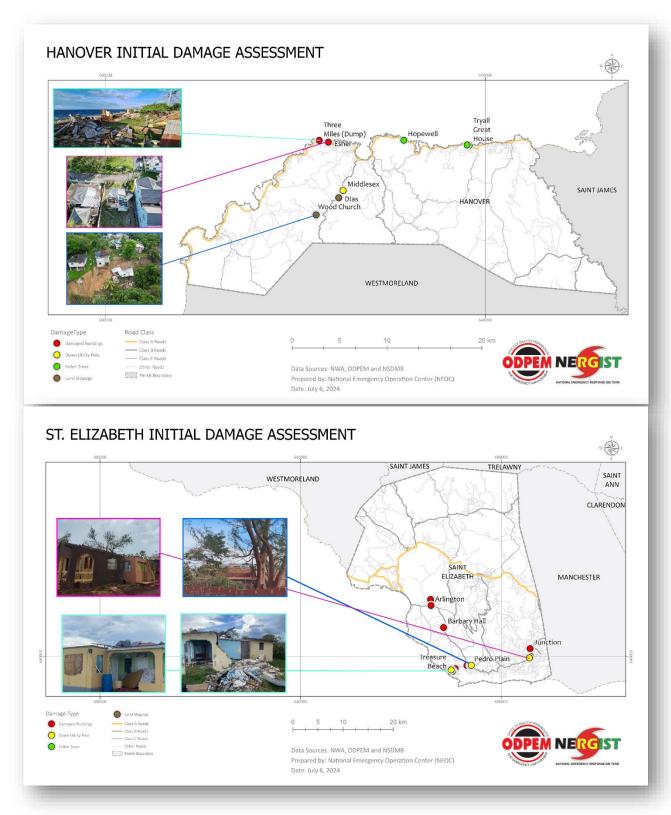
IDA field exercises were conducted in eight (8) parishes – Portland, St. Elizabeth, St. Catherine, Clarendon, Manchester, St. James, Hanover and Westmoreland. These were identified as being the most severely impacted parishes. The "NERGIST Deployment – Hurricane Beryl (Category 4)" Survey 123 tool, was developed using the USAID's IDA Methodology to capture damage extent (*Plates 2 and 3*).

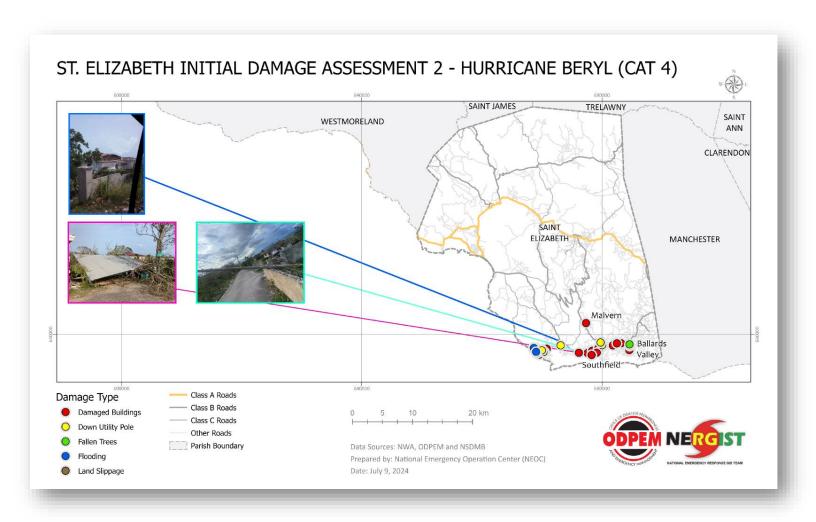






IDA maps were subsequently prepared by the NERGIST team for each parish towards determining the level of damage observed.





Collaborations and partnerships were forged with the Jamaica Fire Brigade (JFB) and Jamaica Defence Force (JDF) Drone/Uncrewed Aerial Vehicle (UAV) teams within the context of Jamaica's National Emergency Operations Centre (NEOC). These collaborations and partnerships pooled human and physical resources to facilitate the capture of earth observation (EO) drone images and videos of areas significantly impacted. Special focus was placed on inaccessible areas due to flooding and landslide damage, in addition to terrain.



