3.4 ICG/CARIBE-EWS Country SOPs – Readiness, Gaps, Actions: 2017 Hurricane Season – Lessons to be Learned

Christa von Hillebrandt-Andrade
NOAA-NWS Caribbean Tsunami Warning Program
Source: UN OCHA, September 2017
Irma

- CARIBE EWS States with most significant impact: Antigua and Barbuda, Saint Barthelemy, Saint Martin, Sint Maarten, Guadeloupe, Dominica, St. Kitts and Nevis, Anguilla, Montserrat, British Virgin Islands, US Virgin Islands, Puerto Rico (Sep. 6), Dominican Republic, Turks and Caicos Islands, northern border of Haiti. Cuba, and southeastern Islands of the Bahamas (Sep. 7).
- Resulted in the loss of lives, significant damage to homes and critical infrastructure (including seismic and sea level stations and communications)

From CDEMA
Sea Level Observations
Sealevel at Vieques_PR station (offset: -3.206 m)

Sealevel at San_Juan_PR station (offset: -2.604 m)

Sealevel at Yabucoa Harbor, PR station (offset: -5.922 m)

Sealevel at Arecibo station (offset: 0.405 m)

Sealevel at Fajardo_PR station (offset: -2.564 m)

Sealevel at Mayaguez_PR station (offset: -2.794 m)
Maria

• Became a category 5 hurricane near the Leeward Islands on Monday September 18th, 2017.
• Hurricane Maria impacted Dominica (Sep. 18), Antigua and Barbuda, Montserrat, St. Kitts and Nevis (Sep. 19) and Puerto Rico and the Virgin Islands (Sep 19 – 20), Dominican Republic (Sep. 20-21)
• Resulted in the loss of lives, severe damage and destruction to infrastructure in various islands, “catastrophic flooding” in several areas and loss of utility services and infrastructure (including seismic and sea level stations and comms).

From CDEMA and AccuWeather
Maria Wind Track
Hurricane Preparedness Tips from National Hurricane Center

- Gather Information
  - Contacts
  - Risk Analysis
- Plan and take action
  - Supplies kit
  - Emergency plans
- Health and Environment
  - CDC, FDA, EPA guidelines for safety during disasters
- Evacuation
- Recover
  - Waiting until areas are declared safe
  - Gradual process

From nhc.noaa.gov
CDEMA Coordination with International Partners through the RRM

CDEMA worked with international partners and World Food Programme (WFP) to re-establish the food ration for the population.

In collaboration with ITU, TSF, military engineers and communications companies, the communication networks have been gradually reconnected.

Reconstruction and removal of debris is an urgent and relevant area where CDEMA has worked in collaboration with UNDP and militaries.

Urgent needs on shelter and temporary housing are being addressed with international partners such as USAID/OFDA, IOM and militaries.

CDEMA has worked with various international actors to reestablish access to water.

CDEMA has collaborated with UNICEF, UNFPA, UNWOMEN on social protection issues and focused on the security problems with RSS and other military assets available in the region.

CDEMA has provided support to several ministry of health and received collaboration with PAHO/WHO and CARPHA to restore health facilities and provide medical supplies.

CDEMA made efforts in collaboration with military and with WFP and other international agencies to mobilize ships and aircrafts to deliver relief assistance.
Dominica – Actions Undertaken:

The following tasks were conducted by CDRU:

- Management of relief efforts at Woodbridge Bay Port, Warehouse 2.
- Distribution of relief supplies to the following communities, organisations and shelters:
  - Discorde/Sylvenia Village
  - Kalinago territory
  - Marigot Village
  - Pichelin Village
  - Vielle Case Community
  - Agape home for the elderly
  - Home for at risk children
  - Madicrest Baptiste Church
  - Police
  - Prison
  - Hospital
  - Ministry of Finance
  - Ministry of Education
  - Ministry of Works
  - Customs Department
  - Solid Waste Management
  - Prime Minister’s Office
  - Port Management Office
  - Financial Complex
  - Paix Boude Private Home Shelter
  - Penville Shelter
  - Dominica State College Shelter
  - Ford Cole Community Shelter
  - Cordwall Pentecostal Shelter
  - Southwest District Shelter
  - River Road and Roseau Central
  - Roseau Valley
  - La-Pain Village
  - Calibish (Plet-McPriere) Village
  - Broye Village
  - Rose Hill
  - Kings Hill Community
  - Bells Village
  - Dominica Import and Export Company
  - Petro Caribe
  - Calabash Shelter
  - Lewisville Shelter
  - Grand Bay Shelter
  - Layos
- Distribution of a number of supplies comprising 7 foam hampers, 16 tarpaulin, 568 canvases, 870 cases of water and 15 bags of flour to persons at the sea port.
- Conducted damage assessments in Kalinago Reserve, 500 houses assessed in the Kalinago Territory to date (Concord, Siniki, St. Cyr, Monkey Hill, Bataka, Gaulete), Salybia is pending.
- Preliminary results show that more than 75% are damaged at level 3-4.
- Government of Dominica requested extension of the CDRU and COST.

The following tasks were completed by Engineering Operations by the Artisans:

- Collected materials from Astraphan for the Inland Revenue Building and entered them into inventory.
- Installed shutters at the Electoral Office.
- Removed some of the electrical fittings from the Inland Revenue Building as part of the process to commence repairs to the roof and ceiling.
- Installed a tarpaulin on the residence of the Cabinet Secretary.
- Conducted an assessment at the EOC in Jimmit and provided a list of plumbing materials to be purchased.
- Materials were allocated for jobs at the Grammar School.
- Erected a flag pole to fly RSS flag at main entrance of Grammar School.
- Removed, strengthened and replaced gate 2 at the Grammar School.
- Built a water drain cover for an open man hole at Grammar School.
- Conducted checks and rectified leaks at Grammar school after water was restored.
- Constructed and installed bathroom doors on the second floor of the Grammar School.

- COST continues to support EOC operations.
- SAR team continues to support the fire and ambulance services (mainly repairs to public buildings and clean-up activities).

PHASE 3 – Disaster recovery Operations:

Support to Participating States:

- Ensuring the conduct of the Post Disaster Needs Assessment (PDNA) in collaboration with partners. This will help reconstruction.
- Ensuring in coordination with national, regional and international response organisations, an After Action Review is conducted and a report is produced. This will help to rebuild the level of preparedness of the country and will enhance the national, regional and international response for future events.
- Ensure early recovery activities are planned and implemented to ensure the continuity of operations of the government and the private and social sectors.
  - Support of Ms. Jennifer Worrell, former National Disaster Coordinator.
  - In coordination with the affected country and with regional and international donors, prepare proposals for reconstruction and recovery projects based on the PDNA reports.
Based on reports and lessons learned, revise and enhance the RRM, the RCP, the SRFPs’, the RCC’s, the SRCCs and the regional and international organisations’ response and recovery plans to ensure there is a better coordination and better response for future events.

- RRM review was previously planned and will be undertaken
- Continue promoting preparedness and mitigation measures in a continuous manner to ensure vulnerability and response capacity do not decrease with time.
- Continue to support states through the Programming Areas of the CDEMA Coordinating Unit

**CDEMA/CARICOM LEGACY PROJECTS**

- As we move into the early recovery phase CDEMA is proposing undertaking a project for each of the most significantly impacted states as a legacy of support.
- Some financial support is already available through donations but more support needs to be generated

**Barbuda**
  - Noting the displacement and recognising there will be some space required for decision-making, undertaking support to the displaced population focusing on:
    - The most vulnerable (single female headed families, elderly and disabled) through:
      - Voucher Grants for grocery and hygiene supplies
      - Rent Grant support

**British Virgin Islands**
Through initial consultation with the BVI on emerging needs
  - A Transitional Social Protection Programme the government intends on implementing to assist those persons who were adversely impacted by Hurricane Irma.
  - Supporting the Education dimension of such a venture
  - Focus on efforts to assist educational provisions for children with special needs.

