

Special Acknowledgement

Our regular *Horizon Newsletter* comprises articles prepared by staff and personnel of the CARICAD Secretariat along with reproductions of articles written by distinguished personages or emerging young professionals in the Caribbean. This special second hurricane preparedness issue of the *Horizon* is different. All original articles were written by CARICAD's Programme Specialist Franklyn Michael. He also undertook all the research for material that accompanies the original articles as cited and sourced. Thank you, Frankie. I think the 2021 version is as useful as the 2020 version was.

Devon Rowe,
*Executive Director
CARICAD and
Editor-in-Chief of the
Horizon Newsletter*



HURRICANE SEASON & COVID-19 IN 2021

Challenges Remain - Pages 4-11

From the desk of the Executive Director

In the 2020 edition of the [Hurricane Season Horizon Newsletter](#) we said:

The COVID-19 crisis continues to unfold as the 2020 hurricane season has begun. This is uncharted territory for all of our members states. The development of a storm or hurricane that could pose a direct threat would be a cause for great concern in the COVID-19 context.

We are all relieved that although the 2020 Atlantic Hurricane Season had 30 named storms, there was no widespread devastation and damage among CARICAD member states as there was in 2017. Experts have again predicted that the 2021 hurricane season will be above average in terms of level of activity.

Significant progress has been made in controlling the spread of the COVID-19 virus in many Caribbean countries. There were no vaccinations in 2020 because the vaccines were not yet available. However the vaccination campaigns in 2021 have been laudable. There is some anxiety arising yet again because of an apparent “third wave” of COVID-19 infections not only in some extra-regional environments but also among some CARICAD member states at the time of production of this newsletter (May 2021).

We have updated some of the articles we published last year because of their immutable relevance but we have added a significant number of new ones in this edition. What we have described above exists as a backdrop to a major explosive eruption of the

La Soufriere volcano in St. Vincent and the Grenadines. The explosive eruption took place in early April 2021. There have been ongoing events since that time. We reiterate our statement of intent from

last year, adapted for this year. We have once again produced this special edition of CARICAD’s Horizon Newsletter to help the entire public sector in member states prepare for the 2021 hurricane



**Devon Rowe,
Executive Director
CARICAD**

season against the backdrop of the COVID-19 crisis. We have provided practical suggestions that we hope our public sector leaders/managers will embrace and implement.

We are aware that you might require more detailed and in some cases very specific information that you might not get here in this Horizon Newsletter. We hope that this

newsletter will encourage you to get any additional information you need from authoritative sources. Please contact us and let us know if there is anything you think that we at the CARICAD Secretariat can do to help you prepare more effectively for this 2021 hurricane season.

On a final note, apart from researching the content and scripting the articles in this second special edition of the hurricane season newsletter, I am delighted that this year Programme Specialist Franklyn Michael has also shown us his creative side with the poem *Facing the Force*, which you can read on the page which follows.



For this publication, we again utilised photographs such as this one provided by Father DeAngelo Bowe, Rector of the Holy Spirit Anglican Church in The Bahamas, which show the immense damage caused by Hurricane Dorian in 2019.

A Poem - Facing the Force

by Franklyn Michael

Verse 1

Growling and howling like a giant beast
It beats, it bleats, it roars, it is all around
A terrifying sound
Thunderous crackling
Stabbing, flashes of lightening
Howling hiss of horizontal rain
Frightening,
Gray skyscrapers of sodden clouds
Deny sunlight in the midst of the day
Darkness, envelopes all
Darkness, over our land
Darkness, over mountains and sea
Darkness, over you, over me
Darkness, a blanket for our country

Verse 2

The hurricane is here
Feels like it's everywhere
Category four
Now at my door
Anxious and cradled in fear
I whisper a marathon prayer
Resurrecting faith and embracing hope
The crash, a slash it's gone to ground
Composites of memories now shattered all around
A creak, a creak, a creak
It lifts and shifts and starts to leak
My hope for a roof lies in a contractor's integrity
Did he do all that he had promised me

Verse 4

Tomorrow I may see
Death, damage, destruction expansively
Tomorrow, I will experience delay, disorder and feel despair
Category 4 crash landed here
We know the rhythm, the cycle and sequence
June to November but worse in September
Emotionally we embrace our ancestors' souls
You our forebears trod this road
Help, help us to carry our load
Yes, our Caribbean reality
Archipelagic geography
Equatorial proximity
The root causes of vulnerability
Today, we must plan, adopt, adapt with innovation
Determination
Embrace Resilience
Climate Change is not surreal
We need a Global, Green New Deal



Verse 3

Invisible damage but audible grief
There is as yet no sense of relief
A new tomorrow I foresee
No electricity
No computer, no cell phone, no TV
WhatsApp is What's gone
No microwave convenience
Three stones or a coal pot
Black soot and smoky fare
Sardine survival, corned beef and biscuit revival
Facebook will be silent, Instagram too
No Signal to website access, what will the youth do
I have been here before, life in a reverse process
Facing the force and survived
It is a wild and crazy ride
Tomorrow my life will change again for many months
Back to basics no computer fonts



In 2021, Hurricane Preparedness will still be taking place in a COVID-19 context. (Photo by Franklyn Michael)

COVID-19: Challenges for Preparedness and Response Remain in 2021

The COVID-19 crisis continues to unfold even though the levels of infection may now be lower in many CARICAD member states than in June 2020. This means that in 2021, hurricane Preparedness and if necessary Response and Recovery will still be taking place in a COVID-19 context.

Effective procedures in the Preparedness phase, (long before any potential hurricane threats) are vital for proficient Response and Recovery. The 2021 hurricane season is forecast to be above average in level of activity once again. In April of this year, the Colorado State University (CSU) predicted 17 named storms for the season. They also predicted four major hurricanes. They forecasted 80 named storm days and 35 hurricane days. Those estimates are well above the long-term averages.

The CSU forecast will have been updated in June after circulation of this our special hurricane season newsletter. The April forecast described above

suggests that CARICAD member states should plan for the probability that impacts from a storm or hurricane might occur.

The novel Coronavirus was first reported in the Caribbean during the first week of March 2020. Our member states have been responding to the resultant pandemic for more than a year now. The macroeconomic, fiscal, societal and psychological effects have been severe.

- ◇ Deaths have been attributed to the virus in all member states
- ◇ Extensive lockdowns had severe economic consequences. The lockdowns sometimes had to be repeated thus exacerbating the negative effects
- ◇ Governments' expenditures have increased markedly and revenues have fallen even more dramatically than expenditures have increased
- ◇ Unemployment and underemployment remain high in several member states

• **Continues on next page**

COVID-19: Challenges for Preparedness & Response Remain



• Continued from previous page

- ◇ Public access to many government services has been reduced
- ◇ Working from home for at least part of the time is now the norm for many people
- ◇ Schools resorted to teaching and learning by distance for extended periods
- ◇ Live sporting and entertainment events such as carnivals have been decimated
- ◇ New standards of proximity and personal closeness in all business and social interactions have to be maintained
- ◇ Workplace layouts now cater for a minimal distance between workers
- ◇ Air and sea travel are a small fraction of pre-pandemic levels
- ◇ Seating arrangements for public transport remain under constant monitoring
- ◇ Hours of work have been adjusted and the wearing of masks or other facial coverings for extended periods of time, remain as a protocol
- ◇ Work and public dining arrangements remain rigidly controlled
- ◇ Social interaction among relatives and friends has often been prohibited for extended periods

physical and social distance will be greater than it was during "Lockdown". There could be unprecedented management challenges in relation to hurricane preparedness among the CARICAD member states that are threatened each year by tropical storms and hurricanes. The implications for shelter management in the St. Vincent and the Grenadines evacuation is a singular and specific COVID-19-related challenge for that country at this time.

CARICAD recommends the following strategic and operational approaches for member states during the 2021 hurricane season in the context of COVID-19:

POLICIES AND STRATEGIES

The list of issues shown above is continuing to create a "new normal" for human interaction throughout the world. We first shared some adaptation suggestions in the 2020 edition. The 2021 hurricane season coincides with efforts in member states to "re-open the economy and society". This means that the challenge to maintain

- ◇ Thoroughly assess the strengths and weaknesses of all organisational structure arrangements for the hurricane season especially strategy-level planning documents, organisational structures, (National Emergency Councils and Operations Centres) staffing/personnel, supplies, equipment and other resources. Take urgent action to deal

• **Continues on next page**

COVID-19: Challenges for Preparedness & Response Remain



Plans should include guidelines for dealing with both hurricane recovery and the COVID-19 crisis, among other hazards and threats.

• **Continued from previous page**

with weaknesses that could negatively affect Preparedness/Response and Recovery efforts. A SWOT analysis can be done quickly and is a good basis for action. CARICAD can provide guidance

- ◇ Urgently review the national disaster policy, the Disaster Act and regulations. Ensure that there is no conflict with any regulations brought into effect for the COVID-19 Response. Adapt operational procedures accordingly
- ◇ Review and revise the National Emergency Operations Centre (NEOC) plans and arrangements. Ensure that there is a proper interface with the national COVID-19 Task Force or closest equivalent working group or committee.
- ◇ Reappoint a Hurricane/COVID-19 chief strategist for 2021 preparations. That person should have

a declared Deputy and should report directly to the Head of Government or Head of State as appropriate. This could be done as a temporary re-deployment for the 2021 hurricane season

- ◇ Review all national/territorial/sectoral/agency hurricane-related plans for Preparedness, Response and Recovery and ensure that mitigative strategies for dealing with the COVID-19 crisis are included as updates in the plans for all phases of the Disaster Cycle
- ◇ Ensure that all public sector entities (Ministries, Departments, Public Companies, Statutory Boards and Public Corporations) prepare or update their Business Continuity Plans. The plans should include guidelines for dealing with both hurricane recovery and the COVID-19 crisis, among other hazards and threats. Ensure also that the plans are based on and are

• **Continues on next page**

**Post-hurricane recovery
presents new challenges
with COVID-19.**

COVID-19: Challenges for Preparedness & Response Remain

• ***Continued from previous page***

aligned with the national guidelines for both hurricanes and COVID-19. Finalise the documents by July 15, 2021. CARICAD had prepared and circulated a [Business Continuity Plan Template](#) for the pandemic in 2020 for your guidance

- ◇ Pay close attention to any personnel who will be required to assist in emergency medical response, front-line health care, Search and Rescue and Shelter Management. Ensure that they are aware of their higher levels of risks and the need for them to be vigilant with regard to COVID-19 so that they can reduce the risks to co-workers if they will be involved in post-hurricane Recovery
- ◇ Create an integrated and harmonised, multi-dimensional public awareness strategy for both hurricane preparedness and COVID-19
- ◇ Ensure that any specialised COVID-19 quarantine facilities can be easily “stood up” or made ready at very short notice for the duration of the hurricane season. Fine-tune or reactivate contact tracing arrangements for COVID-19. Put plans in place for supplementary facilities
- ◇ Ensure that there is a stockpile of Personal Protective Equipment (PPE) for all front-line personnel. Remember that front-line personnel for post-hurricane Preparedness will be a broader and possibly larger group than for the original COVID-19 response
- ◇ Make warehouse management policies COVID-19 compliant
- ◇ Make sure that key personnel receive COVID-related hurricane training
- ◇ Test key personnel systematically and regularly for COVID-19 especially those who are in direct contact with large numbers of people for extended periods
- ◇ Establish a Monitoring and Reporting mechanism for Hurricane Preparedness and Response that can be easily extended into

• ***Continues on next page***

COVID-19: Challenges for Preparedness & Response Remain



Clarify and finalise deployment arrangements for public officers who may be required to lead or support a post-hurricane Recovery effort. (Photo by Franklyn Michael)

• **Continued from previous page**

Recovery if required

- ◇ Review emergency shelter policy, strategy and plans. It is likely that there will be major adjustments needed in shelter plans to cope with the COVID-19 threat and the [physical distancing recommendations of WHO/PAHO](#)
- ◇ Review and revise all shelter management rules and operational guidelines to ensure they are made compliant with COVID-19 procedures. Ensure that they are ratified as may be required by local law
- ◇ Create a COVID-19-compliant policy for long-term care facilities especially those that may become longer-term emergency shelters for elderly or special needs persons

GENERAL/OPERATIONAL SUGGESTIONS

- ◇ Clarify and finalise deployment arrangements for public officers who may be required to lead or support a post-hurricane Recovery effort. Make sure that they will not be listed as critical

for the ongoing COVID-19 response

- ◇ Clarify and promulgate guidelines for the deployment of vulnerable staff and personnel during the 2021 hurricane season in the context of COVID-19
- ◇ Brief staff at all levels about the plans for hurricane and COVID-19 preparedness. Pay particular attention to briefings for senior and top-level public sector managers
- ◇ Establish operational procedures that will be consistent as far as practicable in all those agencies that provide direct service to the public with COVID-19 compliant guidelines for matters such as:
 - Retrofitting of service counters
 - Policies on masks and personal protective equipment (PPE). Protocols for the use of PPE
 - Protocols for clients and other stakeholders on arrival. Sanitation procedures especially on entry by the public

• **Continues on next page**

COVID-19: Challenges for Preparedness & Response Remain

• *Continued from previous page*

- Emergency response arrangements for suspected COVID-19 cases among staff or clients
- Strategies to observe physical distancing in all face-to-face interactions
- Hours of operation for service to the public
- Close-down procedures during hurricane alerts
- Resumption arrangements after the threat of a hurricane has passed
- The security arrangements that will be put in place for offices, facilities, equipment and supplies during a Storm/Hurricane Watch or Warning
- Requirement to reduce numbers in confined spaces and common areas
- Monitoring of staff and visitors of companies with technology-enabled video records of entry, logbooks or registers with contact details. These could be crucial for contact tracing later on so maintenance of these is also critical
- Dealing with suspected COVID-19 cases and contact tracing in hurricane Response and Recovery situations
- Procedures for maintaining high standards of personal hygiene and high standards of sanitation in offices and other places of work and interaction. This might include erecting new hand sanitiser stations, thermometers and additional hand-washing facilities
- Arrangements for provision of masks for personnel and visitors



Attention must be paid to public service announcements to avoid the complete loss of your possessions. (Photo by Fr. Bowe)

- Public service announcements – video/audio/graphics
- Review and revise Relief Management procedures to include COVID-19-related protocols and precautions
- Transportation arrangements for military personnel and volunteers. The arrangements should comply with the COVID-19 protocols and precautions
- Transport arrangements for any essential works
- Sanitation and hand-washing procedures for locations at which large numbers of people might be working for extended periods of time such as at the National Emergency Operations Centre (NEOC). There could be a need to install additional hand-washing facilities

• ***Continues on next page***

Fresh challenges await
a country devastated
by a hurricane.
(Photo by Fr. Bowe)

COVID-19: Challenges for Preparedness & Response Remain



• *Continued from previous page*

- ◇ Mandate and oversee the necessary training for Shelter Managers and their teams. The guidelines should include procedures for visitors at shelters
- ◇ Establish procedures for dealing with non-compliance at shelters
- ◇ Stockpile an adequate supply of [WHO/PAHO recommended COVID-19 posters](#) for mounting in strategic areas in shelters and other key facilities
- ◇ Implement a COVID-19 compliant retrofitting and management programme for sanitation and safety at shelters:
 - Testing of shelterees for COVID-19 on arrival for initial occupancy and during protracted stays at shelters
 - Stocks of individual registration sheets maintained in a computer-friendly manner for later data entry
 - Procedures for taking temperatures

- Policies on mask-wearing at shelters
- Ratio of persons to toilets and showers – number of showers and toilets
- Sanitiser dispensers
- Garbage disposal arrangements
- Transparent barriers (sneeze guards) for reception-type staff/volunteers
- PPE supplies for shelter personnel including face guards for registration and service personnel
- Numbers of stoves per shelter
- Procedures for laundry
- Expanded spacing of cots and other furniture
- In-shelter isolation of suspected COVID-19 cases
- Establish appropriate COVID-19 arrangements for preparation, service and consumption of food
- Include shelter personnel on a high priority list for repeat testing for COVID-19

• *Continues on next page*

The public sector sets the strategic and operational context. Be sure you are ready to lead and manage in the event of a hurricane. (Photo by Fr. Bowe)

COVID-19: Challenges for Preparedness & Response Remain

• ***Continued from previous page***

CONCLUDING SUGGESTIONS

1. Be proactive and initiate planning at all levels early in the hurricane season
2. Seek to create a culture of mutual support among key officials across all sectors
3. Invest in intensive training including desktop exercises especially for new entrants in the system
4. Share information about plans with the public on a consistent basis
5. Complete or update all critical Memoranda of Understanding (MOUs) before the peak of the hurricane season in August/September
6. Have a clear policy and strategy for promoting and supporting COVID-19 vaccinations for all key personnel
7. Develop sound plans for dealing with children. Their presence could become a management issue in the fight against COVID-19

The Caribbean region has a wealth of experience in preparing for and responding to hurricanes. The same cannot be said for the COVID-19 crisis but the COVID crisis requires the use of leadership, management, coordination, teamwork and outreach principles that are well known to many.

Our experience in dealing with the pandemic has grown greatly during the last year. Let us see that as a strength as we face this continuing unprecedented challenge.

Public sector managers are often people with significant influence not only at work but in their communities. Our current situation is an opportunity for all such people to use their influence for the national good.

The private and non-government sectors are willing and competent partners but it is the public sector that sets the strategic and operational context. Be sure you are ready to lead and manage.

BE PREPARED:

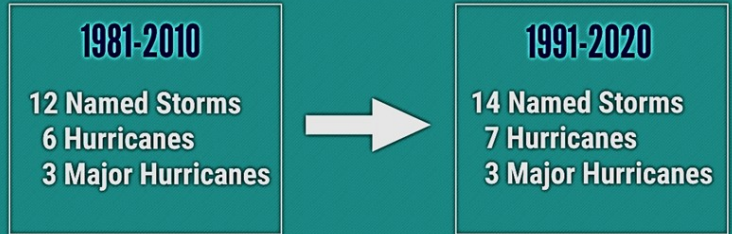
Forecast for 2021 Above Average

The Atlantic hurricane season starts officially on June 1st each year and ends on November 30th. The Colorado State University (CSU) predicted in April that the 2021 hurricane season would be an active one.

"We anticipate that the 2021 Atlantic basin hurricane season will have above-normal activity. Current weak La Niña conditions may transition to neutral ENSO by this summer/fall, but the odds of a significant El Niño seem unlikely. Sea surface temperatures averaged across the tropical Atlantic are currently near average, while subtropical Atlantic sea surface temperatures are warmer than normal. We anticipate an above-average probability for major hurricanes making landfall along the continental United States coastline and in the Caribbean. As is the case with all hurricane seasons, coastal residents are reminded that it only takes one hurricane making landfall to make it an active season for them. They should prepare the same for every season, regardless of how much activity is predicted." (as of 8 April, 2021)
By Philip J. Klotzbach¹, Michael M. Bell², and Jhordanne Jones³.

Extended range Atlantic Basin hurricane forecast for 2021 Released April 8, 2021 Tropical Cyclone Parameters Extended Range (1981-2010 Climatological Average Forecast for 2021 in parentheses) Named Storms (12.1)* 17 Named Storm Days (59.4) 80 Hurricanes (6.4) 8 Hurricane Days (24.2) 35 Major Hurricanes (2.7) 4 Major Hurricane Days (6.2) 9 Accumulated Cyclone Energy (106) 150 Net Tropical Cyclone

'Average' Atlantic Hurricane Season * Effective 2021



* Numbers for an average season reflect the climate record for tropical storms and hurricanes and use the most recent 3 decades as the period of reference. More at: <http://bit.ly/NOAAHurricaneSeasonAverages>



NOAA

Be prepared: Visit hurricanes.gov and follow @NWS and @NHC_Atlantic on Twitter.

Issued 4/9/21

The National Oceanic and Atmospheric Administration (NOAA) has reviewed data relating to averages for the Atlantic Hurricane Season and reports as follows:

This graphic captures the changes in Atlantic hurricane season averages from the last three-decade period of 1981-2010 to the most current such period, 1991-2020. The updated averages for the Atlantic hurricane season have increased with 14 named storms and 7 hurricanes. The average for major hurricanes remains unchanged at 3.

Activity (116%) 160 * Numbers in () represent averages based on 1981-2010 data

The team predicts that 2021 hurricane activity will be about 140 per cent of the average season. By comparison, 2020's hurricane activity was about 170 per cent of the average season. The 2020 hurricane season had six landfalling continental US hurricanes, including Category 4 Hurricane Laura which battered southwestern Louisiana. The CSU team will issue forecast updates on June 3, July 8 and Aug. 5.

This is the 38th year that the CSU hurricane research team has issued an Atlantic basin seasonal hurricane forecast. The Tropical Meteorology Project team also includes Michael Bell, associate professor in the CSU Department of Atmospheric Science, and Jhordanne Jones, graduate research assistant in the same department. Bill Gray, who originated the seasonal forecasts, launched the report in 1984 and continued to author them until his death in 2016.

Family Preparedness for Hurricanes: Lessons of Life and Experience

by Franklyn Michael

I have lived through, worked through and also observed the effects of many major storms and hurricanes in the Caribbean. They include Donna, Hugo, Frederic, Luis, Iris, Marilyn, Lenny, Ike, Ivan, Hanna, and Tropical storm Erika.

The threat of tropical storms and hurricanes is an inescapable feature of life in most CARICAD member states. We must take the threat seriously and prepare purposefully and competently based on up-to-date knowledge and scientific information. This is my attempt to assist you based on what I lived through and learnt from my work. I have learnt many lessons through experience, direct observation and consultations with colleagues in relation to family preparedness for hurricanes. In the interest of brevity I will highlight some of them here as bullet points.

- When you are planning for the construction of your own home invest in hurricane resistant design and construction in relation to the shape of the house, water storage, the pitch of the roof, the materials used for the roof, the overhang, the types of windows and types and sizes of glass sliding doors as well as the types of tiles used. Make sure the location, design and construction methods comply with Building Codes and any other relevant regulations. The cost at construction stage is a small fraction of the potential cost of later damage.
- If your home was not designed for hurricane resistance, invest in retrofitting such as hurricane straps, storm shutters, emergency



Families often lose all of their possessions after a major hurricane.
(Photo by Fr. Bowe)

electricity and water supplies. Such investment is cost effective. Get early advice from manufacturers about securing solar systems and photovoltaic systems.

- Learn as much as you can about the vulnerability of your home to hazards such as winds, landslides, mudslides, storm surges, coastal flooding or landside flooding. If evacuation is recommended during a storm threat, have a clear plan and process. Do not wait for the last moment if you have to evacuate.
- Identify the location in the house where the family will ride out the storm if there is a direct hurricane strike and you decide to remain at home.
- Keep at least three days' survival food and drinking water at all times. Salt is a common

• **Continues on next page**

Family Preparedness for Hurricanes: Lessons of Life and Experience



- ***Continued from previous page***

food preservative but choose long-lasting foods that do not have high salt content. High salt content is not only deleterious for long-term health status but it quickly increases thirst. That thirst will encourage you to drink more water when water might be in short supply. Nowadays there are “low salt or low sodium” versions of many foods. Remember refrigeration might not be available for weeks if you are struck by a storm. Foods that require refrigeration will not last.

- Be vigilant with prescription medications during the hurricane season. Try to have at least a two-week supply available throughout the season. Store the medicines carefully especially if there is a real hurricane threat. However, do not store them so securely that you cannot get access when you need them.
- Always keep a supply of batteries for

emergency lighting and transistor radios in particular. Use and replace batteries within a year. Keep your emergency lamps and lanterns in locations that the family is familiar with.

- Try to create the best arrangements you can for back-up charging of cell phones but remember that cell phone service might not return for a long time if there is a direct hurricane strike from a major hurricane.
- Keep at least two sets of electronically stored files of your vital documents and parts of documents – certificates of all kinds, passport biodata page, driver’s licence, Social Security card. Ideally, you should store one of the back-ups in a different location but that depends on the feasibility of such an arrangement.
- Try to keep vehicles fuelled to at least half capacity during the peak hurricane season.

