



The 2020 Virtual Dry Season Caribbean Regional Climate Outlook Forum (CariCOF)

November 26 & December 4, 2020

Report



1.0 Introduction

Since the 2012 CariCOF, the Caribbean Institute for Meteorology and Hydrology (CIMH) has been coordinating climate forecasting activities leading to a consistently growing body of climate forecasters who (i) contribute to the monthly production of consensus-based seasonal climate outlooks and (ii) engage with the user community, both nationally and regionally to facilitate capacity and awareness-building within climate sensitive sectors.

This Dry Season CariCOF, in light of the global COVID-19 pandemic, all sessions were held virtually. In collaboration with the International Research Institute for Climate and Society (IRI), Columbia University and the National Oceanic and Atmospheric Administration (NOAA), the 2020 Dry Season CariCOF Stakeholders Forum took place on 26 November and 4 December, 2020. This forum was complimented by a session for meteorologists and climatologists from across the region to finalize the climate forecasts (25 November) for the period December 2020 to May 2021 and a training on 2 December .

2.0 The CariCOF Delivery – 26 November 2020

2.1 Welcome Remarks (Dr. David Farrell – Principal, CIMH)

Dr. Farrell welcomed all participants to the second virtual CariCOF with the first virtual being the 2020 Wet/Hurricane Season CariCOF. He was hopeful that a level of normalcy would return so that next year this time, CariCOF would be able to meet face to face. Dr. Farrell alluded to the fact that personal contact is a crucial element to the CariCOF process.

Dr. Farrell also thanked Mr. Adrian Trotman, Head of the Caribbean RCC, and his team, for the development of climate products throughout the current year given the challenges with COVID-19. He is hopeful that the climate products continue to meet the standards of the users and that they in turn provide feedback with respect to different ways in which they can be improved to continue to meet their needs.

When the last Dry Season CariCOF was convened in 2019, the region had been preparing for prospective dry conditions which materialized and posed some challenges to the water and agriculture sectors. Fortunately, most would have already been prepared for the drought and would have put measures in place to mitigate the impacts on sectors and industries.

Dr. Farrell also noted that the 2020 Wet/Hurricane Season forum brought the awareness of an active hurricane season which did materialize. A number of heat waves would also have been forecast, with



several occurring across the region over the past several months. One achievement of the CariCOF in this regard is global recognition of its heat wave product.

2.2 Recent Climate Conditions and the 2019-2020 Dry Season (Mrs. Shontelle Stoute, CIMH)

Mrs. Stoute, Technical Officer at CIMH, gave an overview of the climatology of the Caribbean Dry Season where she presented rainfall and temperature patterns as well as the drivers of the season. She also gave highlights of the 2019-2020 dry season impacts from across the region where water challenges were concerns for many. Leading into the 2020-2021 dry season however, increased rainfall activity posed problems to some countries including Jamaica, St. Kitts and Dominica. Heat stress was also a factor where a number of heat records were broken in 2020.

2.3 Dry Season 2020-2021 CariCOF Caribbean Climate Outlooks (Dr. Cédric Van Meerbeeck, CIMH)

Dr. Van Meerbeeck, Climatologist at CIMH, delivered the 2020-2021 Dry Season Outlooks. The key messages of the outlooks are summarized below.

1. Recently:
 - Intense and record-breaking heat and flood rains in many areas as regional drought largely subsided amidst the busiest Atlantic Hurricane Season on record. This is fuelled by warm ocean temperatures and La Nina.
2. The 2020-2021 Dry Season Outlook:
 - Until March: cool season, steady decrease in rainfall and wet days / increase in dry spells.
 - From April: Heat Season with heatwaves and heat discomfort, increasingly intense showers, but frequent dry spells.
 - Potential for flooding and related hazards
 - i. Guianas: High during intense wet season (December to February)
 - ii. Belize and the Islands: limited to moderate (December, April and May)
3. Prepare for:
 - Initially: flood-related hazards
 - After March: Growing water shortages, increasing wild fire potential and heat discomfort.



2.4 Discussion and Forecast Implications for the 2020-2021 Dry Season

Below is a summary of the discussions captured from the participants. The forecast implications can be found in [Appendix II](#).

Anuradha Maharaj (CWWA) – The CWWA will share products as widely as possible within its network. It is very important for sectoral planning, particularly for the water sector. With regards to the implications of flooding in Trinidad, there is a need for sound strategies directed by the work of CariCOF to be put in place to alleviate impacts. It is good to hear that water availability issues may not be much of a problem but it begs the question of additional storage plans.

