

Jamaica's National Emergency Response GIS Team (NERGIST) -

Leveraging Geospatial Data for Disaster Impact Assessment and Emergency Management

> Presented by: Nadine Brown United Nations International Expert Meeting on Crowdsource Mapping for Disaster Risk Management and Emergency Response December 3 – 5, 2012



What is NERGIST

- National Emergency Response Geographic Information Systems Team
- A group of volunteers consisting of technical GIS specialists drawn from multiple state and private sector entities and tertiary education institutions



What is NERGIST

- Dedicated to undertaking damage assessment and analysis prior to and post meteorological and geological events.
- Established by the National Disaster Committee/ Damage Assessment subcommittee, the Office of Disaster Preparedness and Emergency Management (ODPEM) and the National Spatial Data Management Division (NSDMD)

What is NERGIST

- Approved by Cabinet in 2010
- Group consists of 20 volunteer agencies across public and private sector
- The team has been trained in the use of the USAID IDA/DANA methodology for performing initial damage assessment
- The IDA is designed to assess damage to infrastructure housing, critical facilities



Volunteer Agencies

- Office of Disaster Preparedness and Emergency Management
- Ministry of Water, Land, Environment and Climate Change /National Spatial Data Management Division
- National Land Agency
- Statistical Institute of Jamaica
- National Work Agency
- Urban Development Corporation
- National Housing Trust
 National Water Commission
 Jamaica Bauxite Institute

- Jamaica Defense Force
- Ministry of Transport and Works
- Metrological Service
- National Irrigation Commission Limited
- Jamaica Public Service
- Social Development Commission
- Electoral Office Jamaica
- Ministry of Health
- Planning Institute of Jamaica







Responsibilities of the ODPEM

- Guide and monitor NERGIST
- Supervise and monitor all field work conducted by the NERGIST
- Provide training in damage assessment and the DaLA process and guidelines for data collection
- Defray costs for meals, provide cots and blankets at the operations centre.



Responsibilities of the NSDMD/LICJ

- General management of NERGIST
- Manage the NERGIST operations centre
- Provide and maintain NERGIST OC equipment and software
- Coordinate secondary data collection and analysis
- Post maps and data generated pre and post events on the LICJ geospatial portal or other relevant websites.
- Provide a report on personnel and on the state of items borrowed, at the end of operations



Responsibilities of Partnering GOJ and other Entities

- Release GIS personnel/volunteers
- Determine duration over which Specialist(s) and resources will be made available
- Provide GNSS receivers and cameras (if available)
- Cover subsistence and travel costs of officer(s)
- Provide existing geospatial data if available and required to support planning and recovery analysis exercises.



GIS Volunteers' Responsibilities

- The team is required to work over a period of 3 to 5 days after major disaster events at the NERGIST Operation Centre.
- In the field:- damage assessment and data collection
 - Collect geo-spatial data using GIS grade GNSS receivers and digital cameras. This includes mapping the spatial extent and location of houses and areas affected by storm surge, flooding and landslides.



GIS Volunteers' Responsibilities

- In the operation centre :- data integration, analysis and map production
- Create and edit spatial data
- Perform spatial analysis using GIS software
- Produce situation maps from data provided using ArcGIS
- Download and edit GPS data collected in the field



GIS Volunteers' Responsibilities

- Integrate GPS data with existing data sets
- Perform image analysis
- Produce maps required and requested
- Perform duties professionally



Benefits Gained from Establishing NERGIST

- coordinated, comprehensive and efficient disaster assessment exercises
- accurate data provided to decision makers in a timely manner
- duplication of effort to collect impact data is reduced



Benefits Gained from Establishing NERGIST

- A scientific framework to properly cost reconstruction and recovery exercises is provided
- Fair distribution of benefits to affected persons. This will enhance the credibility of the recovery exercise and should satisfy the donor organisations.



NERGIST ACTIVITIES

- Tropical Storm Gustav test run
- Tropical Storm Nicole
- Hurricane Sandy



First Assignment – Tropical Storm Gustav - 2008

- TS Gustav
 - Impacted Jamaica between August 28 and 29,
 - Estimate of Damage and Losses \$15.51
 billion (US\$213.99 million)
 - I2 lives lost
 - 2% of GDP



TS Gustav – IDA Map





TS Gustav – IDA Map



Tropical Storm Nicole - 2010

- Affected the island over a 6-day period (September 26-October 1)
- approximately 139.54 inches (3,544.4 mm) of rainfall)
- I6 lives lost
- Cost \$20.58 billion (US \$239.6 million)
- 1.9% GDP



NERGIST – Entities that Provided Equipment and Transportation

Equipment

- Office of Disaster Preparedness and Emergency Management (ODPEM)
- Statistical Institute of Jamaica (STATIN)
- National Works Agency (NWA)
- National Housing Trust (NHT)

Transportation

- Office of Disaster Preparedness and Emergency Management (ODPEM)
- Land Administration and Management Programme (LAMP)
- Ministry of Agriculture and Fisheries
- National Land Agency (NLA)

GIS for Blackberry Application

GeoTechVision Enterprises Ltd (Private)



NERGIST - Deployment

- Members of NERGIST were notified via SMS and email for response to Tropical Storm Nicole on the directive from ODPEM
- GNSS/GPS Device were uploaded with Data Dictionary for Initial Damage Assessment
- Incidence Map was generated in Google maps from information received by ODPEM.



NERGIST- Data Collection

Initial Damage assessment was done in the following parishes – Westmoreland, Hanover, St. Catherine and St. Elizabeth

Pilot Test

 Point location of damages collected using GIS on Blackberry application – Freeance Mobile



Tropical Storm Nicole - Affected Areas Hanover





Hurricane Sandy

- October 24- 25, 2012
- I death
- Preliminary Cost J\$ 5 billion

Preparation for Hurricane Sandy

- Risk Assessment Map ArcGIS Explorer online
- Tools to identify, evaluate and prioritize risks
- Shows path of the storm in relation to critical assets
- Allows NERGIST volunteers to add shapefiles
- Risk Assessment Map is shared with the staff of the Office of Disaster Preparedness and Emergency Management









Regional Initiative – Rapid Needs Assessment Team (RNAT)







Rapid Needs Assessment Team (RNAT)

 Purpose - to conduct a rapid assessment of the impact of an event and identify the emerging needs and recommended actions within 72 hours for key decision making for an effective response.



Rapid Needs Assessment Team (RNAT)

- Objectives Bahamas Mission:
- to conduct a rapid needs assessment of Cat Island, Bahamas after the passage of Hurricane Irene in 2011, to:
 - Assist the Bahamas in linking Damage Assessment to needs articulation and preparing a Priority Needs List immediately after the event.
 - Provide guidance to assist in better articulating requirements for national and external assistance



Participating Agencies/Organizations

- Jamaica Defence Force,
- National Spatial Data Management Division (Jamaica)
- Coastal Zone Management Unit, Barbados,
- University of the West Indies
- National Environment and Planning Agency, Jamaica
- Caribbean Disaster Management Agency
- Pan American Health Organization
- United Nations Disaster Assessment and Coordination (UNDAC/OCHA),



LEVELS OF DAMAGE FOR RESIDENTIAL BULIDINGS FOR CAT ISLAND



OR CATISLAND LOCATION Levels of Damage Level 1 - Structure is useable can be occupied Repairs required are minimal Level 2 - Structure is useable can be occupied after urgent temporary measures are taken. Owener will probably need assistance with repairs. Level 3 - Structure is not useable and cannot be occupied until after repairs are made.

Level 4 - Destruction structure is not usable cannot be repaired.Must be rebulit.

Unoccupied Building - Building abandon no sign of resident

LOCATION 1B - NEW BIGHT AIRPORT LEVEL 2 DAMAGE



Damage Analysis Result

New Bight Settlement had on average level 1 and 2 building damages.

Freetown and surrounding settlements had on average level 1 building damages.







Challenges

- Transportation
- Equipment
- Reaching the affected areas in a timely manner
- Coordinating volunteers after the event



Use of Crowdsourcing Mechanism in Disaster Risk Management in Jamaica

- ODPEM -National Emergency Operation Centre
- ODPEM Damage Assessment Information System
- National Works Agency EOC
- Earthquake Unit



ODPEM INCIDENCE MAP





NWA EOC EMap





NWA EOC EMap

Intranet | Internet **Emergency Operations Center eMap** Molynes Road OUNT GENTS Blocked/Impassable Status Cental Blocked by Fallen Condition BULL HEAD Tree **B**3 Action Equipment dispatched Action_Date 10/24/2012 12:00:00 AM ReportedBy Maxine Togar, James Rug 11/12/2012 12:00:00 AM DateReported Contact 343-1221 ReceivedBy Houdini Sutherland Remarks please send help soon JUAN DE BOLAS PRIORITY High Mossmans Peak ×X e Mountain Pea INGSTON Dar ortmor Norman Manl 🔺 🚼 📰 🔳 🔎 🔯 📲 🔯 0 esr



Earthquake Unit - UWI

THE UNIVERSITY O AT MONA, JAMAICA Earthquake Unit	Quicklinks Search Go THE WEST INDIES Directory Campus Map Help	• III
About Us The Jamaica Seismograph N	work Earthquake Data Publication & Research Quick Information Links	
 Our Mission Statement History Earthquakes in Jamaica 	Quick Information	
Staff Earthquake Report Form s felt in parts Jamaica. Did you feel it? Please click here to download and print our Earthquake Report Form*. *Requires Adobe Reader	Frequently Asked Questions Safety Tips	
	 What is an earthquake ? What is a fault? Where does this energy come from ? What causes most earthquakes ? 	-

EARTHQUAKE REPOR	RT FORM	
This form is part of a study of the effects of the earthquake of	ate) which occurred at (time). If you did not feel . Return completed questionnaire to the address on back.	
WHERE WERE YOU		
1. Where were you at the time of the earthquake?		
Parish Town/Dist	trict	
Street Address		
Outdoors [] Indoors [] Stationary vehic Other []	le [] Moving vehicle []	
1. b) If indoors: Which floor were you on?	. Height (number of stories)	
Function (house, school, church etc.)		
Construction (brick, stone, wood etc.)		
2. What were you doing?		
Walking [] Standing [] Sitting [] Knee		
EARTHQUAKE SHAKING AND SOUND		
3. What best describes the shaking you felt?		
No shaking [] Trembling [] Swaying []	8. Were you frightened? No []	Yes []
Rolling motion [] Other []	vhere you were?	
3. b) How strong was the shaking? Weak []	No [] Yes, a few [] Yes, many	[] Yes, most/ all [] Don't know []
4. What best describes any sound you heard?	9. Were any animals nearby frightened?	
No sound [] Rumbling [] Roaring []	No [] Yes, pets []	Yes, farm animals [] Don't know []
	EFFECTS ON OBJECTS, BUILDINGS ETC.	
	10. Did any of the following things happe	n?
	Windows/doors rattled Crockery, etc. rattled Hanging objects swung Pictures moved askew Small objects shifted or fell Books or similar objects shifted or fell Furniture shook visibly Furniture shifted out of place Furniture toppled over Pendulum clock stopped Plants shook Liquids splashed or spilled	No Yes Don't know [] [] [] [] [] [] [] [] [] [] [] [] [] [] [] [] [] [] [] [] [] [] [] [] [] [] [] [] [] [] [] [] [] [] [] [] [] [] []
	Please give details or state anything else	you noticed

Jamaican Felt Earthquakes - 2006

Year	Month	Day	Time (EST)	a.m. / p.m.	Mag., Mt	degrees N	degrees W	depth, km	Sub- area	Sub-area name	Epicentre location	Intensity, EMS
2006	February	13	7:30	a.m.	4.3	18.14	78.05	5	14	New Bank Frac- ture Zone	Offshore south-eastern Westmoreland	Reports from Westmoreland (Sa∨anna-La-Mar)
2006	March	12	7:23	a.m.	2.9	18.17	77.38	10.5	15	Rio Minho Crawle Ri∨er Fault Zone	Northern Clarendon	One report from Manchester [Ingleside II]
2006	April	7	6:11	a.m.	3.0	18.1	76.68	10	16	Blue Mountains Block	Near Sil∨er Hill Peak, Portland	It was reportedly felt in Stony Hill, St Andrew with an intensity of III
2006	May	19	11:13	p.m.	3.1	18.08	76.68	10	16	Blue Mountains Block	Near Chester∨ale, St Andrew	Reports from St Andrew
2006	July	16	11:16	p.m.	3.4	18.18	77.65	10	15	Rio Minho Crawle River Fault Zone	North- East St Elizabeth	One report from St Elizabeth [Santa Cruz II]
2006	August	1	2:16	p.m.	3.9	18.09	76.52	5	13	Port Antonio	Central Portland	It was reportedly felt in Kingston and St Andrew [Mona III, Hope Pastures III, Norbrook III, New Kingston III, Copacabana III] St Thomas [Stanton III]
2006	August	19	11:43	p.m.	3.6	18.06	76.74	15	16	Blue Mountains Block	Near Woodford, St Andrew	It was reportedly felt in Kingston and St Andrew [Red Hills IV, Constant Spring III] St Catherine [Spanish Town II]
2006	September	20	2:26	a.m.	2.9	18.04	76.83	10	21	Kingston	Near Forest Hills, St Andrew	It was reportedly felt in Kingston and St Andrew [Red Hills IV, Liguanea IV]

Produced by Earthquake Unit, UWI Mona, Jamaica 01/2007



HOW DO WE BRING THESE INITIATIVES TOGETHER?



Future of NERGIST

 True Crowdsourcing mechanism -Equipping persons at the community level to capture IDA data

 Real time upload of damage assessment data into server based multiuser geodatabase environment



Future of NERGIST

- A National Disaster Management Application (NDMA) for use by members of the NEOC
 - Equipping Participating agencies with capabilities and expertise to capture/upload damage assessment data to the NDMA
 - Would be useful especially in addressing the issue of coordinating NERGIST deployment
- Training to assess damage caused by geological and man-made hazards



THE END