**Dominica**
Housing support to the Kalinago Territory of Dominica to benefit up to 1000 families focusing on the most vulnerable (single female headed families, elderly and disabled) through:
  - Donation of roofing material through a voucher system
  - Reconstruction of up to 40 homes

This is being made possible through a pledge of 100,000 tons (300,000 sq. ft.) of galvanized sheeting and some pledged cash contribution
<table>
<thead>
<tr>
<th>Country</th>
<th>Time UTC</th>
<th>Phone Number</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANTIGUA AND BARBUDA</td>
<td>17:04</td>
<td>2684244606</td>
<td>DELIVERED 002.4 MINS 005 PGS 01 ATMPS</td>
</tr>
<tr>
<td>ARUBA</td>
<td>17:04</td>
<td>0112975837328</td>
<td>DELIVERED 001.8 MINS 005 PGS 01 ATMPS</td>
</tr>
<tr>
<td>BARBADOS</td>
<td>17:31</td>
<td>2466350009</td>
<td>CANCELLED DISCONNECTED</td>
</tr>
<tr>
<td>BELIZE</td>
<td>17:04</td>
<td>0115012252101</td>
<td>DELIVERED 001.7 MINS 005 PGS 01 ATMPS</td>
</tr>
<tr>
<td>CANADA</td>
<td>17:04</td>
<td>9024264873</td>
<td>DELIVERED 001.6 MINS 005 PGS 01 ATMPS</td>
</tr>
<tr>
<td>COLOMBIA</td>
<td>17:28</td>
<td>0115723336961</td>
<td>CANCELLED BUSY SIGNAL</td>
</tr>
<tr>
<td>COSTA RICA</td>
<td>17:07</td>
<td>01150622203977</td>
<td>DELIVERED 005.5 MINS 005 PGS 01 ATMPS</td>
</tr>
<tr>
<td>CUBA</td>
<td>17:29</td>
<td>0115377997877</td>
<td>CANCELLED BUSY SIGNAL</td>
</tr>
<tr>
<td>CURACAO</td>
<td>17:30</td>
<td>01159988682699</td>
<td>CANCELLED BUSY SIGNAL</td>
</tr>
<tr>
<td>DOMINICA</td>
<td>17:29</td>
<td>7674482883</td>
<td>CANCELLED BUSY SIGNAL</td>
</tr>
<tr>
<td>DOMINICAN REPUBLIC</td>
<td>17:38</td>
<td>8095217213</td>
<td>CANCELLED NO ANSWER</td>
</tr>
<tr>
<td>FRANCE</td>
<td>17:05</td>
<td>01159059086075</td>
<td>DELIVERED 003.3 MINS 005 PGS 01 ATMPS</td>
</tr>
<tr>
<td>GRENADA</td>
<td>17:04</td>
<td>4734441574</td>
<td>DELIVERED 001.8 MINS 005 PGS 01 ATMPS</td>
</tr>
<tr>
<td>GUYANA</td>
<td>17:06</td>
<td>0115922261460</td>
<td>DELIVERED 003.8 MINS 005 PGS 01 ATMPS</td>
</tr>
<tr>
<td>GUADELOUPE</td>
<td>17:13</td>
<td>01150022261246</td>
<td>DELIVERED 000.7 MINS 005 PGS 03 ATMPS</td>
</tr>
<tr>
<td>HAITI</td>
<td>17:06</td>
<td>0115922612284</td>
<td>DELIVERED 003.9 MINS 005 PGS 01 ATMPS</td>
</tr>
<tr>
<td>JAMAICA</td>
<td>17:05</td>
<td>9867942229</td>
<td>DELIVERED 002.2 MINS 005 PGS 01 ATMPS</td>
</tr>
<tr>
<td>NICARAGUA</td>
<td>17:34</td>
<td>01150522491082</td>
<td>CANCELLED NO ANSWER</td>
</tr>
<tr>
<td>PANAMA</td>
<td>17:28</td>
<td>0115073160042</td>
<td>CANCELLED BUSY SIGNAL</td>
</tr>
<tr>
<td>SAINT KITTS AND NEVIS</td>
<td>17:34</td>
<td>8694664305</td>
<td>CANCELLED NO ANSWER</td>
</tr>
<tr>
<td>SAINT LUCIA</td>
<td>17:04</td>