NERGIST Support to Relief & Humanitarian Bodies

NERGIST provided survey testing and field deployment support to over 10 visiting Non-Government Organizations (NGOs) and international humanitarian bodies, including seven UN-related organizations. These organizations included but were not limited to Americares, Heart to Heart, World Food Programme, United Nations Office for the Coordination of Humanitarian Affairs (UN OCHA), United Nations International Children's Emergency Fund (UNICEF) Water Sanitation and Hygiene (WASH) Programme, United Nations Disaster Assessment and Coordination (UNDAC), United Nations Department of Safety and Security (UNDSS), United Nations Development Programme (UNDP), World Food Programme (WFP), International Organization for Migration (IOM) etc. These organizations conducted post disaster assessments in affected communities to produce status reports and coordinate efforts for needed relief and restoration support.

> International Charter Activation for Jamaica

The United Nations Institute for Training and Research (UNITAR) on behalf of the United Nations Environment Programme (UNEP)/United Nations Office for the Coordination of Humanitarian Affairs (UNOCHA) Joint Environment Unit, Emergency Response Section activated the International Charter Space and Major Disasters for Jamaica in response to Hurricane Beryl on 2 July 2024. Preliminary satellite-derived damage assessment and satellite detected water extent were conducted for affected parishes, with reports provided by UNITAR/United Nations Satellite Centre (UNOSAT). The satellite products and reports provided helped inform the operations of Jamaica's NEOC and NERGIST team. These resources can be accessed via: https://disasterscharter.org/web/guest/activations/-/article/storm-hurricane-in-jamaica-activation-893-

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Hurricane Beryl in Jamaica

Hurricane Beryl hit Jamaica on the 3 July bring heavy winds and rainfall. After having battered islands in the eastern Caribbean - killing at least seven people. The storm brought life-threatening winds of up to 130 mph (215 km/h) on to Jamaica's southern coast.

Hurricane Beryl became the earliest hurricane on record to develop into a category four storm, meaning its winds and sea surges were catastrophic, as warming oceans fuelled destruction across the south-eastern Caribbean. Floodwater poured down streets, while roofs were ripped off by the wind. Parts of Jamaica experienced disruption to power and electricity supplies. So far, it has been confirmed that one person has died after a tree fell on their home.

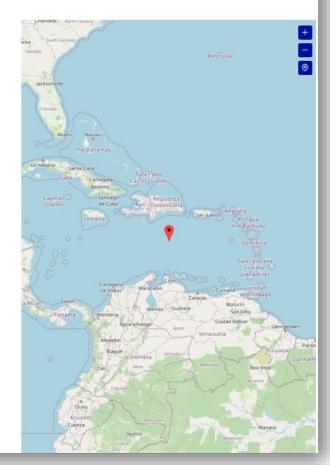
The storm has now weakened to category 2 and has moved on to southern Mexico.

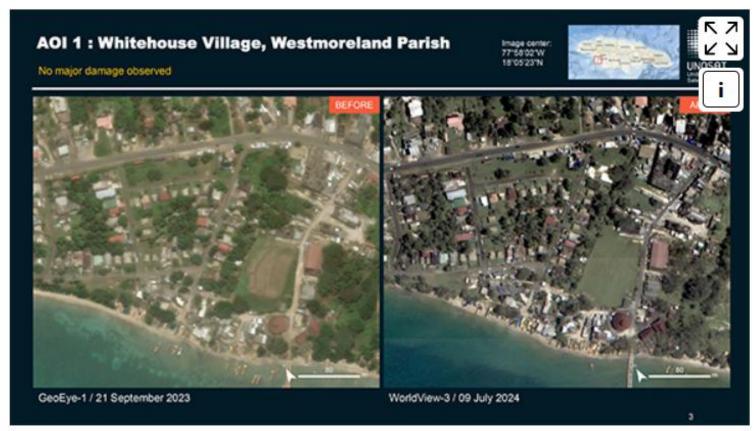
Related Resources:

☑ UNOSAT web map tracking path of Hurricane Beryl towards Jamaica

EUMETSAT case study of Hurricane Beryl

Type of event	Storm
Location of event	Jamaica
Date of Charter Activation	2024-07-02
Time of Charter Activation	08:05
Time zone of Charter Activation	UTC+02:00
Charter Requestor	UNITAR on behalf of UNEP/OCHA Joint Environment Unit - Emergency Response Section
Activation ID	893
Project Management	Teodoro Hunger (UNITAR/UNOSAT)
Value Adding	NOAA VA (NOAA)





Preliminary satellite-derived damage assessment - Westmoreland, Saint Elizabeth & Manchester Parishes, Jamaica