Dr. David Farrell (CIMH) – With regards to the water availability issue, one must be mindful of the fact that just because we may have the quantity, significant rainfall may also pose a water quality issue due to turbidity.

Dale Destin (Antigua Met Service) – it continues to be a significant challenge going from very dry to very wet conditions in terms of forecasting. What work has been done in sub-seasonal forecasting?

Dr. Simon Mason (IRI) – One thing that needs to be worked on is to learn how we can most effectively communicate the uncertainty within the forecast via the sub-seasonal scale. To proceed a watch system needs to be developed, rather than a warning system, with a 2 to 4 week lead time. Methods of communicating the increased risk with the understanding of the level of uncertainty involved should be pursued.

Ms. Sarah Diouf (NOAA) - It is very important to clearly explain the uncertainty associated with the sub-seasonal probabilistic forecasts. For example, Cédric presented the week-1 forecast showing moderate probability for rainfall > 100 mm over portions of Guyana. The probability was around 20%. This also means that there is a probability of 80% for rainfall < 100 mm over this region. We need to continue to work closely to see how to communicate climate information.

Dr. David Farrell (CIMH) – To some degree, it is how you update the climate forecast with the weather information that is important.

Junior Mathurin (St. Lucia Water) – The country notices an uptake in Dengue Fever cases with the increasing rainfall.

Mr. Adrian Trotman (CIMH) – The possibility of continued concerns is real with the possibility of increased rainfall in the coming season.



Dr. Roché Mahon (CIMH) – We are currently in the middle of severe dengue outbreaks in the Caribbean. Since the start of the rainy season in June of this year, increased dengue activity above the seasonal threshold have been reported from many CARICOM territories with St. Vincent and the Grenadines, Grenada and Saint Lucia having high incidence rates. The French Overseas Departments of Martinique and Guadeloupe, and Collectivity of Saint Barths, continue to experience high level of transmission and hospital admissions according to the latest PAHO data. So we are seeing a seasonal increase in the number of cases of dengue which is expected, but this year it is particularly challenging because in some places there is a simultaneous increase in cases of COVID-19. In essence, there are 2 health emergencies. At CIMH, we have explored the possibility of developing a climate-driven spatio-temporal modelling framework for dengue in the Caribbean. This first and foremost is a research exercise and we have done the research in both the Barbados and Dominica contexts. Interestingly, we found associations between dengue outbreak risk and minimum temperature, drought and excess rainfall. There is a possibility that this was realized as we transitioned from a drier than normal 2019/2020 dry season into a drier than normal 2020 wet season and then experienced heavy rains especially in the late wet season in the islands. We would need to consider whether this was a dynamic at play in the increase in dengue outbreaks this year. Further research would be needed.

Dr. Cédric Van Meerbeeck (CIMH) – Heat has also been a factor in the increase in Dengue Fever outbreaks.

Mr. Chambers (Water Resources Authority, Jamaica) – The impact on water resources, particularly during the last dry season, have been severe. With the current outlooks there could be further impacts on the resources and thus there would have to be plans in place to see how to effectively manage the resources. In the area of the Blue Mountains, where rainfall totals are usually high, it has gone dry.

Mr. Glenroy Brown (Jamaica Met Service) – The Met Service is aware of the concerns and continue to provide relevant information to assist with planning. Sectors are advised to continue to monitor their water resources and utilize the information coming out of the Met Service.

Mr. Junior Mathurin (St. Lucia Water) – Public Service Announcements are sent out prior to the season to communicate the current situation and what persons should do.



Kaidar Kisson (Trinidad and Tobago Met Service) – Is there any instrument to monitor how long it takes for water to reach the underground reserves?

Mr. Junior Mathurin (St. Lucia Water) – Each country differs due to several factors.

Dr. David Farrell (CIMH) – It depends on how the rain falls. High intensity rainfall does not mean that you get recharge. Trinidad has a lot of clay-rich soils and thus the recharge rates are going to be reduced. Recharge happens based on the saturated hydraulic conductivity of the soils. Thus, rain above this would give rise to ponding and run off. Hydraulic conductivity maps can be accessed from engineering associations or from soils personnel within agriculture. There also are different ways of calculating saturated hydraulic conductivity of soils.