<td>7584523064</td>
<td>DELIVERED 001.9 MINS 005 PGS 01 ATMPS</td>
</tr>
<tr>
<td>SAINT VINCENT AND THE GRENADINES</td>
<td>17:04</td>
<td>7844571691</td>
<td>DELIVERED 002.0 MINS 005 PGS 01 ATMPS</td>
</tr>
<tr>
<td>SINT MAARTEN</td>
<td>17:34</td>
<td>7215426526</td>
<td>CANCELLED NO ANSWER</td>
</tr>
<tr>
<td>SURINAME</td>
<td>17:11</td>
<td>011597474320</td>
<td>DELIVERED 007.6 MINS 005 PGS 02 ATMPS</td>
</tr>
<tr>
<td>TRINIDAD AND TOBAGO</td>
<td>17:04</td>
<td>8666407946</td>
<td>DELIVERED 001.9 MINS 005 PGS 01 ATMPS</td>
</tr>
<tr>
<td>UK ANGUILLA</td>
<td>17:30</td>
<td>2644973134</td>
<td>CANCELLED DISCONNECTED</td>
</tr>
<tr>
<td>UK BERMUDA</td>
<td>17:06</td>
<td>4412985062</td>
<td>DELIVERED 002.1 MINS 005 PGS 01 ATMPS</td>
</tr>
<tr>
<td></td>
<td>17:04</td>
<td>4412986688</td>
<td>DELIVERED 001.9 MINS 005 PGS 01 ATMPS</td>
</tr>
<tr>
<td></td>
<td>17:16</td>
<td>4412971530</td>
<td>DELIVERED 003.1 MINS 005 PGS 04 ATMPS</td>
</tr>
<tr>
<td>Country</td>
<td>Time</td>
<td>Number</td>
<td>Status</td>
</tr>
<tr>
<td>----------------------</td>
<td>-----------</td>
<td>--------------------</td>
<td>-------------------------------</td>
</tr>
<tr>
<td>UK BRITISH VIRGIN ISLANDS</td>
<td>17:27 UTC</td>
<td>2844686141</td>
<td>CANCELLED BUSY SIGNAL</td>
</tr>
<tr>
<td></td>
<td>17:26 UTC</td>
<td>2844942024</td>
<td>CANCELLED BUSY SIGNAL</td>
</tr>
<tr>
<td>UK CAYMAN ISLANDS</td>
<td>17:06 UTC</td>
<td>3459465020</td>
<td>DELIVERED 003.6 MINS 005 PGS 01 ATMPS</td>
</tr>
<tr>
<td></td>
<td>17:04 UTC</td>
<td>3459494386</td>
<td>DELIVERED 001.9 MINS 005 PGS 01 ATMPS</td>
</tr>
<tr>
<td>UK MONTSERRAT</td>
<td>17:35 UTC</td>
<td>6644912465</td>
<td>CANCELLED NO ANSWER</td>
</tr>
<tr>
<td>UK TURKS AND CAICOS</td>
<td>17:27 UTC</td>
<td>6499414532</td>
<td>CANCELLED NO ANSWER</td>
</tr>
<tr>
<td></td>
<td>17:27 UTC</td>
<td>6499461230</td>
<td>CANCELLED NO ANSWER</td>
</tr>
<tr>
<td></td>
<td>17:32 UTC</td>
<td>6499464372</td>
<td>CANCELLED NO ANSWER</td>
</tr>
<tr>
<td>US VIRGIN ISLANDS</td>
<td>17:04 UTC</td>
<td>3407132075</td>
<td>DELIVERED 002.2 MINS 005 PGS 01 ATMPS</td>
</tr>
<tr>
<td></td>
<td>17:26 UTC</td>
<td>3407156726</td>
<td>CANCELLED BUSY SIGNAL</td>
</tr>
<tr>
<td>PUERTO RICO</td>
<td>17:26 UTC</td>
<td>7872537802</td>
<td>CANCELLED BUSY SIGNAL</td>
</tr>
<tr>
<td></td>
<td>17:27 UTC</td>
<td>7875230823</td>
<td>CANCELLED NO ANSWER</td>
</tr>
<tr>
<td></td>
<td>17:26 UTC</td>
<td>7876521154</td>
<td>CANCELLED BUSY SIGNAL</td>
</tr>
<tr>
<td>VENEZUELA</td>
<td>17:31 UTC</td>
<td>011582122579860</td>
<td>CANCELLED NO ANSWER</td>
</tr>
<tr>
<td></td>
<td>17:07 UTC</td>
<td>011582126628372</td>
<td>DELIVERED 003.5 MINS 005 PGS 02 ATMPS</td>
</tr>
</tbody>
</table>

17:01 marcelo.seluchi@cemaden.gov.br NOT DELIVERED BRAZIL
Coastal Impacts (Puerto Rico)

El Mani, Mayagüez

Rincón
Tsunami Signs Survived

Mayagüez, PR

Rincón, PR
Some Sirens Survived, Others Did Not

Mayaguez

Isabela
Tropical Storm/Hurricane Nate

- October 4-11, 2017
- Affected the CARIBE EWS MS of Nicaragua, Costa Rica, Guatemala, Panama, Honduras, and El Salvador, Mexico (Yucatan Peninsula), Cayman Islands and Cuba
- Flooding
- Revealed the need for better land use planning and the enforcement especially in rebuilding/reconstruction
Lessons Learned With Input of Participants

• Need for redundancy in communication platforms (Internet data can be lost)

• Need for COOP (Continuity of Operations Plan)/Backup Centers—eg PRSN devolved to USGS and Mexico NTWC after the Sept. EQ devolved to their backup Center

• Utility of EMWIN for receiving alerts given the satellite capability

• Need to consider alternates outside ones jurisdiction, especially in SIDS where there may be no agency that can provide service

• Sea level gauges installed for tsunami were useful for storm surge observations

• Tsunami awareness can help even during a storm. In PR the Mayor used the Tsunami Sirens to get people that were not wanting to evacuate, to evacuate during Maria (saving lives)
Cont.

- Lessons for installation of Signage and Sirens
- Empowerment of communities/institutions helps with the relief efforts, especially in situations of loss of communication or very fast developing events
- More education is required so people can understand the vulnerability of structures, eg. that a building can survive hurricane force winds, does not necessarily mean that it can withstand wave impact
- Impact on access to food/commodities/flights/medical care need alternatives that were observed in the Hurricanes could also be experienced for tsunamis
Cont.

- Security issues, law enforcement needs
- Need to consider impacts on people
- DM and Head of Government are also affected by the event despite of preparation efforts, this can impact relief and recovery efforts
- Radio stations can help with the dissemination of information, but it would be useful to have protocols on the type of information.
- Issues in managing incoming relief support, consider military vs humanitarian needs
- Curfews, different views, when they should be implemented
- 72 hours vs longer times to be self sufficient (10-14 days)
- Shelters, EQ/Tsunami vs Hurricane – security, hygiene, health, humanitarian needs
• Ham radio operators/amateur radio operators can also help with communications
• Role on Social Media
• Relationship between DM and Media Practitioners, being accessible to the media is very important.
• Role of Radio/TV
• Emergency Broadcast Radios
• Opportunity to educate and prepare better, new risk reduction initiatives. Eg. DR – Empowerment of Local Authorities after H. Georges. Improve communication, political vs scientific/technical information issues. Financial tools could also be used.
Thank You

Christa von Hillebrandt-Andrade
NOAA-NWS Caribbean Tsunami Warning Program