

14th UN-GGIM Session

August 7-9, 2024, New York



Background paper on “Geospatial Support through partnership and collaboration for Hurricane Beryl 2024: Jamaica Case Study”



Prepared by:

**UN-GGIM Working Group on Geospatial Information
and Services on Disasters**

August 2024



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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”**.

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 2024-25 workplan, special focus is placed on creating a forum and promoting mechanisms to facilitate the connecting of NMA/NGA and NDAs for Strategic Framework implementation, and the advancement of national disaster and emergency support mechanisms.

➤ Introduction

The Caribbean region was recently devastated by Hurricane Beryl in July 2024. Countries such as Carriacou and Petit Martinique (Grenada), Union Island and Canouan (St. Vincent and the Grenadines), Jamaica and sections of the United States of America experienced extensive damage.

Given the level of devastation, Jamaica significantly relied on previously forged partnerships and collaborations, while engaging new partnerships and collaborations towards harnessing the power of geospatial human resources, technologies and information to support the monitoring, response, restoration and the provision of relief supplies.

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. The over 20 years strategic partnership and collaboration forged between the Land Information Council of Jamaica (LICJ) through Jamaica’s National Spatial Data Management Branch (NSDMB) under the Ministry of Economic Growth and Job Creation (MEGJC), in collaboration with Jamaica’s Office of Disaster Preparedness and Emergency Management (ODPEM) under the Ministry of Local Government and Community Development, has been key in providing geospatial support in response to various disasters such as tropical storms, hurricanes, droughts, bushfires, floods, landslides, chikungunya virus outbreak and the coronavirus pandemic.