2.5 Closing Remarks

In closing, Mr. Adrian Trotman (CIMH) thanked all participants for being a part of the day's session. 2020 had been a very interesting year from drought to COVID-19 and the inability to sanitize, to the shift to excess rainfall. Heat stress and increased tropical activity also brought their own concerns to the region. Discussions would continue at the stakeholder's forum on Friday 4 December. Meteorologists and Climatologists would meet on Wednesday 2 December for training.

3.0 Stakeholder Forum - 4 December 2020

3.1 Meeting Objectives

The meeting objectives were as follows:

1. To highlight the range of climate extremes experienced in 2020;
2. To raise sectoral awareness of the availability and importance of heat early warning information in the Caribbean; and
3. To advance the regional discussion on heat early warning information and implications for sectoral response.

3.2 Welcome Remarks: Dr. David Farrell

In his opening remarks to the stakeholder forum, Dr. Farrell noted that the session is designed for climate information producers to work with the sectors to frame a response to the seasonal forecast.

He explained that although the session's focus is on heat, the real overarching goal is to fashion a response that fosters partnerships between climate information users and producers, and to build resilience to climate variability and change within the region's climate sensitive sectors. He encouraged participants to ask as many questions as they wished, noting that the responses could provide information for sectors to make more informed decisions.

3.3 Mentimeter Poll – Part 1

Following the opening remarks, Dr. Roché Mahon, Social Scientist at CIMH, guided participants through a brief Mentimeter poll exercise to elicit responses regarding heat early warning information in the Caribbean. For the first poll question, participants were asked: 'Do you think heat is an important problem for the Caribbean?'. There was a total of 36 respondents for this question with the majority (n=27) indicating that heat was 'very important' (Figure 1).

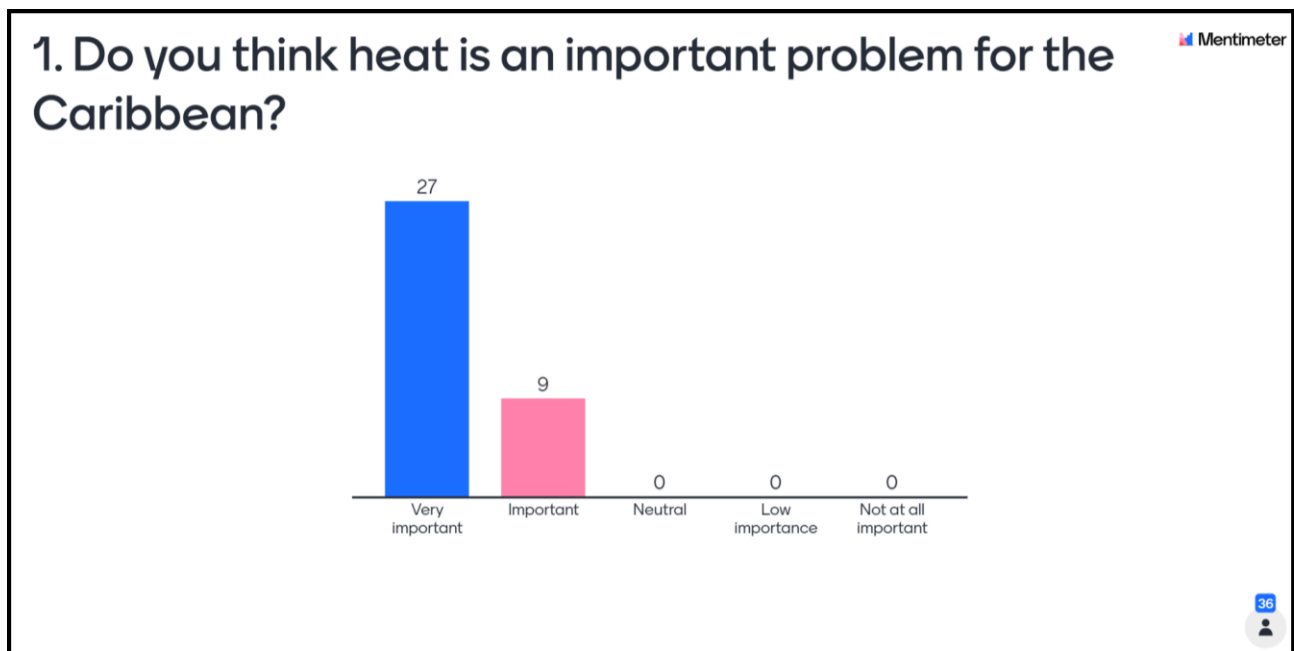


Figure 1: Importance of heat as a problem for the Caribbean

To get an understanding of the scope of reach of heat early warning information at the regional and national levels, participants were asked a second poll question: 'Did you receive or access heat early warning information from your local Met Office or CIMH this year?'. Of the 31 responses received, 11 respondents stated 'No'; 17 respondents indicated 'Yes'; while 3 respondents stated 'Don't remember' (Figure 2).

