Application of Geospatial Tools in Caribbean Disaster Management

Simone M. Lloyd, GISP
Senior GIS Manager & Trainer, National Spatial Data Management Branch
Jamaica Co-chair support & Task Group A & C Lead, UN-GGIM WG Disasters & Jamaica Focal Point, UN-GGIM CARIGEO Steering Committee
Outline

• Highly Vulnerable & Disaster Impacted Caribbean Region
• Disaster Risk Levels in Caribbean
• CCRIF - SPC
• Sendai Framework & Strategic Framework on Disasters
• Caribbean Geoportal:
  • Functionality
  • Disaster-related data available: ESRI, NASA, NOAA & other
  • Utilization
Caribbean is primarily made up of Less Developed Countries (LDCs) and Small Island Developing States (SIDS) that are highly vulnerable to the impacts of disasters.
Disaster Risk Levels in Caribbean

Natural Disaster Risks:
- Hurricanes
- Tropical Storms
- Tropical Depressions
- Troughs
- Earthquakes
- Volcanoes
- Landslides & Floods
- Forest Fires & Wildfires
- Droughts etc.

Other Disasters:
- Epidemic & Pandemics eg. COVID-19
- Chik V, Zik V etc

https://www.childfund.org/Content/NewsDetail/2147489272/
Recent or Current Hazards:
- Tropical Storm Fred
- Tropical Depression Grace
- Trough
- 7.0 Magnitude Earthquake (August 14, 2021)

https://disasteralert.pdc.org/disasteralert/
• Caribbean Catastrophe Risk Insurance Facility (CCRIF) Segregated Portfolio Company (SPC) limits the financial impact of natural hazard events to Caribbean and Central American governments by quickly providing **short-term liquidity** when a policy is triggered.

• CCRIF offers parametric insurance policies for **tropical cyclones, earthquakes, excess rainfall and the fisheries sector.**


[Link: https://www.ccrif.org/?language_content_entity=en]
Uses of Payouts by Category for All Countries to Date

- Capitalization of a recovery fund: 3%
- Immediate post-event activities: 62%
- Long-term infrastructure work: 14%
- Risk mitigation activities to reduce vulnerability to future natural hazard events: 6%
- Economic sectors e.g. agriculture: 6%
- Unallocated contribution to the national budget: 9%
The Sendai Framework for Disaster Risk Reduction articulates a very specific goal: to considerably diminish disaster risk and losses of lives, livelihoods and health and in the economic, physical, social, cultural and environmental assets of persons, businesses, communities and countries.

Provides Member States with concrete actions to protect development gains from the risk of disaster.
The Strategic Framework aims to guide Member States and other stakeholders in making available and accessible all quality geospatial information and services in operations within and across all sectors, before, during and after disaster events.

Use of:

- geospatial information & services
- relevant statistical information

= better understand, formulate policies and manage risks and impacts of disasters

Member States
Five Priorities for Action

- Governance and Policies
- Awareness Raising and Capacity Building
- Data Management
- Common Infrastructure and Services
- Resource Mobilization

Advance the use of Geographic Information to support Disaster Risk Reduction in the Member States.
We are deeply committed to supporting innovation in the Caribbean, helping users discover, explore, and understand the vast information available to them through the power of maps.

Jack Dangermond
President and Founder, Esri
• An open mapping community for the Caribbean
  • Data by Esri, Partners, Governments, other authoritative producers and the Community e.g., NOAA, NASA
  • Analytical tools for spatial data
  • Hands on software training
  • Publish your own data online
  • Field data collection tools
  • Configurable web applications
Supporting Disaster Response in the Caribbean

Geospatial Tools

The Caribbean GeoPortal gives users access to the leading geospatial tools to easily map, analyze, and share geospatial information. Combine your data with open data, apply powerful tools, and create engaging outputs. These tools are free to use for all Caribbean GeoPortal users.

Create a web map

Quickly create maps by dropping in your spreadsheet or combining it with other location data included in the Caribbean GeoPortal. Apply smart mapping styles to make your data visually stunning.

The Caribbean GeoPortal is designed to give single users free access to the best geospatial tools. Tools are continually updated with the latest technology.

Create a Web Map
Apply spatial analytics:

- Aggregate, join, summarize, enrich
- Find, Search, Geocode
- Analyze patterns, calculate density
- Manage data - dissolve, extract, merge and overlay

Apply spatial analytics

Intuitive analysis tools help reveal relationships and outliers, and learn more about your data. Check patterns to make predictions and determine forecasts. Use location to bring data together or enrich it with new insight.

The Caribbean GeoPortal allows users to bring data together and make more informed decisions based on powerful analytics. Answer your first spatial question now.

View all the tools

Take your work into the field

Easily collect data in the field using pre-built apps accessible on all devices. Collect location data or questionnaires via a range of tools. The apps work online and offline to ensure productivity anywhere. Collected data feeds straight back into the geospatial tools ready to map, analyze, and share.

The Caribbean GeoPortal gives users the power to work end to end. Prebuilt applications, offline navigation, and easy to configure tools allow for simple and structure data collection. Start your field work now.
Supporting Disaster Response in the Caribbean

The latest NWS/National Hurricane Center (NHC) and Central Pacific Hurricane Center (CPHC) tropical storm and hurricane information
Earth Observation

NASA's fleet of Earth satellites can provide a wealth of information before, during and after a disaster.
Haiti Earthquake - 7.0 Magnitude
Saturday August 14, 2021

Impacted:
- Haiti, Puerto Rico, Dominican Republic, Jamaica
- Over 1200 persons dead in Haiti
- More than 1,800 people were injured and over 7,000 displaced
- Significant damage to homes, roads, and infrastructure
ESRI Disaster Program

https://www.caribbeangeoportal.com/search?q=noaa

Hurricane and Cyclone App

DRP Admin
Caribbean GeoPortal

Summary
This map contains live feed sources for hurricane path and forecast path of tropical activity from the National Hurricane Center and Joint Typhoon Warning Center.

View Full Details

Application
Web Mapping Application

August 2, 2021
Date Updated

February 6, 2018
Published Date

Public
Anyone can see this content
Tropical Cyclone Dashboard

- Demonstrate ways to combine NASA data with other sources
- Layers include:
  - Soil Moisture (NASA)
  - MODIS Flood Products (NASA)
  - Hurricane Forecast Track (NOAA)
  - Radar (NOAA)
  - Sea Surface Temp. (NOAA/NASA SPoRT)
  - GOES Imagery (NOAA)
Show What’s Possible

- Damage and Flood Proxy Maps
- Resolution: 30m
- SAR-based change detection
- Combine with infrastructure data to show potentially damaged or flooded assets

Source: NASA Disaster Program
Near Real-Time Products

- Global unless noted otherwise
- Coarser resolution
- Automatically updated every few hours to daily or weekly
- Many products for the Caribbean
  - Black Marble Nighttime Blue/Yellow Composite
  - FIRMS Active Fire Points (MODIS, VIIRS)
  - Global Landslide Nowcast
  - Flood Detection – 2, 3 Observations (MODIS)
  - Precipitation Accumulation – 30 min, 3 hour, 1 day (GPM IMERG)
  - Soil Moisture and Soil Moisture Anomaly – 3-Day Composite (SMAP)
  - Evaporative Stress Index – weekly
  - Global Fire Emissions – Daily (VIIRS)
  - True Color Imagery – Daily (MODIS at 250m, VIIRS at 375m)
  - Natural Color Imagery – Daily (MODIS at 250m, VIIRS at 375m)
Black Marble Nighttime Blue/Yellow Composite

- Daily product
- Monitor changes in nighttime lights
- Imagery available ~4-6 hours after acquisition
- Resolution: 750m
- Clouds also obscure lights
- Bright moon phases wash out faintest lights and light up cloud tops

Source: NASA Disaster Program
Global Precipitation Measurement Products

- 30-min, 3-hour, 1-day, 7-day total accumulations
- Resolution: 0.1 degrees
- Updated every 3 hours

Source: NASA Disaster Program
Soil Moisture

- Soil Moisture Active Passive (SMAP) derived product
- 3-Day Composite
- 25.4mm = saturated
  - Red = dry
  - Green = wet
- Resolution: .25°
  - Best for larger Countries

Source: NASA Disaster Program
Global Landslide Susceptibility

Source: NASA Disaster Program
Caribbean Geoportal Webinar series

April - September 2021

Webinar #1: How You Can Use the Caribbean GeoPortal (April 21, 2021)

Webinar #2: Leveraging the Caribbean GeoPortal for Disaster Planning and Management (June 22, 2021)

Webinar #3: Metadata, Maintenance & Best Practices On Data Sharing (for data producers) (September 21, 2021)

https://www.youtube.com/watch?v=h8-C_wNhpkE

https://www.youtube.com/watch?v=seekUoKUTIA&t=576s
Utilize the Caribbean GeoPortal
Access https://www.caribbeangeoportal.com/
Explore wide array of geospatial data and tools available
Contribute and upload geospatial data
Apply geospatial tools to analyze data and make decisions in response to disasters
Thank you!

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Simone Lloyd, GISP
Jamaica Co-chair support
UN-GGIM Working Group on Geospatial Information and Services for Disasters
&
Senior GIS Manager/Trainer
National Spatial Data Management Branch (NSMDB)
Land Information Council of Jamaica (LICJ)
Ministry of Housing, Urban Renewal, Environment & Climate Change (MHURECC),
Jamaica W.I
simone.lloyd@mhurecc.gov.jm