Hurricane Beryl 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 geospatial support for various disasters over the past 20 years.

➤ NERGIST Background

Jamaica’s National Emergency Response Geographical Information Systems (GIS) Team 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 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.



The team has been actively supporting ODPEM's disaster response efforts from 2004 after the devastating impact of Hurricane Ivan on Jamaica. The official establishment of the National Emergency Geographical Information Systems Response Team 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 category five 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 billion¹. Given the level of devastation experienced, LICJ established a partnership with the ODPEM to provide geospatial mapping support to the National Emergency Operations Centre, 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 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.

➤ **NERGIST Support in Jamaica’s NEOC**

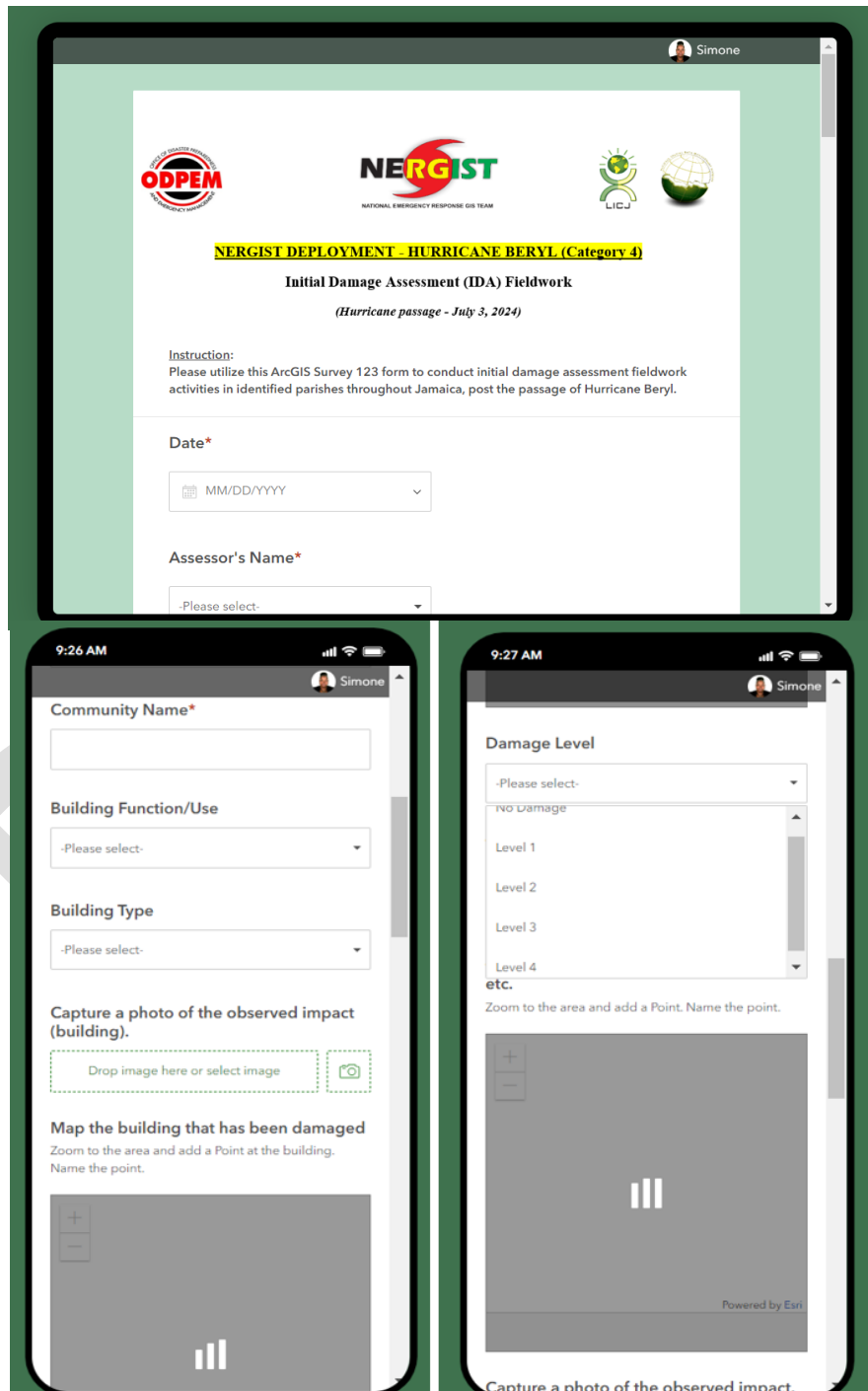
Jamaica was declared a National Disaster Area on 2 July 2024, and the National Emergency Operations Centre (NEOC) was subsequently activated at level three at the ODPEM. Thereafter, NERGIST was activated to provide geospatial support to the NEOC on July 3, 2024, given the impending passage of Hurricane Beryl. Upon activation, NERGIST provided in-house mapping of the status of emergency shelters and 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 affected parishes. These assessments were conducted over a two-year period using computer tablets or smartphones fitted with an ArcGIS Survey 123 mobile GIS survey tool and 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).

| 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 | 16 |
| Supporting Deployment Teams | |
| Office of Disaster Preparedness & Emergency Management (ODPEM) | 2 |
| St. Patrick’s Rangers | 2 |
| Jamaica Fire Brigade UAV Team | 4 |
| Jamaica Defence Force Drone Team | 16 |
| Subtotal | 24 |

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

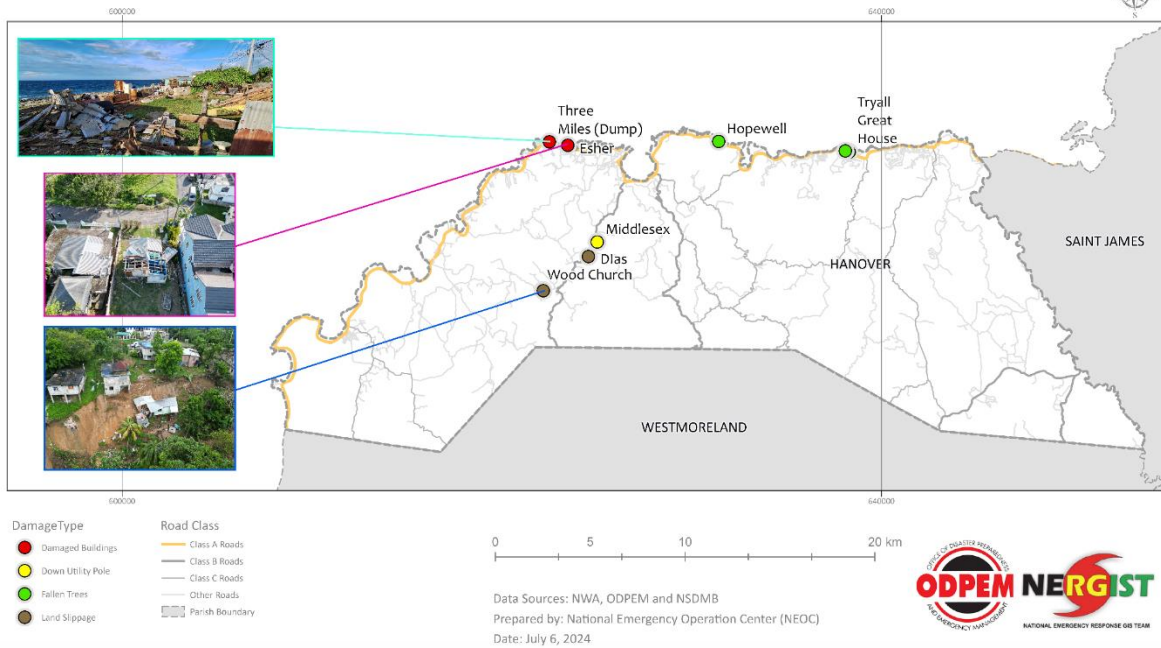


IDA field exercises were conducted in eight (8) parishes – Portland, St. Elizabeth, St. Catherine, Clarendon, Manchester, St. James, Hanover and Westmoreland. These were identified as being the most severely impacted parishes. The “NERGIST Deployment – Hurricane Beryl (Category 4)” Survey 123 tool, was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

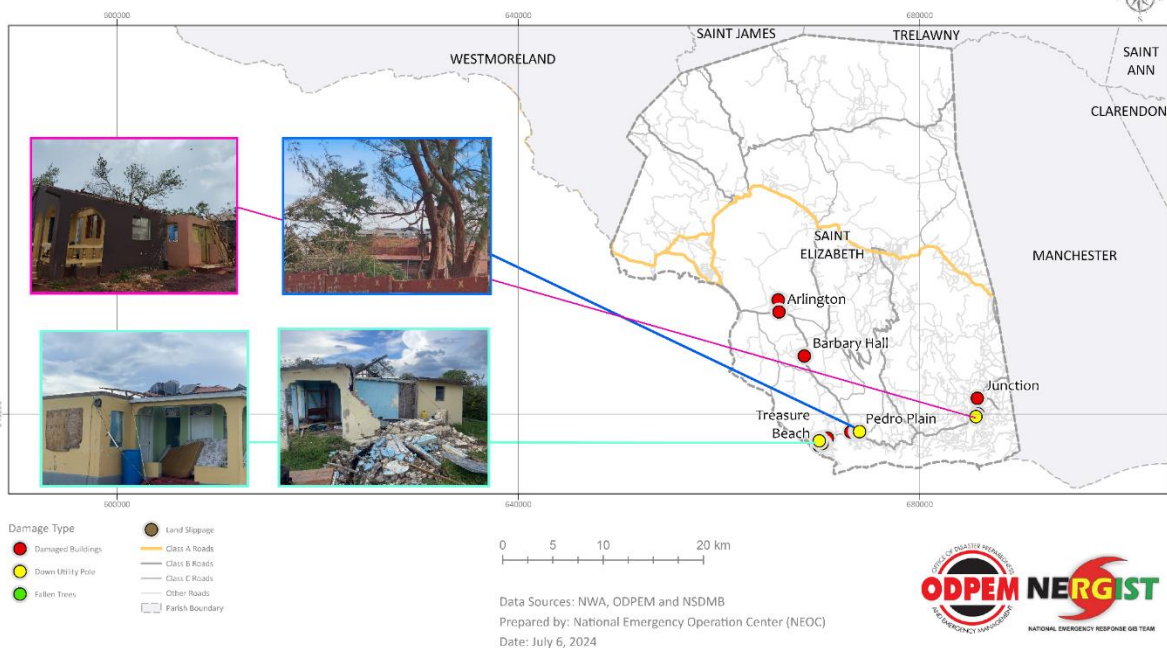


IDA maps were subsequently prepared by the NERGIST team for each parish towards determining the level of damage observed.