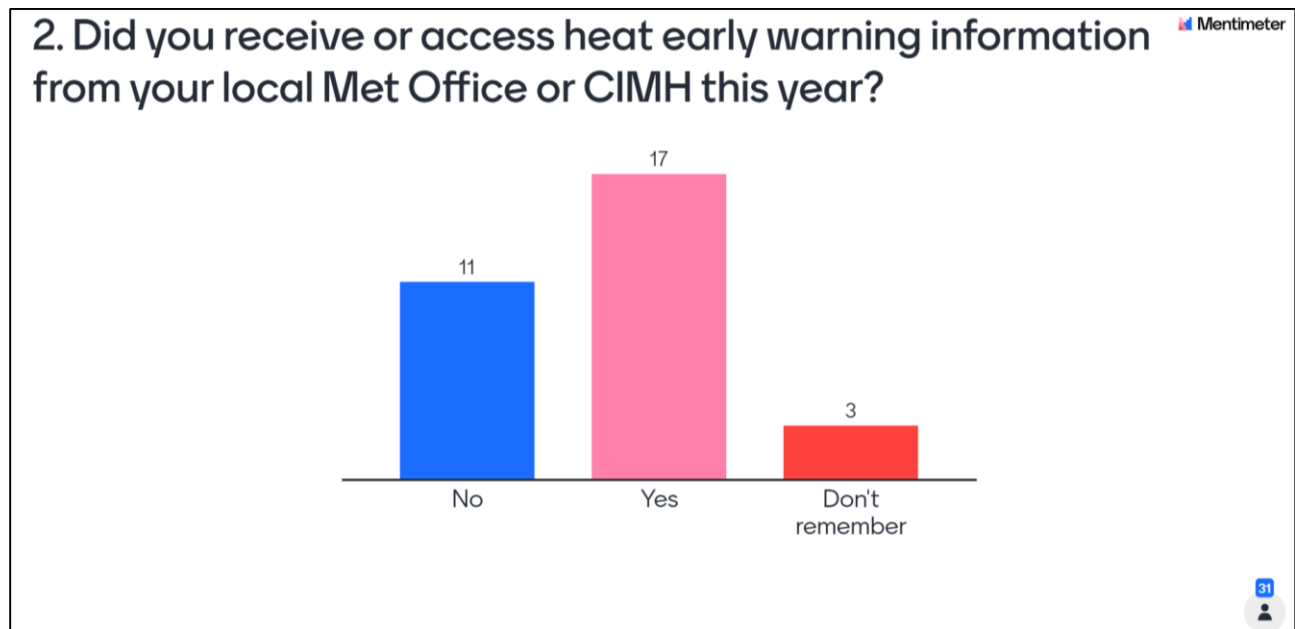


Figure 2: Receipt or access of heat early warning information

Dr. Mahon thanked participants for their responses which would go a long way towards helping the climate community to beginning to understand end-user behaviour in accessing and using heat early warning information.

3.4 Mentimeter Poll - Part 2

Dr. Roché Mahon and Ms. Jodi-Ann Petrie, Technical Officer at CIMH led a second round of polling on Mentimeter. A total of 33 persons participated in the second poll. To get a better understanding of the impact of heat on stakeholders' decision-making, participants were asked: 'how important is heat to the professional decisions that you make?'. A total of 12 persons indicated that heat was 'very important', 16 said that heat was 'important'; while 5 persons were 'neutral'. The results of the poll are shown in Figure 3 below:

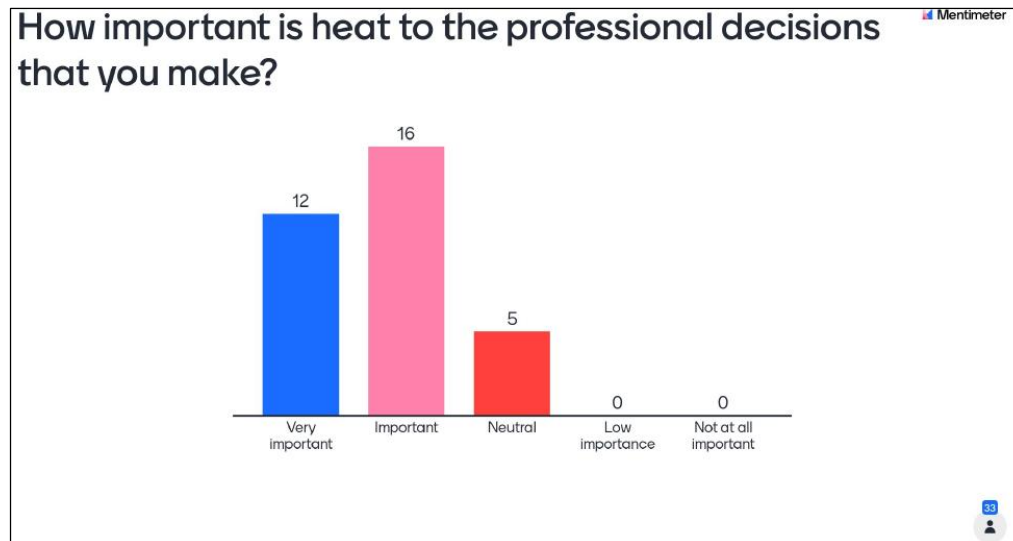


Figure 3: Importance of heat to professional decision-making

Participants were also asked: ‘do you think it is necessary for your sector to apply heat considerations in its practice?’. A total of 32 persons voted that it was ‘very necessary’ and 1 person voted that it was ‘not necessary at all’. The results of the poll are shown in Figure 4 below:



Figure 4: Necessity of applying heat considerations within sectoral practices



3.5 Zoom Focus Group Session

In a virtual break-out group session following the Mentimeter poll, participants were placed into three focus groups and were asked to take 50 minutes to provide responses to the following questions:

1. Has your life or livelihood been impacted by heat in previous years? This year?
2. How has your sector been impacted by heat in previous years? This year?
3. Did you apply heat early warning information? If yes, how did it change your decisions or behaviour?
4. What should heat early warning providers (Met Offices and CIMH) do to improve the content of information and/or its dissemination?

The responses to the questions by each breakout group can be accessed via the following links:

- Breakout Group 1: <https://owncloud.cimh.edu.bb/index.php/s/tzZsa7LMpMX9Jf6>
- Breakout Group 2: <https://owncloud.cimh.edu.bb/index.php/s/psdyBdI4ur9bDw4>
- Breakout Group 3: <https://owncloud.cimh.edu.bb/index.php/s/MDxryDwCTRKpPIN>

3.6 Supporting sectoral response to climate extremes: The role of the Regional Roadmap and Plan of Action (RPA) for Caribbean Climate Services 2020-2030 - Dr. Roché Mahon, CIMH

Dr. Mahon, delivered the final presentation on ways in which the Regional Roadmap and Plan of Action (RPA) would support sectoral response to climate extremes in the Caribbean in the coming years. Dr. Mahon began her presentation by stating that although it was well known that sector-specific climate services often catalyse sectoral response to climate extremes by tailoring climate messages to include a specific and targeted sectoral focus thereby enhancing the usefulness and usability of the information for sectoral application, in the Caribbean context, there was a significant problem. The key problem was that the region currently had relatively few tailored climate products at national level. Dr. Mahon further explained that it was not just a matter of how many tailored products were available, but also a matter of how many climate-sensitive sectors have tailored information - essentially a coverage problem with some sectors being served in some limited way and others that are not.

Dr. Mahon noted that the picture is similar at the regional level. She showcased the 3 main regional sector-specific bulletins for the agriculture and food security, health and tourism sectors on which the Caribbean RCC collaborates with partners at Caribbean Agricultural Research and Development



Institute (CARDI), Caribbean Public Health Agency (CARPHA), Pan American Health Organisation (PAHO), Caribbean Tourism Organization (CTO) and Caribbean Hotel and Tourism Association (CHTA). However, she noted that much more can and should be done to not only improve what we already have but also to generally expand the range of risk-based, impacts- based products available for sectoral decision-making. Dr. Mahon explained that risk-based, impacts- based products are quantitative products that integrate climate and sectoral variables to provide an indication of the influence of climate on sectoral outcomes. The process of delivering these products requires strong collaboration on co-production because it is strongly dependent on observation, monitoring and modelling of both climate and sector parameters. Dr. