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Photo caption: Residents of Roseau, the capital of Dominica, emerge from their homes to inspect the catastrophic damaged caused by Hurricane Maria on September 18, 2017. Photo credit: New York Times.

Caribbean Sub-Regional HADR Response Efforts in Hurricane Season 2017

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Introduction

Hurricane season 2017 was devastating for Caribbean nations. Three major hurricanes – monstrous category 4 or 5 storms – swept across the region in less than two weeks, leaving devastation and misery in their wake and overwhelming the capacities of the countries' rescue and recovery efforts. Collectively, the storms delivered a massive blow to the Caribbean, the 2nd, 3rd, and 5th most costly storms in Atlantic Ocean history.

In response, regional and international aid groups sped to the affected countries to render assistance and alleviate suffering. At the center of the coordinated activity for humanitarian assistance and disaster relief (HADR) was the Caribbean Disaster Emergency Management Agency (CDEMA) headquartered out of Barbados. CDEMA is the disaster response agency that manages the assistance of local, regional, and international aid following a disaster, whether geologic (e.g., earthquakes, volcanoes, landslides), meteorological (e.g., hurricanes, droughts, floods), or man-made (e.g., pandemics, industrial accidents). CDEMA has aligned their HADR efforts with four nations, Jamaica, Antigua and Barbuda, Barbados, and Trinidad and Tobago, which are assigned as sub-regional responders in the event of a disaster. These four nations have the capacity to provide airlift, command, control, and communications, search and rescue, heavy equipment, security, and medical aid to the region of the Caribbean to which they are assigned.

This report examines the HADR response efforts of the Sub-Regional Focal Points (SRFP) during hurricane season 2017. Although half of the CDEMA participating states (9 of 18) were impacted by hurricanes during the 2017 season, a complete description of the HADR efforts on every island is beyond the scope of this article. Instead, the article focuses on the responses by two SRFP nations - Barbados and Trinidad and Tobago - to Dominica. The article addresses how the SRFP nations were activated, CDEMA's role in facilitating the response and assistance, what the SRFP nations accomplished, and how (in some cases) they were unable to successfully complete their HADR effort. By publishing this summary of the responses to hurricane season 2017, it is the author's hope that it may improve future responses to disasters in the region, raise awareness of

how CDEMA and the SRFP nations operate, and illuminate areas in which other international donors can contribute to HADR efforts in the Caribbean.



Map caption: The Lesser Antilles are a group of island nations located in the eastern side of the Caribbean. Map credit: Perry-Castañeda Map Collection, University of Texas.

CDEMA and the Regional Response Mechanism (RRM)

The Caribbean Disaster Emergency Management Agency (CDEMA) was created in 1991 by the Caribbean Community (CARICOM) nations to coordinate disaster responses and humanitarian assistance to Caribbean nations. Originally called the Caribbean Disaster Emergency Response Agency (CDERA), the name was changed to CDEMA in 2009. Eighteen Caribbean nations – referred to as Participating States (PS) - have signed agreements with CDEMA. CDEMA headquarters is in Barbados. Mr. Ronnie Jackson of Jamaica has been the Director since 2013.

Each Participating State has its own national disaster office. Like the Federal Emergency Management Agency (FEMA) in the United States, the national disaster office in each country coordinates

local, regional, national, and international assistance following a catastrophic event.¹ The director of each disaster office normally serves a dual function as the head of the disaster response efforts for his or her country as well as the CDEMA representative in that country.

Depending on the severity of the incident, CDEMA may activate any number of specialty teams that deploy nearly immediately at the disaster site and assess the situation. For example, a Rapid Needs Assessment Team (RNAT) was on the ground in Dominica just 36 hours after hurricane Maria made landfall. A Disaster Relief Unit (DRU) and a CARICOM Operational Support Team (COST) were also deployed to Dominica.

Table 1 contains a brief description of these specialty teams.