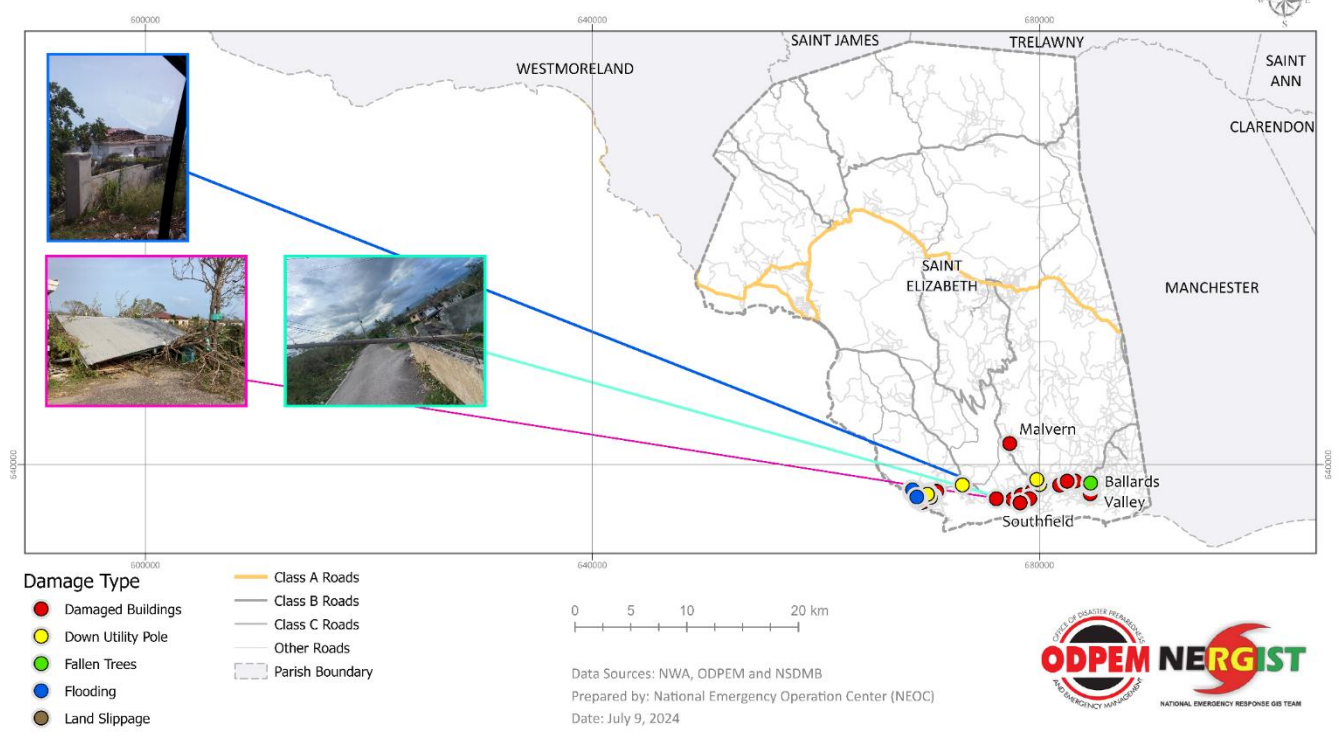
HANOVER INITIAL DAMAGE ASSESSMENT



ST. ELIZABETH INITIAL DAMAGE ASSESSMENT



ST. ELIZABETH INITIAL DAMAGE ASSESSMENT 2 - HURRICANE BERYL (CAT 4)



Collaborations and partnerships forged with the JFB and JDF drone/UAV teams within the context of the National Emergency Operations Centre (NEOC), facilitated the capture of earth observation (EO) drone images of areas significantly impacted, with special focus 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 NGOs and international humanitarian bodies, including seven UN-related organizations. These organizations conducted post disaster assessments in affected communities to produce status reports and coordinate efforts for needed relief and/or 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/>



The screenshot shows the 'Charter activations' page on the Disasters Charter website. The header includes a logo for the International Charter Space & Major Disasters, navigation links (Home, About, Activations, News, Library), a language dropdown set to 'English', and a 'Login' button. The main heading is 'Charter activations'. Below it, a card titled 'Hurricane Beryl in Jamaica' features a 'Browse activations on map' link. The text describes the hurricane's impact on Jamaica on July 3, mentioning heavy winds, rainfall, and fatalities. It notes that Beryl was the earliest hurricane on record to reach category four and that the storm has since weakened to category two and moved to southern Mexico.



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

[Download full report](#)

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Map produced by UNITER / UNOSAT



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

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Map produced by UNITAR / UNOSAT