• ***Continues on next page***



Family Preparedness for Hurricanes: Lessons of Life and Experience

• *Continued from previous page*

That could help you to avoid the "mad rush" to gas stations during a storm alert. One way to do this is to fill the vehicle and then top it up afterwards when the fuel level drops down to half-tank of fuel.

- Have a plan for protection of your vehicles as best you can if a storm strikes. Give priority to preventing damage to the front wind screen. This might mean parking vehicles differently when a storm threatens. Remember vehicles can be washed away in floods in flood-prone areas during hurricanes.
- Prepare the entire family intellectually, psychologically and emotionally for what all of you might face during the passage of a major hurricane. Watch TV shows and videos in advance, listen to experts when they speak and listen to accounts of survivors. Speak with contacts who have survived hurricane events in other countries.
- Keep as much cash as you can manage to hold in a secure location in your home in a place that should be safe from damage. Remember you might not have normal banking services for a while if your country is hit by a major hurricane. Do not forget where you have put the cash.



***Cleaning up after a hurricane
Can be a challenge. (Photos by Fr. Bowe)***

- Have a clear plan for aged, infirmed, and the differently-abled in your family. Be clear as to what is to be done by whom when a hurricane threatens. Make sure enthusiasm is matched by knowledge, competence and commitment.
- Keep a large supply of "jumbo" or lawn-size garbage bags of the thickest gauge you can get. If your roof is damaged you might have to put many household and personal items in garbage bags to protect them from the elements until your roof can be repaired and that could take a while because of challenges with availability of both workmen and materials
- Keep a supply of large freezer bags in addition

• ***Continues on next page***

Family Preparedness for Hurricanes: Lessons of Life and Experience

- ***Continued from previous page***

to garbage bags. These are handy for storing papers and other documents. It is also wise to have insulated containers of various sizes. Those will be useful for storage as well.

- Take and keep in electronic form photographs of your home and contents. Note the date on which the photos were taken. That could prove very helpful to you if you have to make a claim for insurance. Pay particular attention to appliances.
- Organisations should consider the use of Cloud Technology as part their business continuity plans. The use of Cloud Technology would allow for easy retrieval of original documents and restoration of system information and data depending on the extent and sophistication of the cloud technology in use. Similarly, individuals should consider where practicable, storage of important documents and pictures in a secure Cloud arrangement.
- The COVID-19 realities that are still emerging, suggest that a wider group of responders will be required to deal with the twin challenges of COVID-19 and the threat of hurricanes during 2021. Responders might even be required for new activities and tasks. Additional and alternative or supplementary personnel should be identified and trained appropriately. Our current circumstances indicate that such contingency arrangements may now be even more critical than at the start of the COVID-19 crisis in 2020.
- Ensure that each member of the family has at least one pair of good-fitting, comfortable work shoes. Check the shoes periodically because "dry rot" can set in and cause the soles to separate



Take and keep in electronic form photographs of your home and contents; note the date on which the photos were taken.
(Photo by Fr. Bowe)

from the shoes if they are not worn often. Replace or repair them if that happens. Put on those shoes with a good pair of thick socks if you get to a Hurricane Warning event and a strike is considered imminent.

- Keep a good, water-proof toolkit and high-quality tools from reputable manufacturers. Good quality tools are always worth the investment. Make sure you have a hammer, different types of pliers and vice grips, various sizes and types of screwdrivers, wrenches and saws. Keep nails, screws and bolts of various sizes. Keep twine and water-resistant tape and rope of various sizes. You might have to use and replace those every few years.
- It usually takes longer to prepare the yard, especially the backyard, than most of us think. Securing loose and very light-weight items is a big task. Start the job early if it is necessary to do it.

• ***Continues on next page***

Family Preparedness for Hurricanes: Lessons of Life and Experience



Prepare the entire family intellectually, psychologically and emotionally for what all of you might face during the passage of a major hurricane. (Photo by Fr. Bowe)

• ***Continued from previous page***

- Create plans for emergency toilet arrangements (I will spare your sensitivities here) but know what your plan A, plan B and plan C will be. Remember in the aftermath of a major hurricane strike you might not have pipe-borne water for weeks. Potable water should be kept for drinking in such situations. Comply with the advice health experts give.
- If you live in a hurricane-prone zone, invest incrementally each season in supplies and tools such as shovels, hoes, spades, yard brooms, tarpaulins and large sheets of durable plastic. Store these items carefully. If you can, put them in an appropriate storage location that does not hamper everyday life and living.
- Pay close attention to personal care products and supplies such as diapers for children and adults (if needed), feminine hygiene supplies, baby and adult wipes, garbage bags, toilet paper and paper towels. Try to keep adequate supplies for the numbers in your family based on your spending power. They can be used in rotation after the end of the season.
- Protect your large electronic appliances such as TVs, microwaves, entertainment centres, stereos and desktop computers. If you protect them with secure water-proof coverings most of them survive hurricane conditions well provided that they are covered and then not left sitting in water. Remember that you should unplug such

appliances before the power is turned off at the mains by your electricity provider.

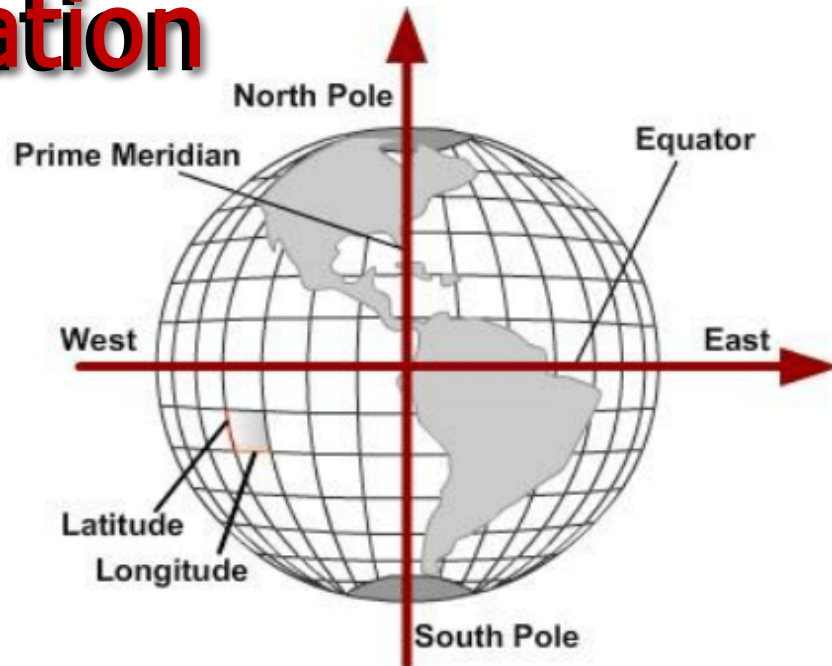
The list of items that I have provided and described above might seem imposing, expensive and even esoteric to some people. You might also wonder about storage space and if you will remember all that you have acquired for hurricane preparations and how to use them. My advice is the following:

- Develop an actual checklist of these items that the family can review in June and December of each year.
- Be prudent in your purchases by identifying the products that save life or promote health and security. Always purchase those items first.
- Maintain your tools and equipment. Proper maintenance extends their useful life for many years.
- Put a premium on quality – always look for authentic and genuinely well-known brands. Hurricane preparedness is not the time to experiment with products of questionable quality.
- When retrofitting your home, for example with storm shutters or hurricane straps, get expert advice. Plan the work in phases, in that way you will be able spend money in phases according to your financial capacity.
- Consider informal agreements with close neighbours or relatives who live close by. In that way, not everyone might need to purchase a wheelbarrow. If you are a good carpenter, assist someone who is a good plumber on the basis of reciprocity.

Know Your Location

A globally accepted system that uses latitude and longitude coordinates allows us to locate any place on the earth's surface. Latitude measures locations on the globe that are north and south of the Equator. The measurements are stated in degrees, minutes and seconds. The highest numerical readings for latitude are ninety degrees North (90°N) and ninety degrees South (90° S). The Equator is zero degrees (0°). The Equator divides maps of the earth into Northern and Southern hemispheres. When lines of latitude are shown on a map, a globe or a graphic of the earth, they are displayed as parallel lines with the Equator and they are equidistant. One degree of Latitude is equivalent to 69 miles. There are small variations at the Equator and the Poles. The variations have been calculated and are used when required.

Longitude measures locations east and west of the Prime Meridian. In 1884 it was agreed that the Prime Meridian identified a location in Greenwich, London, England. You should note that the more



widely used meridian in more modern times is the IERS Reference Meridian.

The International Reference Meridian (IERS) was devised from the Greenwich Meridian but it is slightly different. The difference between both exists because of variations between astronomical

• *Continues on next page*



Know Your Location

- **Continued from previous page**

and geodetic coordinates. Those differences are important in this the age of satellite imagery.

Lines of longitude are also stated in degrees, minutes and seconds. Longitude is measured in degrees that extend both east and west of the Prime Meridian to a maximum of one hundred and eighty degrees East and West (180° E or W°). The Prime Meridian is zero (0°) degrees. It divides maps of the world into the Eastern and the Western hemisphere. On a map, the lines of Longitude meet at the North and South Poles. At the Equator one degree of Longitude is equivalent to 69 miles but only at the Equator. At forty degrees (40°) North or South the distance is 53 miles. That distance becomes smaller and smaller until the longitude lines meet at the Poles on a map or a globe.

Lines of Longitude are known as meridians and not parallels as the lines of Latitude are. It is the intersection of the values for latitude and longitude that give a unique position for a specific location. There are now APPS that give us locations and calculate distances.

Locations of storms or hurricanes are given in terms of latitude or longitude for the centre of the system, e.g. seventeen degrees North and sixty degrees West. (17° N 60° W). That information makes it possible to track the movement of the system on a map or follow it on technology-driven schematics and graphics.

When you know the location of your country (a CARICAD member state for example) in latitude and longitude you can get the earliest indication of the proximity of your country to likely effects from the

storm. Additionally, you will get a clearer picture by examining the predicted, projected path of the system as given in weather reports. Remember that the centre of the hurricane could be anywhere in the "cone of uncertainty" and there is about a 30 per cent chance that the system will also travel outside the cone. You must be mindful that a hurricane can be hundreds of miles across and hurricane conditions might extend for a hundred miles or more from the centre.

We have prepared the table below for your information and convenience. It shows the latitude and longitude of all CARICAD member states. Remember that the precise location within a multi-island state for a particular island in that state or territory could be slightly different from the figures shown.

- **Continues on next page**

COUNTRY/TERRITORY	LATITUDE IN DEGREES NORTH	LONGITUDE IN DEGREES WEST
Anguilla	18. 22 N	63.06 W
Antigua & Barbuda	17. 06	61.79
Bahamas	25. 33	77.39
Barbados	13.19	59.54
Belize	17.18	88.49
British Virgin Islands	18.42	64.64
Dominica	15.41	61.37
Grenada	12.11	61.67
Guyana	04.86	58.93
Jamaica	18.10	77.29
Montserrat	16.74	62.18
St. Kitts & Nevis	17.35	62.78
Saint Lucia	13.90	60.97
St. Vincent & the Grenadines	12.98	61.28
Suriname	3.91	56.02
Trinidad & Tobago	10.69	61.22
Turks and Caicos Islands	21.69	71.79

Know Your Location



The Bahamas is the most northerly CARICAD member state and suffered significant damage in 2019. (Photo by Fr. Bowe)

- **Continued from previous page**

Further, in geographically large member states such as Guyana, Suriname and Belize the values will be different for different locations within the country.

Note that The Bahamas is the most northerly CARICAD member state, Suriname is the most southerly, Barbados is the most easterly and Belize is the most westerly.

In earlier years there was a tradition of identifying a 'Hurricane Belt' in the Atlantic Basin.

It encompassed the northern part of the Caribbean Sea as well as the Gulf of Mexico. It also included Florida and the Florida Keys. There is now a disinclination to consider the Hurricane belt as having statistical certitude. It used to be said that Grenada was outside the Hurricane Belt but that kind thinking started to change when



Grenada was devastated by a major hurricane — Ivan in 2004. It is worth remembering that in 1955 Hurricane Janet, a category 5 hurricane, caused widespread damage and several deaths in Barbados and the Grenadines that are often considered to be outside the zone of likeliest hurricane impact.



Property destruction in The Bahamas.
(Photo by Fr. Bowe)

Climate Change and Hurricanes

On March 31st, 2021 five [National Oceanic and Atmospheric Administration](#) (NOAA) scientists — [Thomas R. Knutson](#), [Maya V. Chung](#), [Gabe Vecchi](#), [Jingru Sun](#), [Tsung-Lin Hsieh](#) and [Adam J. P. Smith](#) — wrote a paper entitled, *Climate Change is Probably Increasing the Intensity of Tropical Cyclones*, and reached several important conclusions that we have reproduced here in our newsletter.

"Warming of the surface ocean from anthropogenic (human-induced) climate change is likely fuelling more powerful Tropical Cyclones (TCs). The destructive power of individual TCs through flooding is amplified by rising sea level, which very likely has a substantial contribution at the global scale from anthropogenic climate change. In addition, TC precipitation rates are projected to increase due to enhanced atmospheric moisture associated with anthropogenic global warming."

- Warming of the surface ocean from human-induced climate change is likely fuelling more powerful tropical cyclones (TCs).
- The destructive power of individual TCs through flooding is amplified by rising sea

level, which very likely has a substantial contribution at the global scale from anthropogenic climate change.

- TC precipitation rates are projected to increase due to enhanced atmospheric moisture associated with anthropogenic global warming.
- The proportion of Category 4 & 5 TCs has increased, possibly due to anthropogenic climate change, and is projected to increase further.
- Most climate model studies project the total number of TCs each year to decrease or remain approximately the same."

The forecasts described above should encourage serious reflection and concerted action for Climate Change Adaptation in CARICAD member states. In 2019 the **High-Level Working Group on Inter-American Relations & Bipartisanship** published a paper entitled, *The Caribbean's Extreme Vulnerability to Climate Change: A Comprehensive Strategy to Build a Resilient, Secure and Prosperous Western Hemisphere*.

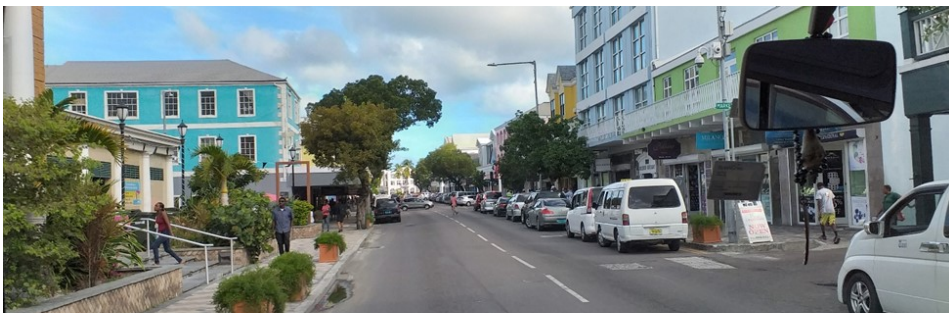
• **Continues on next page**

Climate Change and Hurricanes

• Continued from previous page

Some of the significant conclusions put forward in the article are reproduced because of their cogency and relevance.

"The projected consequences of climate change for the Caribbean have strong implications not only for today's economy, but also for the long-term development of the entire region. The sectors at higher risk include tourism, fishery, agriculture, human settlements, and infrastructure (UNDP, 2018). Caribbean islands have diversified their economies away from agriculture and moved into tourism and services. But although tourism makes up for 15 per cent of the Caribbean's GDP, agriculture is still a major land-use activity. The effect of extreme weather events on countries that dedicate large areas of land to agricultural production for export can be particularly



The Bahamas has a high rate of exposure to hurricanes. (Photo by Franklyn Michael)

devastating. Recent extreme weather events, at times, have wiped out the entire sugar cane production of Cuba, banana plantations in Jamaica, Saint Lucia and Dominica, and decimated nutmeg exports from Grenada. Water temperature increase also poses a particular challenge on Caribbean export fisheries. In Barbados, where yellow fin tuna is the island's greatest fish export, as surface temperature rises, tuna is forced to move northward to find the oxygen it needs to live. This means fishermen must move deeper to find high quality tuna, adding fuel costs in the sector, but most importantly raising territorial implications in the Caribbean. The same goes for flying fish. In a typical year, flying fish account for around 65 per cent of the total fish catch in Barbados, according to the Food and Agriculture Organization (FAO) of the United Nations. But as flooding increases, changing the direction of surface water current, fishers are forced to travel farther into the ocean going as far as 500 km away from Barbados, reducing catches of an important staple for local residents (St. Lucia Times, 2019). The consequences of inaction also paint a devastating picture for future health and wellbeing. Between 2001 and 2009 there were 211,937 registered cases of dengue fever in the Caribbean. Climate change is expected to increase dengue fever transmission by 300 percent, as increased temperature reduces parasites' incubation time. Additionally, if climate change is not addressed today, between 2030 and 2050, climate change is expected to cause approximately 250,000 additional deaths per year from malnutrition, malaria, diarrhoea, and heat stress (ECLAC 2011 and Sealy, H. 2018).



Although tourism makes up for 15 per cent of the Caribbean's GDP, agriculture is still a major land-use activity. (Photo by Fr. Bowe)

Naming of Hurricanes

THE NAMES FOR THE 2021 ATLANTIC HURRICANE SEASON – JUNE 1 – NOVEMBER 30



Atlantic Hurricane Names 2021

Ana
Bill
Claudette
Danny
Elsa
Fred
Grace
Henri
Ida
Julian
Kate
Larry
Mindy
Nicholas
Odette
Peter
Rose
Sam
Teresa
Victor
Wanda

The World Meteorological Organization (WMO) maintains lists of hurricanes for each of the tropical cyclone prone areas of the world. The storms and hurricanes are referred to as Tropical Cyclones. The Atlantic Basin includes the Caribbean Sea and the Gulf of Mexico. This action is in keeping with a convention that was agreed to in 1950 to formally name Atlantic hurricanes. A list was originally kept by the National Hurricane Centre (NHC) in the USA. The responsibility was passed to the WMO in 1953.

The list of names for the 2021 season comprises 21 alternating names of men and women. The names of men were not included until 1979. The list is recycled in the sixth year. This means that for example a list used in 2019 is recycled in 2025. In cases in which storms occur in December they are given names from the list for the current season.

On the other hand, storms which occur very early in a year are given names from the next season's list. Prior to 2021 whenever there was a need for more than 21 names in a season, the Greek alphabet was used as it was in 2005 and 2020. The supplementary Greek alphabet list was adopted as a solution to a challenge that emerges when there are more than 21 named storms in a single Atlantic Hurricane Season. This can occur because names for storms are not created with the letters Q, U, X, Y and Z. The Hurricane Committee of the WMO decided recently that it would dispense with the system of using Greek alphabet letters as supplementary names for hurricanes.

Storm names are retired from the list when they are especially deadly or destructive. When the names are retired we are assured that any reference made later on can only be to those particular storms or hurricanes and not a predecessor or successor system with the same name. However, because retirement only occurs with the really destructive systems the names of storms that do little or no damage might be repeated. In that regard four names were removed from the rotating list after the 2020 season. The names removed were Dorian, Laura and the Greek names of Eta and Iota. They caused death and/or significant damage somewhere in the hemisphere. The Hurricane Committee has decided that Dorian will be replaced by Dexter, and Laura by Leah.

It should be noted that although there was a lobby to officially start the Hurricane season in May instead of June, the start of the season will remain June 1.

The supplemental names for 2021 are: **Adria, Braylen, Caridad, Deshawn, Emery, Foster, Gemma, Heath, Isla, Jacobus, Kenzie, Lucio, Makayla, Nolan, Orlanda, Pax, Ronin, Sophie, Tayshaun, Viviana and Will.**

• *Continues on next page*



Naming of Hurricanes

Flooding caused by Hurricane Tomas in central Castries, Saint Lucia.

- *Continued from previous page*

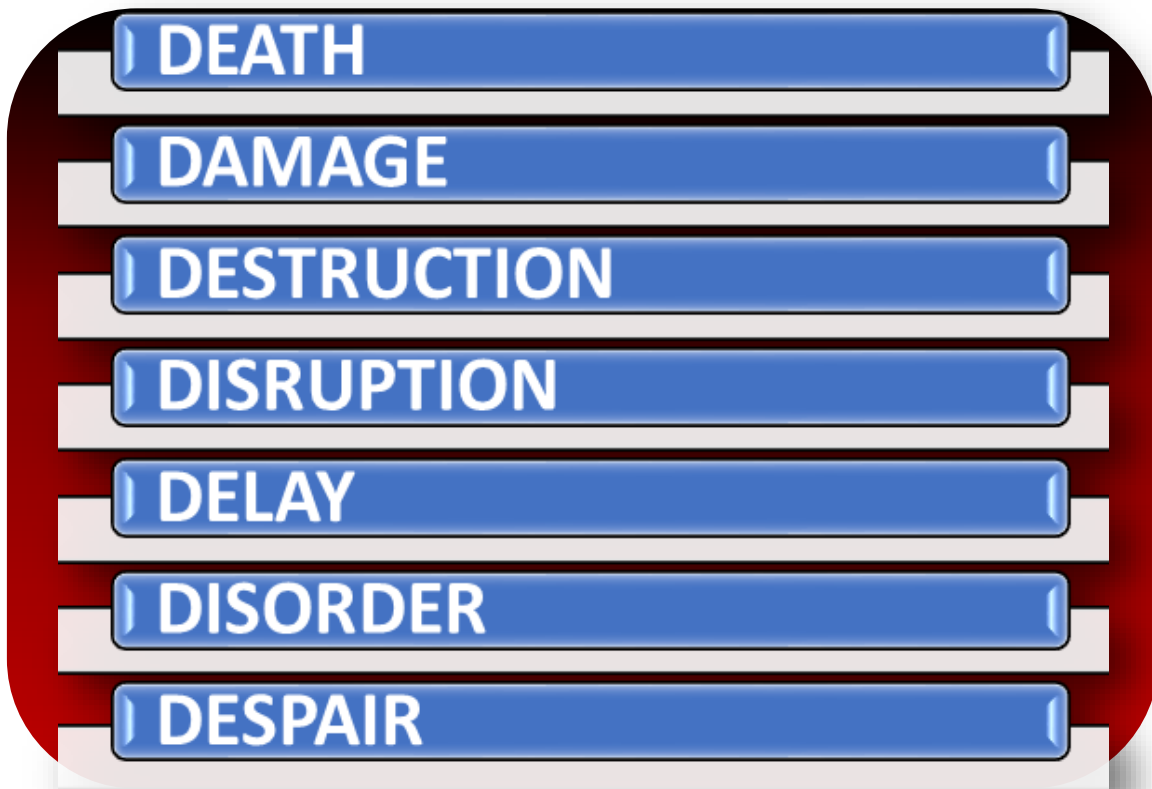
This is the list of primary Atlantic Hurricane names for 2022-2026:

2022	2023	2024	2025	2026
Alex	Arlene	Alberto	Andrea	Arthur
Bonnie	Bret	Beryl	Barry	Bertha
Colin	Cindy	Chris	Chantal	Cristobal
Danielle	Don	Debby	Dexter	Dolly
Earl	Emily	Ernesto	Erin	Edouard
Fiona	Franklin	Francine	Fernand	Fay
Gaston	Gert	Gordon	Gabrielle	Gonzalo
Hermine	Harold	Helene	Humberto	Hanna
Ian	Idalia	Isaac	Imelda	Isaias
Julia	Jose	Joyce	Jerry	Josephine
Karl	Katia	Kirk	Karen	Kyle
Lisa	Lee	Leslie	Lorenzo	Leah
Martin	Margot	Milton	Melissa	Marco
Nicole	Nigel	Nadine	Nestor	Nana
Owen	Ophelia	Oscar	Olga	Omar
Paula	Philippe	Patty	Pablo	Paulette
Richard	Rina	Rafael	Rebekah	Rene
Shary	Sean	Sara	Sebastien	Sally
Tobias	Tammy	Tony	Tanya	Teddy
Virginie	Vince	Valerie	Van	Vicky
Walter	Whitney	William	Wendy	Wilfred

The 7 Ds of Hurricane Damage

by Franklyn Michael

I have found that one of the most challenging of the issues in helping to prepare communities for the effects of hurricanes is that there is a tendency to focus on the features of the storms themselves and not on the effects that we have to deal with after. In that regard I have developed the concept of the Seven Ds (7Ds) of Disaster and applied it to hurricanes. The graphic below displays the concept:



DEATH

The graphic starts with death. Hurricanes have been responsible for deaths. It must be stated that most of the deaths caused by hurricanes happen because of flooding and storm surge at the coastline or inland flooding. It is seldom that many deaths are directly caused by the force of the wind. It now appears that our CARICAD member states have become increasing proficient at saving lives during hurricanes. The number of deaths recorded even after a major hurricane is usually low (thankfully).

DAMAGE

Hurricanes cause extensive damage. The damage occurs across all sectors in the natural and built environments. All economic sectors, the public, social and community sectors suffer damage. The damage can result from a combination of strong winds, heavy rains, landslides and floods. Secondary damage may occur from exposure to the elements

after the initial hurricane impact. The list of areas where damage can occur is as broad as human everyday living experience:

- Coastlines, beaches and reefs
- Forests and vegetation
- Houses and household appliances, furniture and equipment
- Personal items – clothing, mementos
- Commercial buildings and services
- Social infrastructure – hospitals and clinics, Schools and other institutions of learning
- Office complexes
- Airports and ports
- Roads
- Bridges
- Boats – commercial and pleasure
- Vehicles

• ***Continues on next page***

One of the greatest challenges of Recovery management after a hurricane is the challenge of replacing what has been totally lost or otherwise destroyed.



The 7 Ds of Hurricane Damage

• *Continued from previous page*

DESTRUCTION

It is important to recall that anything that can be damaged by a hurricane can also be destroyed by a hurricane if the forces are strong enough. One of the greatest challenges of Recovery management after a hurricane is that of replacing what has been totally lost or otherwise destroyed. This is particularly important in relation to critical facilities such as hospitals and airports. It is also pivotal in social recovery if many houses and schools are completely destroyed in a hurricane event.

The mere existence of a hazard does not automatically or immediately result in a disaster. There tends to be a progression from the appearance of a hazard to the negative effects that may culminate in an emergency, a crisis or a disaster. Overall vulnerability is a function of the relationship between hazards and level of risk.

DISRUPTION

A major hurricane impact results in disruption. The disruption relates primarily to services. Services provided by all sectors are usually suspended because the situation must be assessed and decisions taken as to how best to resume services. This often takes time. It sometimes affects critical utilities and other essential services.

DELAY

Delays are common with hurricane impacts. Entities might not have been directly damaged but because of disruptions that have taken place in other areas of the economy, then delays arise. A school might not have undergone serious damage but if there is extensive damage to the water system, the school cannot resume classes.

• *Continues on next page*

The 7 Ds of Hurricane Damage

• *Continued from previous page*

DISORDER

Hurricanes can create disorder in several ways. The disorder can result from the destruction, damage and delay alluded to before. Additionally, disorder can result from actions by small groups of people engaging in nefarious activities such as looting or larceny.

There is growing concern that societal disorder after a hurricane strike is becoming a greater challenge than it was in previous decades. There have been situations in which internal security proved to be a genuine problem to the degree that regional military forces had to be sent into countries to help. We need to plan and prepare for this apparent threat to order and good governance.

DESPAIR

There is an increasing realisation that major hurricanes can create a sense of despair that affects individuals, families and communities. There is also the realisation that the

socio/economic realities of our region indicate that the despair is often greater among women because of their living circumstances. This is an area in which there are increasingly strident calls for preventive and corrective action. A major hurricane impact results in disruption which relates primarily to utility services.

Living through a major hurricane impact is stressful for everyone. We should accept that as critical as physical survival is for all, we must also consider what some people might go through after the event. Those who might have lost relatives, neighbours or loved ones or who received major injuries will be under great stress for extended periods. Some might have lost one of their biggest investments — their homes. Additionally, the social and economic dislocation will result in people becoming unemployed, partially employed or losing their accommodation and access to educational facilities. Some people might find themselves living in shelters for a long time. The psycho-social consequences for many people are an important part of the Response and Recovery management canvas and should be treated as such.



Major hurricanes can create a sense of despair that affects individuals, families and communities.

Beware of Hurricane Winds



Many places were damaged by the wind in The Bahamas with the passage of Hurricane Dorian. (Aerial shot by Fr. Bowe)

by Franklyn Michael

The principal difference in the categorisation of a Hurricane over a Tropical Storm is the sustained wind speed. A storm has sustained wind speeds that are between 39 and 73 miles per hour (mph). Hurricanes have wind speeds that may range from 74 miles per hour to more than 160 mph. Both storms and hurricanes can have wind gusts that are higher than the sustained winds. In general terms, hurricane winds are not the hurricane-generated hazard that cause the highest numbers of fatalities. However, the winds do cause fatalities and extensive damage. It is useful to think of the effects of hurricane winds in two distinct but related categories — direct and indirect effects.

DIRECT EFFECTS OF WIND DAMAGE

Hurricane winds can do extensive damage by the sheer physical force of the winds. This happens when trees are uprooted, electrical poles toppled and perimeter fences flattened. The direct effects of wind damage could be millions of dollars in each event. In 2017 colleagues and friends in the British Virgin Islands (BVI) described scenes like the following:

- ◇ Yachts removed from marinas and deposited in main roads

- ◇ Cars lifted unto porches
- ◇ Roofs deposited in neighbouring front yards
- ◇ Washers and dryers removed from verandas and put into the streets
- ◇ Cutlery from one apartment being blown into another
- ◇ Windows shattered by the force of the wind alone

In 2004 in Grenada there was a famous story about a house that had “crossed the road” in a coastal village due to Hurricane Ivan.

Hurricane winds can also damage buildings directly because of the force of pressure differentials. The pressure exerted by the wind on one side of a building or on the roof might be greater than on another side of the building. In a major hurricane that difference can be so great that in a manner of speaking the building almost explodes. Buildings that have roofs made of materials other than concrete with a very low pitch are particularly susceptible to this form of damage. The changes in force and pressure can be particularly marked if the eye of the storm passes over or near a

• ***Continues on next page***

Beware of Hurricane Winds

• Continued from previous page

particular location. In Hurricane Hugo in Montserrat in 1989, I can recall my ears "popped" near the time of the passage of the eye of the storm.



(Photo by Franklyn Michael)

INDIRECT EFFECTS OF WIND DAMAGE

The indirect effects of hurricanes can be thought of as both a companion to and largely a consequence of the direct effects. The force of the wind can topple huge trees. When those trees fall, if they fall on a house or vehicle, they can do great damage. Sadly, there have been cases where people have been killed when trees fall on houses and vehicles.

One of the most dramatic features of a major hurricane is the nature and extent of flying debris. Debris driven by hurricane force winds can do extensive damage. Portions of roofs, tree branches, garbage cans, outdoor furniture and construction debris can become truly lethal missiles on the winds of a major hurricane.

One of the ways in which major hurricanes create indirect damage is through the impact of "horizontal rain". If you have not experienced it, you might find it hard to believe. The force of the winds is enough to send the rain forward parallel with the ground. Most buildings, especially houses are designed for normal rain that falls vertically; horizontal rain can cause extensive interior flooding.

CREATING RESILIENCE TO WINDS

- Countries should have cohesive policies for Disaster Risk Reduction in relation to all hazards particularly land zoning and physical planning
- All our member states should work to create or revise their building codes and ensure that the appropriate resistance requirements for wind damage are included along with provisions for all major hazards
- Rigorous standards should be introduced and maintained for construction materials to promote resistance to all hurricane hazards. The standards should be backed up with

relevant, modernised, laws and regulations

- The training that is formally provided in construction methods should be standardised to ensure the acquisition of skills and techniques related to hazards
- The mechanisms that are used for building inspection should be vigorously implemented in all sectors

It is important that we accept hurricanes as a part of the reality of Caribbean life that requires human behavioural change to promote higher levels of resilience. Experts in some quarters are predicting that hurricanes might become more powerful in the years ahead. Should that forecast prove to be accurate then we must bear the following in mind. In hurricanes, the wind force increases exponentially. This means that in a hurricane that is twenty five miles per hour (25 mph) stronger, the force of the winds will be seventy three per cent (73%) greater.

THE SAFFIR-SIMPSON WIND SCALE

The Saffir-Simpson Hurricane Wind Scale is a 1 to 5 rating based on a hurricane's sustained wind speed. This scale estimates potential property damage. Hurricanes reaching Category 3 and higher are considered major hurricanes because of their potential for significant loss of life and damage. Category 1 and 2 storms are still dangerous, however, and require preventative measures. In the western North Pacific, the term "super typhoon" is used for tropical cyclones with sustained winds exceeding 150 mph. Note that all winds are using the U.S. 1-minute average.

SOURCE: Quoted directly from the National Hurricane Centre (NHC)
<https://www.weather.gov/mfl/saffirsimpson>

• Continues on next page

Beware of Hurricane Winds

CATEGORY ONE HURRICANE

Winds 74-95 mph (64-82 kt or 119-153 km/hr). Very dangerous winds will produce some damage: Well-constructed framed homes could have damage to roof, shingles, vinyl siding and gutters. Large branches of trees will snap and shallowly rooted trees may be toppled. Extensive damage to power lines and poles likely will result in power outages that could last a few to several days. Irene of 1999, Katrina of 2005, and several others were Category One hurricanes at landfall in South Florida.

CATEGORY TWO HURRICANE

Winds 96-110 mph (83-95 kt or 154-177 km/hr). Extremely dangerous winds will cause extensive damage: Well-constructed framed homes could sustain major roof and siding damage. Many shallowly rooted trees will be snapped or uprooted and block numerous roads. Near-total power loss is expected with outages that could last from several days to weeks. Frances of 2004 was a Category Two when it hit just north of Palm Beach County, along with at least 10 other hurricanes which have struck South Florida since 1894.

CATEGORY THREE HURRICANE

Winds 111-129 mph (96-112 kt or 178-208 km/hr). Devastating damage will occur: Well-built framed homes may incur major damage or removal of roof decking and gable ends. Many trees will be snapped or uprooted, blocking numerous roads. Electricity and water will be unavailable for several days to weeks after the storm passes. Unnamed hurricanes of 1909, 1910, 1929, 1933, 1945, and 1949 were all Category 3 storms when they struck South Florida, as were King of 1950, Betsy of 1965, Jeanne of 2004, and Irma of 2017.

CATEGORY FOUR HURRICANE

Winds 130-156 mph (113-136 kt or 209-251 km/hr). Catastrophic damage will occur: Well-built framed homes can sustain severe damage with loss of most of the roof structure and/or some exterior walls. Most trees will be snapped or uprooted and power poles downed. Fallen trees and power poles will isolate residential areas. Power outages will last weeks to possibly months. Most of the area will be uninhabitable for weeks or months. The 1888, 1900, 1919, 1926 Great Miami, 1928 Lake Okeechobee/Palm Beach, 1947, Donna of 1960 made landfall in South Florida as Category Four hurricanes.

CATEGORY FIVE HURRICANE

Winds 157 mph or higher (137 kt or higher or 252 km/hr or higher). Catastrophic damage will occur: A high percentage of framed homes will be destroyed, with total roof failure and wall collapse. Fallen trees and power poles will isolate residential areas. Power outages will last for weeks to possibly months. Most of the area will be uninhabitable for weeks or months. The Keys Hurricane of 1935 and Andrew of 1992 made landfall in South Florida as Category Five hurricanes.

Saffir-Simpson Hurricane Wind Scale

(1 = least extreme; 5 = most extreme)

Category 1



- Winds range from **74 to 95 mph**
- Minor damage to property (roof damage)
- Injuries to humans are isolated
- Short-term power outages

Category 2



- Winds range from **96 to 110 mph**
- Significant property damage, flooding
- Increased threat to humans due to falling debris
- Extensive, multi-day power outages

Category 3



- Winds range from **111 to 130 mph**
- Mobile and frame homes destroyed, extensive flooding
- Evacuation necessary for human safety
- Electricity, water unavailable for up to several weeks

Category 4



- Winds range from **131 to 155 mph**
- Houses, shopping centers irreparably damaged
- Humans at serious risk of death in certain areas
- Long-term power outages, water shortages

Category 5



- Winds of **155 mph+**
- Complete destruction of homes, shopping centers
- Trees uprooted, extreme flooding
- Power and water potentially out for months



The British Virgin Islands were severely damaged by storms and hurricanes in 2017. (Photo by Franklyn Michael)

Preparing for Hurricanes

SUGGESTIONS FOR PUBLIC SECTOR MANAGERS

Preparing for hurricanes in CARICAD member states must be done against a backdrop that is different from locations on the mainland of the United States such as Florida or the Carolinas:

- ◇ Most member states are economically dependent on tourism. The numbers of tourists on any given day, may be many thousands in a non-COVID-19 setting
- ◇ Evacuation off islands by road is impossible
- ◇ Regional travel will most likely be suspended in the smallest of the member states even before winds get to tropical storm strength
- ◇ Ferry services might have to be suspended because of difficult docking conditions
- ◇ Critical facilities such as hospitals, ports and airports are few
- ◇ Schools are often required for use as emergency shelters
- ◇ Stockpiles or stores of emergency supplies are very limited
- ◇ There is a heavy reliance on imported foods especially long shelf life food liked canned and dried goods
- ◇ Modern house construction styles, although making homes more salubrious, has made the buildings more vulnerable to wind damage – lengthy overhangs, lots of glass, lower pitched roofs, limited used of hurricane straps

CARICAD suggests that all public sectors (focus of CARICAD's mandate) plan for the persistent threat of hurricanes and the high probability of impact somewhere in the region each year. This requires a commitment on the part of public sector managers and leaders to embrace preparedness as part of the job.

It is important to be thorough and systematic with hurricane preparedness. Make hurricane preparedness (should really be all hazard preparedness) a part of organisational culture. In that regard CARICAD suggests the use of a framework such as the **BE, KNOW, HAVE and DO Model** that CARICAD previously proffered for managing in a crisis, be adapted for hurricane preparedness.

• **Continues on next page**

Preparing for Hurricanes

SUGGESTIONS FOR PUBLIC SECTOR MANAGERS

- Continued from previous page**

We are at the start of the 2021 hurricane season, so we have adapted the original model to focus

specifically on hurricanes. It is our hope that with continuous improvements in Preparedness, fewer lives will be lost and few hurricane impacts will become disasters.

- Continues on next page**

FRAMEWORK FOR PUBLIC SECTOR LEADERS/MANAGERS FOR PREPARING FOR HURRICANES

BE	KNOW	HAVE	DO
Committed to leading hurricane preparations	How to get reliable, official, weather information	Clear priorities for your organisation's work	Redeploy staff according to both competencies and commitment
Conscious that in 2020 (at least) COVID-19 protocols must be observed while dealing with hurricane preparedness	The location of your country in terms of latitude and longitude	Detailed, timely information about the impact of the hurricane on the organisation	Keep up-to-date with official weather information
An example to your staff – take the hurricane threat seriously	How to communicate at all times with staff and personnel at all levels	An accurate contact list for all staff including residential addresses. Keep a duplicate copy with you at home	Arrange training for staff in critical areas of skill that could be needed if there is an impact
Be thorough – plan for all departments and units	The members of staff that are likely to be overcome by fear and stress if a threat becomes imminent	Regular briefings among staff as you prepare for hurricanes	Arrange First-Aid training for staff
A source of accurate information about storm threats	Know the Emergency regulations as they might apply to your organisation and its work	Tabletop or if relevant, field exercises for your organisation	Check the emergency kit in the organisation
Be organised — Always have relevant documents available	Flood-prone zones in case you and staff have to transit them	Up-to-date contact information for key officials outside of your organisation	
Emotionally competent – consider how your behaviour and leadership styles impact others		Hard copies of contact lists as back ups	
		Reliable ICT systems and hardware for use for remote work if required	
		Accountability procedures in place for use of vehicles, plant and equipment during emergencies	
		Duplicate and back-up equipment and supplies	

Preparing for Hurricanes

SUGGESTIONS FOR PUBLIC SECTOR MANAGERS

• Continued from previous page

AFTER THE STORM: PERFORM AND TRANSFORM

In 2020 CARICAD promulgated two documents dealing with post-hurricane recovery. The first is a Model Hurricane Recovery Strategy and the second is a Guide for Post-Hurricane Recovery for Public Sector Managers. It is hoped that those documents will be embraced as a resource by public officers. The documents were produced because CARICAD wishes to emphasise that when a major hurricane hits a member state, it is the entire public sector that must respond. The framework below is therefore intended as a quick reference for public sector managers in the event that they are required to participate in post-hurricane Recovery.

FRAMEWORK FOR PUBLIC SECTOR LEADERS/MANAGERS FOR POST-HURRICANE WORK

BE	KNOW	HAVE	DO
Ready to work in a highly stressful environment	How all staff have been impacted	Various means of closely following Recovery activities	Share accurate weather information throughout the organisation
Conscious that in 2020 (at least) COVID-19 protocols must be observed while dealing with hurricane recovery	How to assign persons best suited to specific tasks	Regular briefings among staff as Recovery work continues	Keep up-to-date with official Recovery information
An example to your staff in terms of commitment to the long hours of demanding work Needed for Recovery	How to communicate with staff that may be under severe psychological stress	A revised contact list for all staff. Some staff may be staying with relatives and friends or even in shelters	Arrange counselling for staff that could be needed if there is an impact
Committed to urgency allied with effectiveness	How to manage change well	Up-to-date contact information for key officials outside of your organisation	Introduce internal staff welfare programmes. Pay particular attention to differently-abled staff
A source of accurate information about Recovery	How to coordinate work with strategic partners	Hard copies of contact lists as back-ups	Plan and manage all meetings well
Be empathetic and very patient with your staff	How best to relay public information related to your work if authorised to do so	Implementation matrices	Monitor all Recovery work systematically and regularly
Willing to use flexible structures such as working groups		Reliable ICT systems and hardware for use for remote work if required	Produce and submit progress reports on schedule
		Accountability procedures in place for use of vehicles, plant and equipment during Recovery	Review, assess and realign work as circumstances require
		Suitable Personal Protective Equipment (PPE) for personnel who might have to perform front-line Recovery tasks in the organisation or provide direct service to the public	Evaluate results and write down lessons for the future



There was widespread property destruction in The Bahamas.
(Photo by Fr. Bowe)

The CARICAD Guide for Post Hurricane Recovery: A Publication

The public sector has a critical role to play in any crisis, emergency, or disaster situation. Tropical storms and hurricanes are perennial, pernicious hazards in the Caribbean. The events of the 2017 hurricane season in which at least eight of CARICAD's 17 member states were directly affected by two major hurricanes, illustrate the importance of the public sector being well prepared for such events in future. In the smallest of the member states the public sector may well be the most prominent provider of healthcare, education, security, utility and communication services. The public sector takes the lead in matters of national security and public safety. The public sector also takes the lead in matters of welfare and public assistance. The capacity of the public sector for post-hurricane Response and Recovery may determine the overall effectiveness of the Recovery effort.

CARICAD has circulated a [Guide for Public Sector Managers for Post Hurricane Recovery Planning and Management](#) (The Guide). It is intended as a reference document for senior managers in the public sectors of CARICAD member states. It is also intended as a tool for capacity building for staff at all levels based on CARICAD's mantra for crises — [Prepare, Perform, Transform](#).

The Guide provides information from the concept

of a disaster to the priority actions and activities that are needed to lead a Recovery effort after a hurricane impact. It includes information that stresses the importance of Leadership, Management, Coordination and Teamwork to achieve the agreed priorities. The information was developed after extensive research and drawing on the experience of some of the most knowledgeable disaster managers in the Caribbean region. We have deliberately made the suggestions operational and practical. Many of the practices we advocate can be attested to by our own CARICAD team, based on our experiences.

We hope that public sector managers will continue to keep The Guide as a constant reference during upcoming hurricane seasons. We also hope that they will use it to help to prepare their Ministries, departments or agencies for the reality of hurricanes, this year and in the years ahead. The Guide is laid out in such a manner that managers can refer to the sections and subsections that may be most relevant to their needs and interests. It is also written in a way that allows managers to copy the pages with practical suggestions and tips as a quick reference into a separate folder.

The [CARICAD Schema for Post Hurricane Recovery Management \(2017\)](#) is also presented in this newsletter.

The 'R' Framework for Recovery and Resilience



'Normal' in a post hurricane situation will be more aspirational than actual for many months. (Photo by Fr. Bowe)

We continue to reiterate our opinion that the public sector is pivotal in any crisis, emergency, or disaster situation that happens in a CARICAD member state. Tropical storms and hurricanes are persistent and perennial hazards in the Caribbean. The devastating events of the 2017 hurricane season illustrate the importance of the entire public sector being well prepared for such events. The CARICAD Secretariat had for many years made the case that effective Disaster Management in the Region was heavily dependent on a public sector that was prepared to play a critical leadership and management role in all phases of the disaster cycle. The effects of hurricanes Irma and Maria in 2017 made the point forcibly for yet another time. The ongoing volcanic events in St. Vincent and the Grenadines provide another reminder.

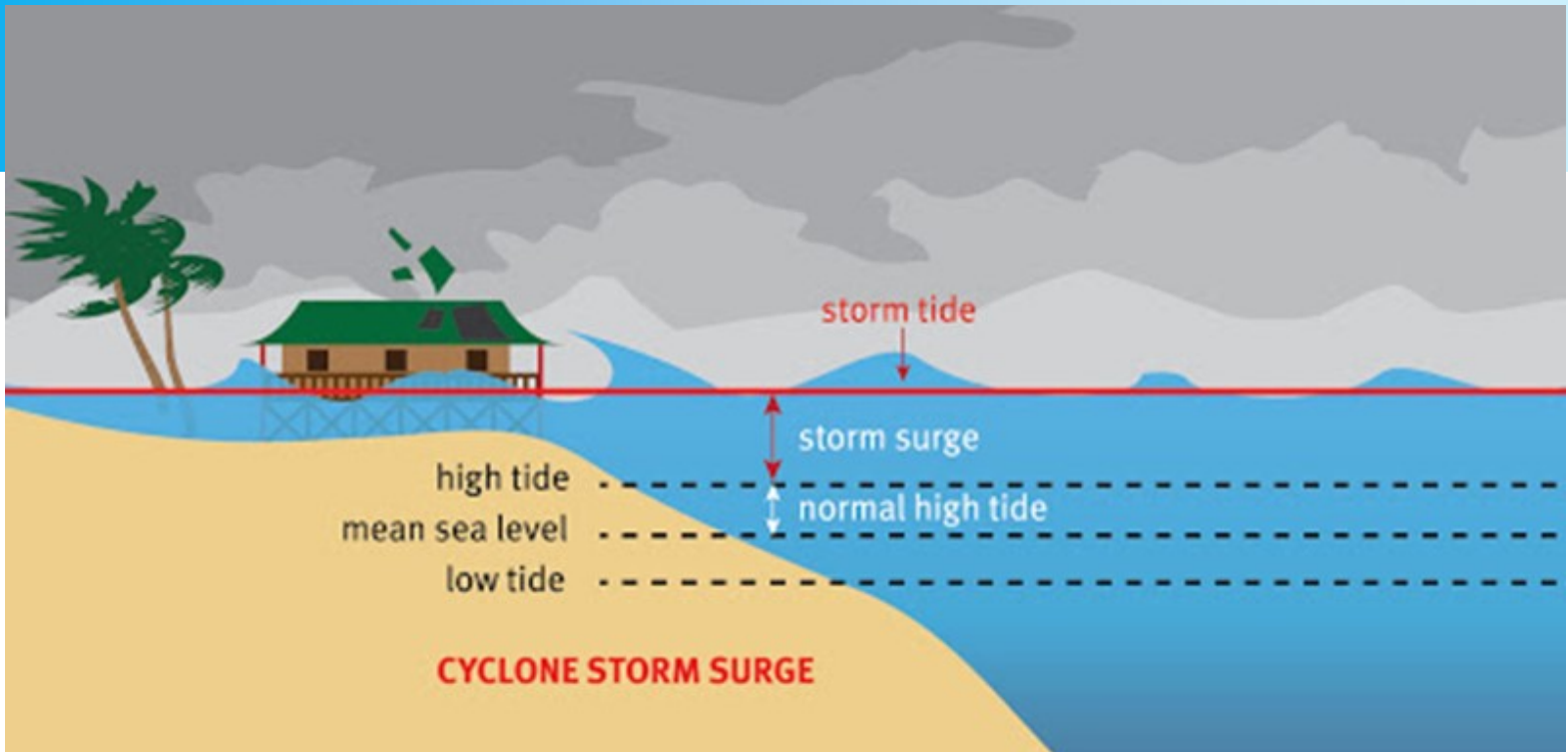
The public sector includes statutory organisations, executive agencies and government companies. In those cases, the level of independence of the organisations will be greater than in a hierarchical line Ministry reporting relationship. However, the government still maintains administrative control. In the smallest of the member states the public sector may well be the most prominent provider of health, education, emergency shelter, welfare, security,

utility, environmental protection and communication services. The level of readiness and response and recovery capacity of the public sector may determine the overall effectiveness of the Recovery effort.

The transition to Recovery means an affected state would have gone through much of the trauma and challenge of the Response Phase and would then be moving to "return to normal" as far as possible. The commitment to returning to normal carries with it the understanding that the public sector will also be attempting to return to normal. "Normal" in a post hurricane situation will be more aspirational than actual for many months. Public sector managers should recognise that despite the dramatic negative effects of disasters that there is a potential for the positive. Disasters create an opportunity not only to rebuild and replace but to change and improve (Transform). This suggests that there will be a need for clarity of vision, knowledge, skills and a commitment to consistent determined action to make the changes that will lead to greater resilience and sustainability. The 'R' Framework for Recovery that we provide below is intended to help public sector managers establish clear priorities for post hurricane Recovery.

• ***Continues on next page***

KEY ACTION AREAS	TASKS AND ACTIVITIES
R PAIR	• Schools • Health facilities • Other government buildings • Coastal defences • Docks and ancillary facilities
R EPLACE	• Infrastructure damaged beyond repair • Emergency Supplies • Equipment • Outmoded legislation
R EDUCE	• Vulnerability to storms, hurricanes and their associated negative effects • Vulnerability to the effects of climate change
R E-DEVELOP	• Community-level Disaster Management structures and procedures • Hazard-resistant shelters • Search and rescue capacity • Emergency communications arrangements • Emergency water supplies • Early warning systems • Emergency warehouse arrangements • Debris removal systems • Procedures for continuity of Government • Procedures for protecting cultural and recreational facilities • Retrofit selected buildings
R E-DEPLOY	• Critical personnel to focus on the Management of Recovery • Financial resources to meet the costs of Recovery Projects and programmes
R EMOVE	• Human-caused hazards that can increase vulnerability and the negative effects of Climate Change
R EGAIN	• A national approach to environmental protection, vulnerability reduction and Climate Change Adaptation
R ETAIN	• Needs-based, direct, welfare and housing assistance programmes • A Comprehensive Disaster Management (CDM) approach to vulnerability reduction • Up-to-date strategy for all phases of the Disaster Cycle • Systems and procedures for effective mass communication and information dissemination • Effective vector and rodent control systems • Strategic partnerships with the non-state sectors – private and voluntary • Pre- and post-event procedures for working with local, regional and international agencies • Gender-sensitive approaches to Recovery • A strong-focus on psychosocial issues during Recovery • Up-to-date comprehensive disaster legislation



Facts About Hurricanes

Did You Know...

- ⇒ That the first named storm of the 2020 Atlantic Hurricane Season appeared as early as May 16
- ⇒ About 100 tropical waves reach the Atlantic Ocean from the African coast each year but on average only four become major hurricanes
- ⇒ In the 2005 season there were 28 named storms and hurricanes
- ⇒ In 2020 there were 30 named storms and hurricanes – the most in any single season
- ⇒ Storms and hurricanes are the only weather hazards that are given individual, human names
- ⇒ In the Atlantic Basin, storms are not given names starting with Q, U, X, Y and Z. The Atlantic Basin includes the Caribbean Sea and the Gulf of Mexico
- ⇒ Men's names were not given to hurricanes until 1979. A major hurricane - Frederic appeared in 1979, it caused damage extending from the Eastern Caribbean to Quebec in Canada
- ⇒ The National Hurricane Centre in the USA regards hurricanes that are in categories 3, 4 and 5 as major hurricanes. Their wind speeds exceed 100 mph
- ⇒ The names of four hurricanes that occurred in 2004 have all been retired. They are Charley, Frances, Ivan and Jeanne. The names were retired because of the loss of life and the level of damage they created
- ⇒ The Bahamas is the CARICAD member state that has the greatest occurrence of hurricanes in recorded history
- ⇒ The strongest hurricanes tend to appear in September but in October there might still be major storms or hurricanes
- ⇒ Slow-moving hurricanes can be very destructive. They may cause extensive flooding

• ***Continues on next page***

Facts About Hurricanes

Did You Know...

• **Continued from previous page**

⇒ In 1982 there were only two hurricanes

⇒ The six most costly Atlantic basin hurricanes to date are: Katrina, Maria, Irma, Harvey, Sandy and Andrew

⇒ Hurricanes travel from east to west in the Atlantic basin but the reverse can occur. This has happened at least once in a hundred years. In 1999 hurricane Lenny arose in the western hemisphere and travelled from west to east. That resulted in extensive damage to the normally well protected west coasts of many Caribbean islands

⇒ In the *Dow Jones Island Index*, Curacao was ranked as the Caribbean island least likely to be hit by a hurricane, followed by Bonaire, Grand Cayman, Barbados and Aruba.

⇒ Although the Pacific hurricane season begins in May it ends in November like the Atlantic hurricane season

⇒ The strongest hurricanes can rise to 50,000 feet into the atmosphere

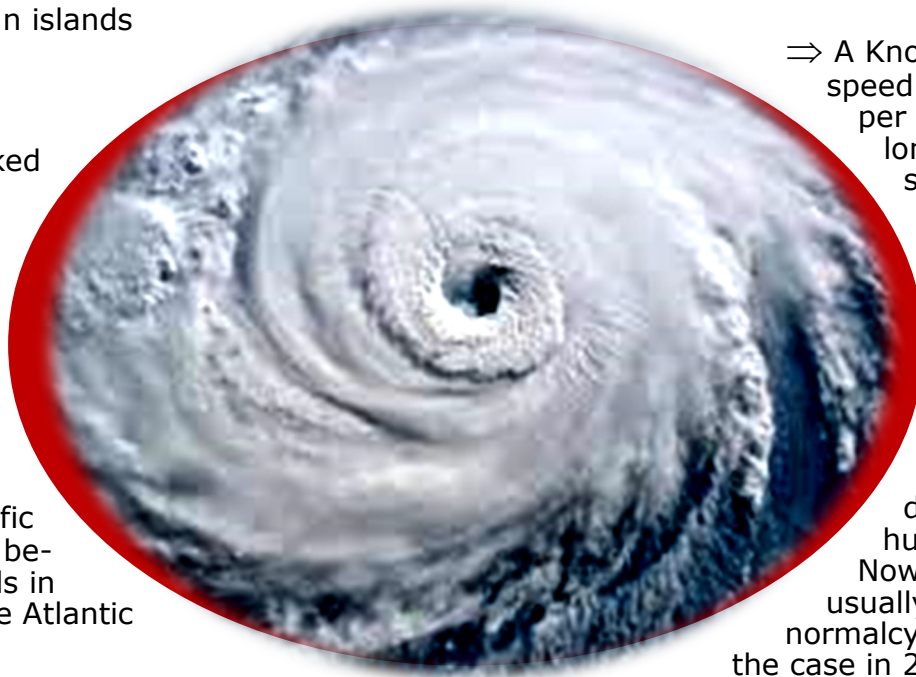
⇒ Hurricanes can be as large as 600 miles in diameter with 'eyes' that are 25 miles in diameter.

⇒ The "Eye Wall" of a hurricane has the strongest winds, the heaviest and greatest turbulence. That is why damage can be so extensive if the eye of a hurricane passes over a small island

⇒ A Millibar is a measurement of the air pressure. Usually the lower the pressure the stronger the

hurricane. *The Website Ask Tom Why* says: *The three Atlantic Basin hurricanes (all Category 5) with the lowest pressures on record are Wilma (Oct. 19, 2005, with 882 millibars or 26.05 inches of mercury), Gilbert (Sept. 14, 1988, 888 millibars or 26.22 inches) and the Labour Day Hurricane (Sept. 2, 1935, 892 millibars or 26.35 inches)*

⇒ The name hurricane is believed to be an adaptation of the Taino Native American word. Many experts say the Taino word *Huracan* only meant "storm". Additionally some researchers suggest that it also referred to a storm god or an evil spirit



⇒ A Knot is a measure of speed. It is one nautical mile per hour. It is slightly longer than a statute mile. You can convert Knots per hour to miles per hour by multiplying the figure by 1.15

⇒ The "All Clear" after the passage of a hurricane is an official declaration that the direct threat from a hurricane is over. Nowadays activities are usually pushed back into normalcy. This is likely to be the case in 2020 with COVID-19

⇒ Storm surges have been responsible for more fatalities in hurricanes than the winds

⇒ A category 5 hurricane can generate a storm surge of 20 feet or more

⇒ Water conducts electricity well so walking through water with downed, energised cables is very dangerous

⇒ The records show that at least 10 hurricanes have occurred in December in the Atlantic Basin

CARICAD's Schema for Post Hurricane Recovery Management

Post hurricane Recovery is a protracted, multidimensional, multi-sectoral, multi-component, multi-agency effort to restore a community affected by a hurricane to an acceptable level of normalcy. It is intended not only to restore life as it was but to make the community more resilient to hazards of all kinds in future. It is costly and fraught with conflict and misunderstanding. It is a complex process that is sometimes difficult to grasp in its entirety.

When there is a common understanding of the conceptual framework for Recovery there is less misunderstanding and confusion and much more collaboration, coordination and cooperation. That common understanding is critical for all key

actors in the process. Public sector managers are the usual leaders of the process in a structural setting such as a Recovery Task Force.

The CARICAD Schema for Post Hurricane Recovery Management was developed to provide as a "single-page view" a schematic that shows the process in logical, connected relationships of role, structure, systems, skills, outputs and deliverables.

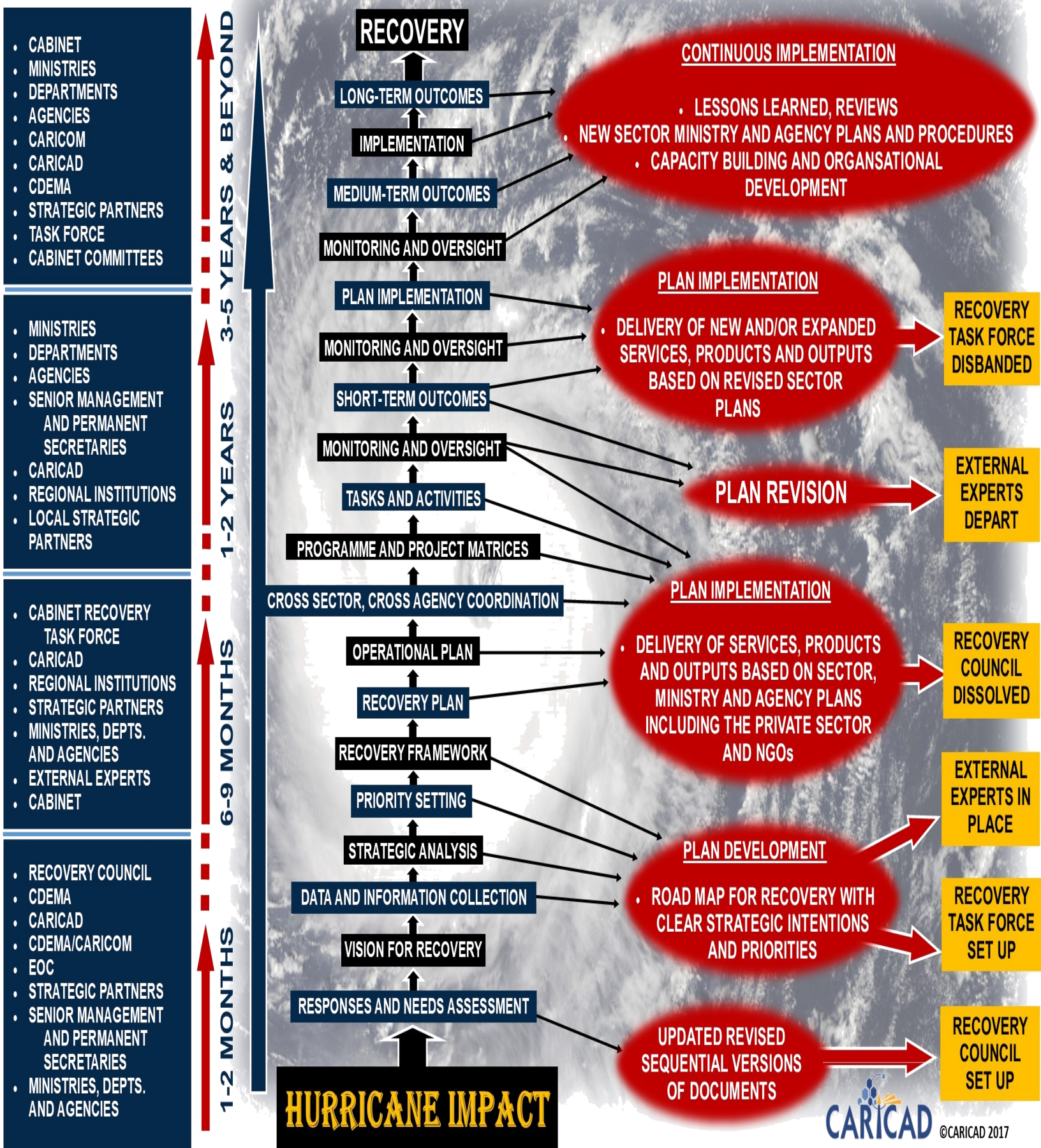
The CARICAD Schema illustrates the following:

- There is a long sequence of important planning, coordination, management, leadership and implementation activities that are required after a hurricane impact
- Hurricane Recovery often takes several years
- The process is essentially sequential but there is overlap and iteration; strategies and plans will probably have to be changed several times
- Many organisations, agencies and stakeholders are involved
- A journey of successful Recovery leads to greater Resilience
- Good information and data management are a critical components of Recovery
- There are several tiers of oversight in Recovery management
- A Recovery Task force should have an end-date for its work
- External experts should have an end-date for their work
- Successful Recovery is likely to occur in phases – early, short and medium-term and long-term

CARICAD has developed and recently promulgated a comprehensive template as [Model Recovery Strategy for Member States](#). Both the schema shown on the next page and that template were inspired by and rooted in work done by CARICAD in 2017/18 with the Government and people of the Turks and Caicos Islands in developing that territory's Post-hurricane Recovery Strategy.



CARICAD SCHEMA FOR POST HURRICANE RECOVERY MANAGEMENT 2017



Glossary of Storm/Hurricane Terms

CARICAD encourages you to become familiar with the specific terms that are used in official circles in relation to tropical storms and hurricanes. The more familiar you are with the meanings of the terms, the more confident you will be with your own Preparedness and the more likely you will be to help others to prepare. The following are among those terms:

SOURCE – National Hurricane Centre – USA

Advisory:

Official information issued by tropical cyclone warning centres describing all tropical cyclone watches and warnings in effect along with details concerning tropical cyclone locations, intensity and movement, and precautions that should be taken. Advisories are also issued to describe: (a) tropical cyclones prior to issuance of watches and warnings and (b) subtropical cyclones. They are usually issued every six hours. Special advisories are issued when there is a significant change in storm-related weather conditions.

Centre (Center):

Generally speaking, the vertical axis of a tropical cyclone, usually defined by the location of minimum wind or minimum pressure. The cyclone centre position can vary with altitude.

Cyclone:

An atmospheric closed circulation rotating counter-clockwise in the Northern Hemisphere and clockwise in the Southern Hemisphere.

Eye:

The roughly circular area of comparatively light winds that encompasses the centre of a severe tropical cyclone. The eye is either completely or partially surrounded by the eyewall cloud.

Eyewall/Wall Cloud:

An organised band or ring of cumulonimbus clouds that surround the eye, or light-wind center of a tropical cyclone. Eyewall and wall cloud are used synonymously.

Gale Warning:

A warning of 1-minute sustained surface winds in the range 34 kt (39 mph or 63 km/hr) to 47 knots (54 mph or 87 km/hr) inclusive, either predicted or

occurring and not directly associated with tropical cyclones.

High Wind Warning:

A high wind warning is defined as 1-minute average surface winds of 35 knots (40 mph or 64 km/hr) or greater lasting for 1 hour or longer, or winds gusting to 50 knots (58 mph or 93 km/hr) or greater regardless of duration that are either expected or observed over land.

Hurricane/Typhoon:

A tropical cyclone in which the maximum sustained surface wind (using the U.S. 1-minute average) is 64 knots (74 mph or 119 km/hr) or more. The term hurricane is used for Northern Hemisphere tropical cyclones east of the International Dateline to the Greenwich Meridian. The term typhoon is used for Pacific tropical cyclones north of the Equator west of the International Dateline.

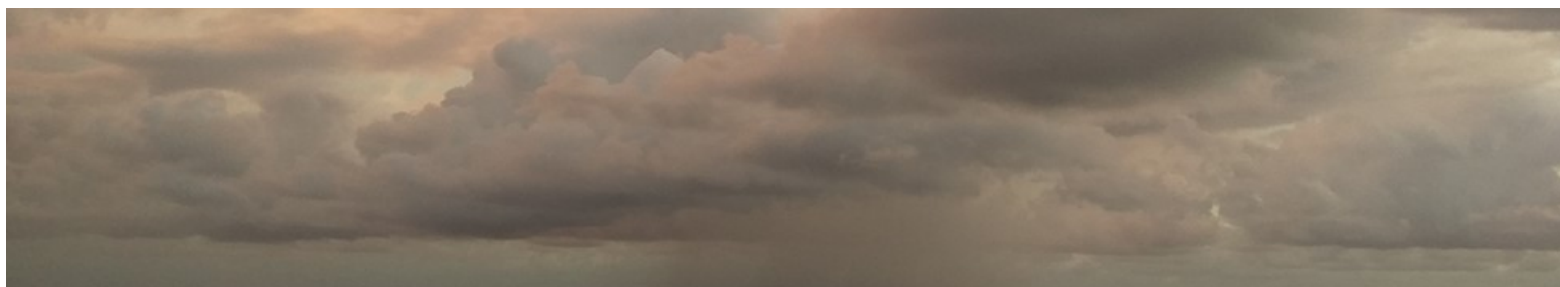
Hurricane Season:

The portion of the year having a relatively high incidence of hurricanes. The hurricane season in the Atlantic, Caribbean, and Gulf of Mexico runs from June 1 to November 30. The hurricane season in the Eastern Pacific basin runs from May 15 to November 30. The hurricane season in the Central Pacific basin runs from June 1 to November 30.

Hurricane Warning:

A warning that sustained winds 64 kt (74 mph or 119 km/hr) or higher associated with a hurricane are expected in a specified coastal area in 24 hours or less. A hurricane warning can remain in effect when dangerously high water or a combination of dangerously high water and exceptionally high waves continue, even though winds may be less than hurricane force.

• ***Continues on next page***



Glossary of Storm/Hurricane Terms

• *Continued from previous page*

Hurricane Watch:

An announcement for specific coastal areas that hurricane conditions are possible within 36 hours.

Indirect Hit:

Generally refers to locations that do not experience a direct hit from a tropical cyclone, but do experience hurricane force winds (either sustained or gusts) or tides of at least four feet above normal.

Landfall:

The intersection of the surface centre of a tropical cyclone with a coastline. Because the strongest winds in a tropical cyclone are not located precisely at the centre, it is possible for a cyclone's strongest winds to be experienced over land even if landfall does not occur.

Major Hurricane:

A hurricane that is classified as Category 3 or higher.

Storm Surge:

An abnormal rise in sea level accompanying a hurricane or other intense storm, and whose height is the difference between the observed level of the sea surface and the level that would have occurred in the absence of the cyclone. Storm surge is usually estimated by subtracting the normal or astronomic high tide from the observed storm tide.

Storm Warning:

A warning of 1-minute sustained surface winds of 48 knots (55 mph or 88 km/hr) or greater, predicted or occurring, not directly associated with tropical cyclones.

Tropical Depression:

A tropical cyclone in which the maximum sustained surface wind speed (using the U.S. 1-minute average) is 33 knots (38 mph or 62 km/hr) or less.

Tropical Disturbance:

A discrete tropical weather system of apparently organised convection — generally 100 to 300 nautical miles in diameter — originating in the tropics or subtropics, having a non-frontal migratory character, and maintaining its identity for 24 hours or more. It may or may not be associated with a detectable perturbation of the wind field.

Tropical Storm:

A tropical cyclone in which the maximum sustained surface wind speed (using the U.S. 1-minute average) ranges from 34 knots (39 mph or 63 km/hr) to 63 knots (73 mph or 118 km/hr).

Tropical Storm Warning:

A warning that sustained winds within the range of 34 to 63 knots (39 to 73 mph or 63 to 118 km/hr) associated with a tropical cyclone are expected in a specified coastal area within 24 hours or less.

Tropical Storm Watch:

An announcement for specific coastal areas that tropical storm conditions are possible within 36 hours.

Tropical Wave:

A trough or cyclonic curvature maximum in the trade-wind easterlies. The wave may reach maximum amplitude in the lower middle troposphere.

Some Sources for Weather Information

- [Antigua & Barbuda Meteorological Services](#)
- [Bahamas Meteorology Department](#)
- [Barbados Weather](#)
- [Barbados Weather on Yahoo](#)
- [Barbados Weather at CDEMA](#)
- [National Meteorological Service of Belize](#)
- [CDEMA](#)
- [Department of Emergency Management \(DEM\) Barbados](#)
- [Grenada Meteorological Office](#)
- [Meteorological Service of Jamaica](#)
- [Saint Lucia Meteorological Services](#)
- [Trinidad and Tobago Meteorological Service](#)
- [NATIONAL Hurricane Centre](#)
- [Weather Channel](#)
- [Weather Underground](#)
- [World Meteorological Organization](#)

NOTE TO READERS

The information provided in this newsletter is set in the context of CARICAD'S Memorandum of Understanding (MOU) with CDEMA. The MOU was signed in 2016. It is stated in the Rationale that both CARICAD and CDEMA have the ultimate aim of facilitating and supporting sustainable development and on improving capacity within member states. The two institutions also agreed to continue joint efforts to mainstream Disaster Risk Reduction. Therefore, the contents of this newsletter are not intended to replace, duplicate or supplant any information provided by CDEMA or the National Disaster Offices of CARICAD member states. It is intended to reinforce their efforts.

THE TEAM

The CARICAD Horizon is a regular publication of the Caribbean Centre for Development Administration (CARICAD). The Horizon has superseded the "Chronicle". The Editor-in-Chief is CARICAD's Executive Director, Devon Rowe. The Production Team comprises: Franklyn Michael, Rosemund Warrington, Dr. Lois Parkes, Trudy Waterman, Angela Eversley and Petra Emmanuel.

Previous editions can be viewed at:

<u>March 2021</u>	<u>October 2019</u>
<u>October 2020</u>	<u>Board Meeting 2019 Special Edition</u>
<u>July-August 2020</u>	<u>April 2019</u>
<u>Special Hurricane Edition June 2020</u>	<u>December 2018</u>
<u>Special COVID-19 Edition May 2020</u>	<u>August 2018</u>
<u>March 2020</u>	<u>December 2017</u>
<u>December 2019</u>	<u>July 2017</u>