CARICOM Disaster Relief Unit (CDRU)	Consists of military, fire, and police forces from other CDEMA Participating States. Organized and deployed by the Regional Security System (RSS). Focuses on management of emergency supplies, establishment of communications, and assignment of personnel to critical missions. Reports to the National Emergency Operations Centre (NEOC) of the affected country. Size: 20-50 persons.
CARICOM Operational Support Team (COST)	Provides surge support to Emergency Operations Centre (EOC) to assist with information management and coordination efforts. Size: up to 5 persons.
CARICOM Disaster Assessment and Coordination Team (CDAC)	Conducts disaster assessment and needs analysis (DANA) including damage reports and impact data. Size: up to 6 persons.
Rapid Needs Assessment Team (RNAT)	Determines initial verification of the impact of the disaster. Normally only deployed for 2-3 days. Size: 6-8 persons.
Regional Search and Rescue Team (RSART)	Conducts urban light-level SAR operations. Supports organic SAR forces in affected country. Size: 6 persons per team.

Because the Caribbean is such a large area – it includes over one million square miles of territory, includes 30 independent nations or dependent territories, and has a population of more than 43 million people – CDEMA has delegated disaster coordination to four nations. These countries, Jamaica, Antigua and Barbuda, Barbados, and Trinidad and Tobago, are designated as sub-regional focal points (SRFP). Each of the four SRFPs have responsibility for a geographic area of the Caribbean: Jamaica in the northwest, Antigua and Barbuda in the northeast, Barbados in the central, and Trinidad and Tobago in the south. When directed by CDEMA, the SRFP nation is normally the first outside responder to disasters that strike countries in its geographic area of responsibility.

¹ FEMA normally only works on HADR efforts internal to the U.S. The Office for Foreign Disaster Assistance (OFDA) works under the Agency for International Disaster Assistance (USAID) and normally leads U.S. government efforts to provide support for affected countries.

² CDEMA Regional Response Mechanism (RRM) Handbook, 2016, pages 19-29.

The SRFP militaries are particularly well-suited to provide humanitarian assistance and disaster relief. They were chosen because of their relatively large security forces and their capacities to provide command and control, communications, search and rescue, and relief efforts following a natural disaster. Ideally, once deployed to a disaster zone, the SRFP nation arrives with critical skills, equipment, and expertise to provide disaster relief to the stricken area. The mission may include repair and restoration equipment such as bulldozers, earth moving equipment, and dump trucks. The rescue forces can also assist with restoration of critical facilities such as potable water, electricity, communications, and medical facilities. Additionally, the military forces can also help repair buildings, restore power, fix damaged bridges and highways, conduct debris removal, and deliver aid to areas cut off from government centers.

Table 2 – Sub-Regional Focal Points (SRFP) ³		
SRFP Country	Area	Responsibility for Countries:
Jamaica	Northwestern sub region	Bahamas, Belize, Haiti, and Turks and Caicos Islands
Antigua and Barbuda	Eastern sub-region	Anguilla, Montserrat, St. Kitts and Nevis, British Virgin Islands
Barbados	Central sub-region	Dominica, Saint Lucia, St. Vincent and Grenadines
Trinidad and Tobago	Southern sub-region	Grenada, Guyana, Suriname

Hurricane Season 2017

In September 2017, traditionally the peak period for hurricane activity in the Atlantic Ocean and Caribbean Sea, three major category 4 and 5 hurricanes devastated a number of Caribbean nations.⁴ On September 6, Hurricane Irma made landfall on Barbuda. A category 5 storm with 180 mph winds, it was the second most powerful hurricane ever recorded in Atlantic storm history, only surpassed by Hurricane Maria two weeks later. Later that day, Irma made landfall in Saint Martin and Sint Maarten and Virgin Gorda, one of the eastern-most islands of the British Virgin Islands, causing extensive damage. The storm went on to wreak havoc in the Turks and Caicos, Bahamas, and Cuba, and on the west coast of Florida on September 10.

On September 6, at the same time Irma was glancing off of northern Cuba, Hurricane Jose was forming into a hurricane about 800 miles east of the Leeward Islands. Jose eventually grew into a Category 4 hurricane with 155 mph winds, just below Category 5 status. September 8 marked the first time in Atlantic hurricane season history that two major hurricanes existed at the same time. Up until that day, Jose was barreling down on An-

³ CDEMA Regional Response Mechanism (RRM) Handbook, 2016, p. 17.

⁴ Data for this section drawn from NOAA reports on Hurricanes Irma (published 30 June 2018), Jose (20 Feb 2018), and Maria (14 Feb 2019). All NOAA reports available at: <https://www.nhc.noaa.gov/>.

tigua and Barbuda and the British Virgin Islands which had only two days earlier received a devastating blow from Hurricane Irma. Luckily, on September 9, Jose veered north into the open Atlantic Ocean and eventually dissipated without making landfall.

The worst was still to come. In the space of just 36 hours, Maria exploded from a tropical storm on the morning of September 17 to a category 5 hurricane on the evening of September 18. At 8 PM on September 18, it made a direct hit on the island of Dominica damaging nearly 100 percent of the buildings on the islands and many of the refuges in which the citizens of the island had taken shelter.

CDEMA Response

In the wake of the three hurricanes, CDEMA activated the SRFP nations. With the exception of Antigua and Barbuda which were reeling under the damaged caused by Hurricane Irma, each of the SRFP nations deployed their armed forces to disaster areas, in some cases more than one. The next section of this report examines two SRFP responses to Dominica: Barbados and Trinidad and Tobago.

Table 3 – Summary of Hurricane season 2017 deployments of Barbados and Trinidad and Tobago			
SRFP Nation	Deployed to	Personnel	Transported by
Barbados	British Virgin Islands Dominica	BVI: 8 persons Dominica: 133 persons	Organic naval and land assets of Barbados Defence Forces
Trinidad and Tobago	British Virgin Islands Antigua/ Barbuda Dominica	BVI: 1 person Antigua/Barbuda: 10 persons Dominica: 106 persons	Organic naval and land assets of TTO Defence Forces

Barbados Assistance to Dominica

Bridgetown, Barbados is only 192 miles from Roseau, Dominica and, as a result, the Barbados Defence Force (BDF) was in an advantageous location to serve as first responder after the hurricane strike on the island. Dominica is one of the nations for which Barbados is assigned SRFP responsibility.

The first news of the damage on Dominica reached Barbados through the Regional Security Service (RSS), a cooperative organization among seven Eastern Caribbean nations that provides collective responses in the event of a security crisis or national emergency.⁵ Both Barbados and Dominica are RSS members. Soon after Maria passed over the island, the RSS Executive Director, Captain Errington Shurland, ordered one of the RSS aircraft to conduct a surveillance flight over Dominica. The aircraft crew reported that the island had suffered widespread damage.

Barbados Defence Force (BDF) Chief of Staff Colonel Glynn Grannum recommended to senior government officials to deploy the BDF Coast Guard vessels – already on alert because of the hurricane threat - to

⁵ RSS members include Antigua and Barbuda, Barbados, Dominica, Grenada, Saint Kitts and Nevis, Saint Lucia, and Saint Vincent and the Grenadines.

Dominica on an HADR mission.⁶ Normally, calls for assistance to CDEMA go through the national disasters offices to the CDEMA headquarters in Barbados or from Prime Minister in the affected country to his or her equivalent in the other countries. However, in the case of Hurricane Maria, there were no communications from government officials in Dominica. Electrical power and communications lines had been severed. Regardless, the extent of the damage reported by the RSS flight spurred officials in Bridgetown to action. The BDF had responded to another similar disaster when Tropical Storm Erika had struck Dominica in 2015 so many of the military officials were familiar with the HADR requirements they faced.



Photo caption: local residents in Roseau, the capital of Dominica, come out of their homes to survey the damage on the morning of September 19, the day following the storm. Photo credit: Government of Dominica.

The BDF Public Relations Officer made an announcement on the Barbados radio station, Voice of Barbados, calling for public donations of relief supplies for the Dominicans. The response was overwhelming with donations of bottled water, medical supplies, tarps, non-perishable canned foods, and generators. Vehicles were soon forming long lines at

BDF bases to deliver the emergency materials.⁷

Equipment and personnel were loaded on HMBS LEONARD C. BANFIELD (P-02) at the BDF Coast Guard base in northern Bridgetown. BANFIELD is one of three 42-meter, 240-ton offshore patrol vessels in the Barbados fleet. The ships were too small to carry vehicles or heavy construction equipment but were able to carry first responders and emergency supplies such as medical and communications equipment. The ship got underway for Dominica on the evening of September 19, less than 24 hours after the hurricane had landed on the island. In addition to the ship's 15-person crew, there were about 30 other personnel onboard to include policemen, infantry, medical professionals, and communications specialists. Later trips would include news reporters and CDEMA representatives. According to participants interviewed for this report, the ship was so laden with supplies and equipment that there wasn't a spare "inch of space" left.