➤ Map Action Support

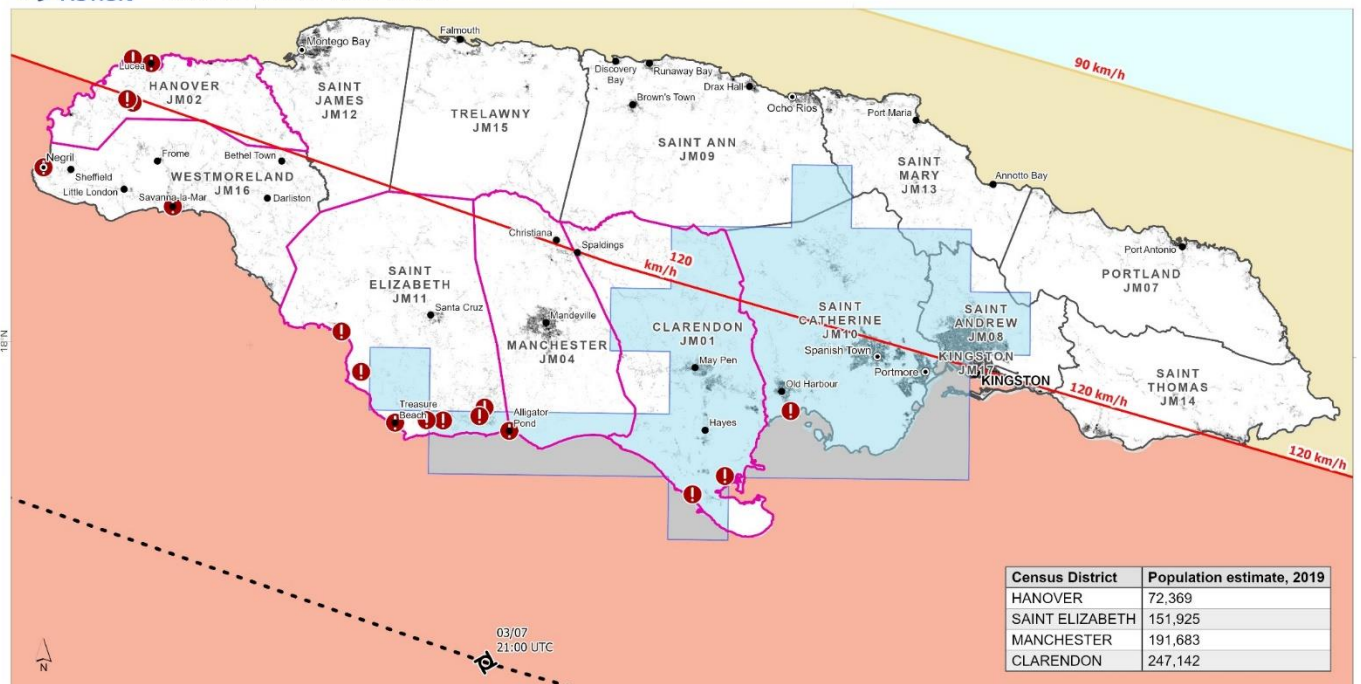
MapAction is a non-profit organization providing geospatial expertise to improve outcomes in humanitarian emergencies. MapAction team members visited Jamaica and provided geospatial mapping support to the United Nations Disaster Assessment and Coordination (UNDAC) and Jamaica's NEOC. They facilitated 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 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 lessons learnt were shared amongst the NERGIS and MapAction team members. Although MapAction has since left Jamaica, they continue 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 NERGIS for the collaborative field activities for damage assessment and reports. MapAction resources can be accessed via: <https://maps.mapaction.org/event/2024-jam-001>



Jamaica: Hurricane Beryl
Situation Overview (as of 12 July)

MA001 v01



| Census District | Population estimate, 2019 |
|-----------------|---------------------------|
| HANOVER | 72,369 |
| SAINT ELIZABETH | 151,925 |
| MANCHESTER | 191,683 |
| CLARENDON | 247,142 |



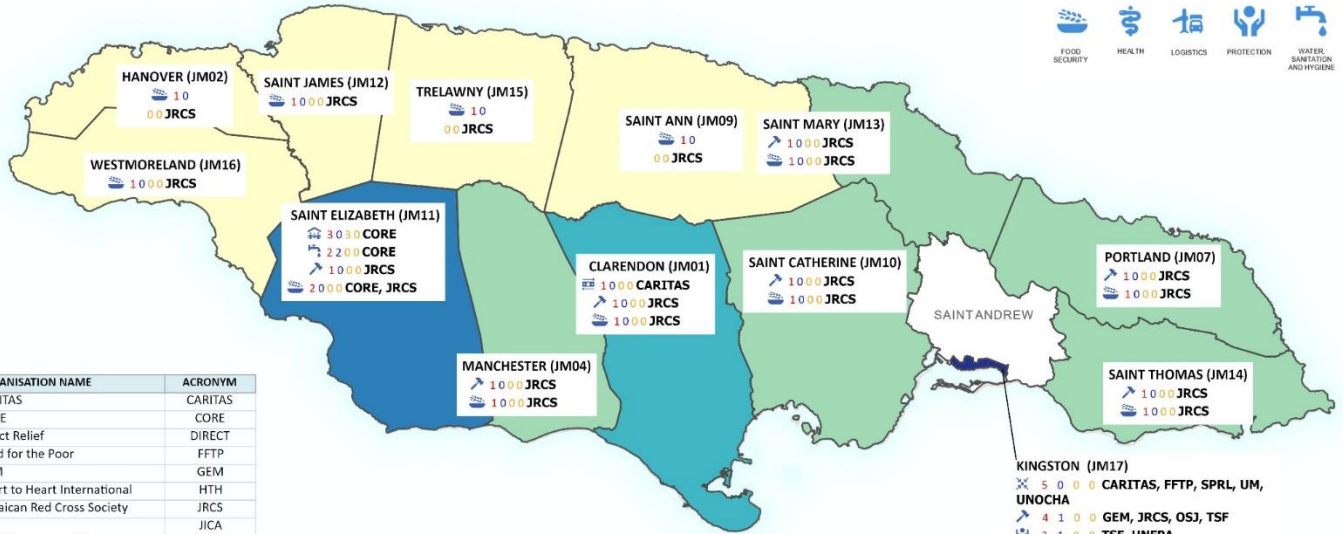
Situation overview as of 12 July 2024. Showing hurricane wind speeds, cumulative rainfall (1-9 July), Office of Disaster Preparedness and Emergency Management (ODPEM) priority assessment locations and UN and partner assessed parishes.

- Capital
- City
- Town
- Parish
- Population per 100m²
 - 0 - 5
 - 6 - 20
 - 21 - 50
 - 51 - 80
 - 81 - 270
- ! Priority community (ODPEM)
- - Storm track
- ☼ Hurricane event
- Wind speeds
 - 120 km/h
 - 90 km/h
- Total rainfall 1-9 July
 - >300mm
- UN assessed parish

Created 17 Jul 2024 / 15:40 UTC-05:00
Projection & Datum WGS 1984
GLIDE Number
Produced by MapAction <https://mapaction.org> jamaica@mapaction.org
Supported by the German Federal Foreign Office.

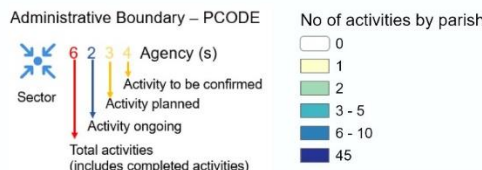
Data Sources
OpenStreetMap, OCHA, GADM, ODPEM, GHSL, United Census Bureau
Table: 2019 population estimates - US Census Bureau report (2023)

The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations or MapAction.

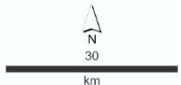


| ORGANISATION NAME | ACRONYM |
|-------------------------------|---------|
| CARITAS | CARITAS |
| CORE | CORE |
| Direct Relief | DIRECT |
| Food for the Poor | FFTP |
| GEM | GEM |
| Heart to Heart International | HTH |
| Jamaican Red Cross Society | JRCS |
| JICA | JICA |
| LIFT Disaster Logistics | LIFT |
| OCHA | UNOCHA |
| Operation Save Jamaica | OSJ |
| St. Patrick's Rangers Limited | SPRL |
| TSF | TSF |
| UNFPA | UNFPA |
| University of Miami | UM |

Data Sources
 Boundaries: OCHA
 Who what where - OCHA
 Map created by MapAction (17/07/2024)
 The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations or MapAction.
 Supported by the German Federal Foreign Office.



KINGSTON (JM17)
 5 0 0 0 CARITAS, FFTP, SPRL, UM, UNOCHA
 4 1 0 0 GEM, JRCS, OSJ, TSF
 2 1 0 0 TSF, UNFPA
 2 0 0 0 FFTP, UM
 2 0 0 0 FFTP, LIFT
 9 0 0 0 FFTP, GEM, JICA, SPRL
 4 0 0 0 CARITAS, FFTP, GEM, SPRL
 5 0 0 0 DIRECT, FFTP, HTH, UM, UNFPA
 4 1 0 0 CARITAS, FFTP, JRCS, SPRL
 8 0 0 0 CARITAS, FFTP, GEM, JRCS, SPRL



➤ Closing

Existing arrangements and partnerships are critical for a 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/National Geospatial Agencies, National Disaster Agencies (NDAs), and other stakeholders align with the Working Group on Geospatial Information and Services for Disaster's (UN-GGIM WG Disasters) recommendations for such collaborations within Member States. The unfortunate impact of disasters such as the recent Hurricane Beryl provided a unique opportunity for sharing information, practices, and lessons learned that may be of benefit to Member States.