Download full report

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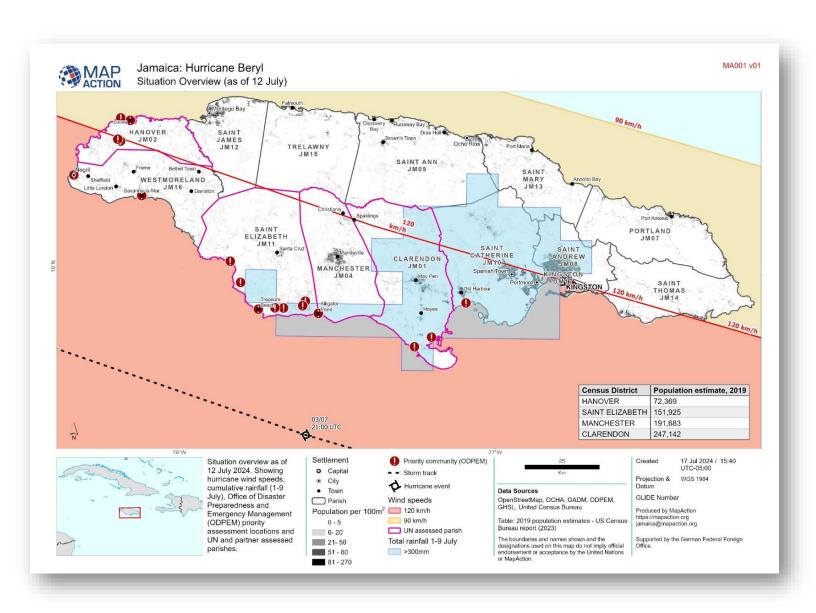
Satellite detected water extent in Kingston, Saint Catherine and Saint Andrew Parishes, Jamaica

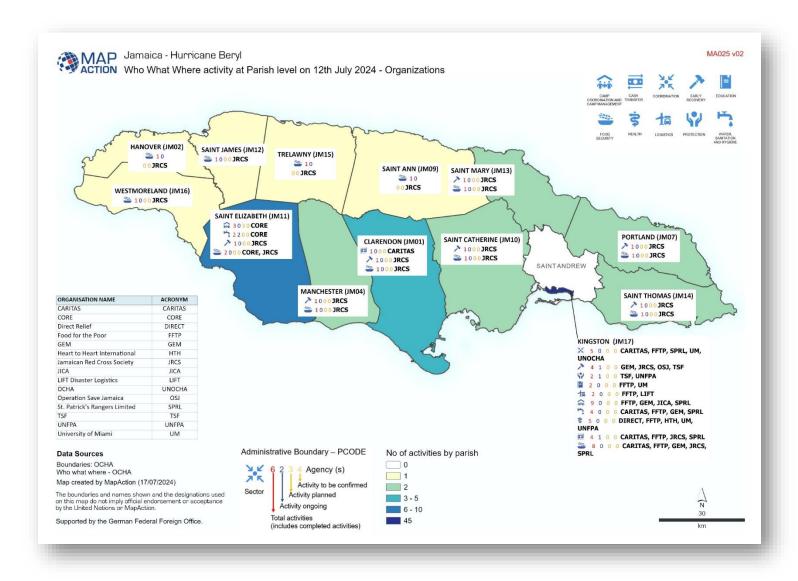
Copyright: © DLR e.V. (2024), Distribution Airbus DS Geo GmbH Map produced by UNITAR / UNOSAT

Map Action Support

MapAction is a non-profit organization providing geospatial expertise to improve outcomes in humanitarian emergencies. MapAction team members visited Jamaica and provided geospatial mapping support to the United Nations Disaster Assessment and Coordination (UNDAC) and Jamaica's NEOC. They facilitated additional mapping support using the geospatial data collected by NERGIST in the field or mapped in-house at the NEOC. Maps displaying wind direction and areas impacted by Hurricane Beryl, amongst others were produced. MapAction also facilitated collaboration discussions with the NERGIST team and supported the NERGIST Post Hurricane Beryl Debriefing Session by sharing their own

experience with providing geospatial support for other similar disasters. Geospatial mapping and analysis related knowledge sharing of lessons learnt was facilitated amongst the NERGIST and MapAction team members. After MapAction left Jamaica, they continued to provide remote support in response to Hurricane Beryl via the dedicated beryl2024@mapaction.org email address established. Knowledge transfer was also facilitated amongst the UNOCHA, UNDAC, and the International Organization for Migration (IOM), with NERGIST for the collaborative field activities for damage assessment and reports. MapAction resources can be accessed via: https://maps.mapaction.org/event/2024-jam-001







Joint Webinar on "Preparation, Response and Recovery: Lessons Learnt from Hurricane Beryl"

The UN-GGIM: Americas' CARIGEO Steering Committee (CARIGEO) in collaboration with the UN-GGIM Working Group on Geospatial Information for Disaster Risk Management collaborated in hosting a joint webinar on May 20, 2025, entitled "Preparation, Response and Recovery: Lessons Learnt from Hurricane Beryl". The webinar focused on reinforcing known principles of Disaster Risk Reduction and Management (DRRM), while sharing lessons learnt by Caribbean Member States, in addition to regional and international agencies that provided support during the preparation, response and recovery phases of

Hurricane Beryl. Emphasis was placed on the utilization of geospatial technologies, geospatial information and earth observation data to support the phases of Hurricane Beryl. This webinar was quite timely in preparing Caribbean Member States for the 2025 North Atlantic Hurricane Season which commenced in June 2025.

The UN-GGIM: Americas' CARIGEO Steering Committee seeks to geo-empower Caribbean Member States by promoting the strengthened implementation and utilization of geospatial technologies and information in advancing the achievement of Sustainable Development Goals, while also addressing concerns that affect Caribbean Member States and bolstering their ability to make better informed decisions in achieving national priorities. The fostering of greater awareness, the building of capacity and the forging of partnerships and collaborations within the region, in addition to harnessing the technical support of stakeholders outside the Caribbean sub-region are key focus areas of CARIGEO.

The UN-GGIM Working Group on Geospatial Information for Disaster Risk Management (UN-GGIM WG GI4DRM) through its developed 'Strategic Framework on Geospatial Information and Services for Disasters,' guides Member States and other stakeholders in making available and accessible accurate, timely and reliable geospatial information and services, in a coordinated way, to decision makers and operational leads prior to, during and post disaster events. The Strategic Framework was developed to aid Member State's implementation of the Sendai Framework on Disaster Risk Reduction (2015-2023). Additionally, the Working Group has strategically focused on the forging of partnerships between National Disaster Agencies and National Geospatial Agencies / National Mapping Agencies towards facilitating available and accessible, accurate, timely and reliable geospatial information and services to aid national disaster management mechanisms. Only through such partnerships will the successful implementation of the Strategic Framework on Geospatial Information and Services for Disasters be achieved within Member States.

Decision 14/108 on Geospatial information for climate and resilience from the 14th Session of UN-GGIM (August 2024), "Encouraged the implementation of the Strategic Framework on Geospatial Information and Services for Disasters, and welcomed additional participation by all relevant actors in the working group to foster better and inclusive dialogue, raising awareness, capacity development and expand the use of geospatial information and services for disaster response and recovery initiatives". Towards this end, the UN-GGIM: Americas' CARIGEO Initiative, the UN-GGIM WG GI4DRM and the UN-GGIM: Americas' Working group on Geospatial Information and Services for Disasters were focused on implementing this Decision through this webinar and other initiatives.



Stakeholders from the Caribbean subregion and wider Americas region, engaged in rich discussions on disaster risk, reduction and management, exchanged knowledge and experiences, shared best practices and innovations (including the use of geospatial technologies, geospatial information and earth observation data in support of preparations for the 2025 North Atlantic Hurricane Season and beyond. A wide cross section of 120 participants from 33 countries from across the five UN-GGIM regions, contributed to and benefitted from the rich exchange of knowledge facilitated by the webinar, to support their preparation efforts for potential tropical cyclones, storms and hurricanes.

The United Nations Economic Commission for Latin America and the Caribbean (UNECLAC) provided technical support for the hosting of the webinar, Additionally, they developed a webinar webpage to facilitate access to the powerpoint presentations and recordings. Please utilize the link below to access accordingly.

https://www.cepal.org/en/events/webinar-preparation-response-and-recovery-lessons-learnt-hurricane-beryl

Conclusion

Hurricane Beryl taught the Caribbean Member States the important lesson of how existing arrangements and partnerships, in addition to the forging of new partnerships are critical for timely geospatial response when an emergency is declared. The case study from Jamaica demonstrates that geospatial support provided through partnerships and collaborations between the National Mapping Agencies (NMA)/National Geospatial Agencies (NGA), National Disaster Agencies (NDAs), and other stakeholders align with the Working Group on Geospatial Information for Disaster Risk Management (UN-GGIM WG GI4DRM) recommendations for the forging of such collaborations within and for the benefit of Member States. Additionally, Member States can harness the benefits of creating a similar team of geospatial volunteers. Within Jamaica's context the team is coordinated by the NGA and NDA, with significant support from the NMA. The unfortunate impact of disasters such as the 2024 Hurricane Beryl, provided a unique opportunity for sharing information, practices, and lessons learned that may be of benefit to Member States. As such, the hosting of the joint webinar was a strategic initiative to facilitate knowledge sharing amongst Member States for implementation within the Caribbean subregion, wider Americas region, in addition to all other regions of the UN-GGIM.