The primary BDF mission to Dominica was twofold. The most urgent task was to provide HADR assistance to the survivors. This was to include medical aid, route clearance, communications restoration, and a damage assessment. Secondly, the BDF personnel were to provide security by assisting the Dominican police with port and prison protection.

Up to this point, Dominica had been ominously silent. No news or reports were being received from the island. Then ham radio operators started relaying messages regarding the extent of damage, describing a scene of "total devastation."

⁶ Interview with Colonel Glynn Grannum, May 29, 2019.

⁷ Interview with BDF Chief of Staff COL Grannum, 29 May 2019.



Photo caption: HMBS LEONARD C. BANFIELD (P-02) of the Barbados Defence Force (BDF) was the first foreign ship to reach Dominica after Hurricane Maria made landfall on the island on September 18, 2017. Photo credit: ShipSpotting.com

BANFIELD was the first help from outside Dominica to arrive in the country and the ship's crew found a devastated country. The corpse of one of the storm victims, floating in the waters offshore, was a grisly indication of what awaited ashore for the emergency responders. Upon arrival, the BDF contingent commander reported to the Disaster Management Office. It was located in the Financial Services Center in downtown Roseau. The bottom floor of the building had been flooded and electricity in the capital had been disrupted. But the building was still structurally sound and electricity had been restored with a portable generator.

Getting assistance to other parts of the island proved difficult. Many of the roads were impassable, having been washed out or blocked by fallen trees and other debris. The control tower and passenger terminal at the Douglas-Charles airport in Dominica were undamaged by the storm but the runways, once cleared of debris, were intact so aircraft could land

with relief supplies. But the airport was located on the northeast of the island, on the complete opposite side of the country from the capital in the southwest. The center of Dominica is heavily forested and mountainous terrain and the road across the top of the island was heavily damaged by the torrential rains and fallen trees. Transporting supplies from the airport to other parts of the island was impossible until the routes were cleared. In addition, a northerly route around the top of the island was also blocked by debris and landslides. It took four days before the overland routes from the airport could be opened to vehicular traffic.

As a result, the Barbados Coast Guard personnel resorted to delivering emergency supplies to Dominican coastal communities by sea, ferrying them ashore by small boat. The BDF vessels were able to replenish a number of Dominican coastal communities to which overland access remained blocked

by collapsed roads and bridges. The officials interviewed for this research reported that they “had never seen a disaster to this scale” before.

Two other 42-meter vessels of the Barbados Coast Guard, the HMBS TRIDENT (P-01) and the HMBS RUDYARD LEWIS (P-03) also subsequently deployed for Dominica. Over the next three months, the ships made multiple trips to Dominica and back to Barbados, carrying fresh personnel, hundreds of tons of supplies, and evacuating 245 persons from the island. In total, the Barbados ships made 13 trips to Dominica and delivered 3,152 tons of relief supplies. The deployments finally ended over three months later on December 29 when the last BDF ship returned to Bridgetown.

British and Dutch military units also contributed to the relief efforts. Hurricane Irma had rolled across a number of Caribbean islands just two weeks before Maria, causing extensive damage to Sint Maarten (Dutch territory), St. Barthelemy (French territory), Anguilla, British Virgin Islands, and Turks and Caicos Islands (all British territories). European nations with citizens in these countries responded by sending military vessels and aircraft to assist with recovery and resupply efforts. A number of European countries also maintain a guard ship in the Caribbean for exactly these kind of circumstances. As a result, assets from Britain, France, and the Netherlands were also able to respond to the crisis in Dominica. Each provided helicopters that brought an immensely important airlift ability to Roseau, flying supplies and personnel from cricket fields in the capital to areas that needed it. USS WASP (LHD-1), a U.S. Navy large deck multipurpose amphibious helicopter carrier, arrived at Dominica on September 22, four days after the storm.

Trinidad and Tobago assistance to Dominica

The National Disaster office in Trinidad and Tobago is called the Office of Disaster Preparedness and Management (OPDM). When a disaster strikes a Caribbean nation in the TTO SRF region, the Ministry of Foreign Affairs, the OPDM, and the Trinidad and Tobago Defense Force (TTDF) coordinate the response. Within the TTDF, the First Engineer Battalion is designated as the “first responder” unit. According to OPDM officials, the Engineer Battalion is tasked with search and rescue operations, assistance with law enforcement operations, providing shelter, food, and first aid to victims, and conducting a needs and assessment analysis. TTDF personnel such as medics and security forces from other units can be recruited based on the skills required for the mission.



Photo caption: The mountainous interior of the island of Dominica was heavily damaged by Hurricane Maria, making passage between the international airport and the capital impassible.

Hurricane Maria made landfall on Dominica just after 9 PM on the evening of September 18. TTS MORUGA (CG 27), a 50-meter, 485-ton Trinidad and Tobago coast guard vessel, arrived in the early morning hours of September 21 to provide assistance. The trip distance from Port of Spain, Trinidad



Photo caption: Trinidad and Tobago Coast Guard (TTCG) vessel TTS MORUGA CG 27 arrived in Dominica on September 21, 2017 laden with relief supplies for residents of Dominica. Photo credit: CCN3 News.

to Roseau, Dominica is almost 300 nautical miles and required nearly two full days of transit. The OPDM had been placed on alert because of the hurricane threat and TTDF forces were already in standby mode. For that reason, the crew and support personnel onboard MORUGA were ready to respond just over 48 hours later.

MORUGA had over 50 personnel embarked including the ship's company plus engineers and security personnel. The ship carried over two tons of food and supplies for the disaster recovery effort.⁸

Upon arrival in Roseau, the TTDF relief mission had four goals: (1) conduct an initial assessment of the situation, (2) locate an ashore operating base, (3) check the condition of the port to determine if it was intact and operational, and (4) establish communications with and offer assistance to the Dominican government.⁹ However, no Dominican forces or authorities were present to greet the vessel. Government personnel were still recovering from the imme-

diate logistical challenges and psychological trauma following the natural disaster. The most pressing concerns were providing medical care to injured persons, restoring communications with other parts of the island, conducting a damage assessment, re-establishing command and control, and distribution of food and relief supplies.

Within two days of the ship's and crew's arrival, contact had been established with the Dominica government representatives. The Dominica national disaster office has established their operations center in the National Emergency Operations Center (NEOC) in Roseau. Likewise, the Dominica police force was also organizing response efforts out of the NEOC. Offers of assistance from NGOs, the United Nations, and a number of international donors began flowing into the operations center.

A second deployment of a larger force arrived on Dominica on October 3. By that point, two other TTDF vessels had joined the relief effort, TTS QUINAM (CG 60) and TTS BRIGHTON (CG 24). The TTDF vessels returned periodically to Port of

⁸ CCN3, 22 Sept 2017, <https://www.cnc3.co.tt/press-release/defence-force-ships-more-228-tonnes-supplies-dominica>.

⁹ After Action Report of TTDF, December 2017.

Spain to replenish stores and fuel, as well as to evacuate victims of the storm. Over 650 tons of goods were delivered to Dominica over the course of three months of assistance.

The TTDF medical team treated over 450 patients. Urgent repairs were conducted to a significant number of government facilities such as school, hospitals, ferry terminal, elderly care homes, and government buildings such as the Ministry of Finance, the seaport, colleges, homeless shelters, police stations, churches, and the parliament building. Most work involved repairing or replacing damaged roofs.

Problems in Dominica

Two problems in particular bedeviled the HADR teams from Trinidad and Tobago and Barbados: (1) communications and (2) funding to support logistics.

Communication systems are often one of the first victims of severe disasters. Above-ground systems such as relay towers, transmission centers, and landlines are very vulnerable to heavy winds and flying debris caused by storms. The 185 mile per hour winds of Hurricane Maria devastated the communications grids on Dominica. CDEMA reported that the loss of communications had significant repercussions for other HADR efforts on the affected islands. “Extensive loss of the communications infrastructure in Dominica and BVI created major constraints in the [CDEMA] operations in coordination, relief planning, logistics and reporting,” CDEMA wrote in its after action report.¹⁰

In Dominica, for example, the hurricane damage was so severe that the National Emergency Opera-

tions Centre (NEOC) was not established for a number of days after the storm strike, effectively forcing aid groups and SRFP forces to commence work without effective communications and only minimal coordination. According to CDEMA officials, the CARICOM Operational Support Team (COST) was able to provide support for daily briefings until the NEOC was fully manned.¹¹

Communication to the public was a critical ability in order to inform citizens of aid locations and government recovery efforts. Social media is normally a very effective means of getting information to storm victims but the electrical grid had been so badly damaged on the island that electricity was not restored for weeks. Generators were available to some individuals and organizations but were unable to provide power for the general populace. Batteries for portable radios quickly ran out. As a result, Dominican officials were forced to rely upon leaflet distribution and vehicle mounted loudspeakers to communicate to the public.

Adequate funding for logistics and lift capacity are the second biggest challenge facing SRFP nations. Providing rapid transport of disaster response personnel and supplies remains a “major problem” for CDEMA and the SRFP nations primarily because funds were not programmed to support the logistical efforts.¹² In fact, CDEMA’s official review of the 2017 hurricane response points toward “persistent challenges in the logistics [efforts]” due mainly to limited funding and “lack of funding constrained the speed of deployment” and forced CDEMA to deal with unavailable or inadequate transportation assets.¹³ As a result, a number of emergency response teams showed up without the equipment they needed

¹⁰ CDEMA, “Rapid Review of the Regional Response in the Hurricanes Irma and Maria Events,” September 2017, p. 33. The damage to the British Virgin Islands (BVI) caused even more damage to the communication systems than that of Dominica; it took first responders from CDEMA days to establish communications with government officials. One of the first efforts of response teams in BVI was to get high frequency (HF) and very high frequency (VHF) communications restored. Response teams from Great Britain were able to provide mobile satellite communications in order to establish initial voice and data communications. Ham radio operators on BVI also proved to be a valuable local asset.

¹¹ CDEMA, “Rapid Review of the Regional Response in the Hurricanes Irma and Maria Events,” September 2017, p. 23.

¹² CDEMA AAR, p. 32.

¹³ CDEMA, “Rapid Review of the Regional Response in the Hurricanes Irma and Maria Events,” September 2017, p. 9 and p. 26.

to sustain themselves and subsequently became a liability for host nation forces who had to provide them, in some cases, with the same resources required of the storm victims. For example, according to CDEMA after action reports, CDRU units showed up in the affected country without their equipment. In addition, according to officials in Bridgetown, the Barbados Defence Force had to absorb “hundreds of thousands of dollars” of operational and logistical costs for the numerous trips their ships took to and from Dominica.

Movement around the island was severely limited, not only by the damage from the storm but also by the lack of heavy lift vehicles available to the TTDF personnel. The group had one truck loaned to them by the Dominica Air and Sea Ports Authority (DASPA). The truck had been toppled on its side and slightly damaged turn the storm. Fuel and oil for the vehicle was provided by DASPA as well as from re-supply tanks on the TTS BRIGHTON (CG 24) of the TTDF Coast Guard.

Conclusion

The damage from Hurricane Maria to Dominica was severe. Sixty-five people lost their lives and another 34 are missing and presumed dead. According to the Red Cross, 98 percent of the roofs of the buildings on the island were damaged or destroyed. Two-thirds of the island’s 73,000 inhabitants were displaced from their homes. Half of the houses had extensively damaged frames. The entire banana and tuber crop on the island, a vital part of the economy, was destroyed as was the livestock of many farmers.

The CDEMA Sub-Regional Focal Points (SRFP) militaries played an instrumental role in the relief efforts, arriving quickly at the scene with badly needed supplies and emergency personnel. Personnel from Barbados and Trinidad and Tobago, familiar with the HADR duties assigned to CDEMA units, provide

an urgent first responder ability during these types of natural disasters. There is room for improvement among SRFP units and the Hurricane Maria disaster exposed a number of important gaps in their capacities, particularly with regard to communications and funding for costly air- and sealift that are more often than not absorbed by the SRFP units.

This report does not cover a number of other important HADR response mechanisms in place in the Caribbean including the RSS, CDEMA overarching strategy, small response teams, or PAHO. It is hoped that this article will stimulate others to provide descriptive reports of their own organizations’ responses to HADR events.

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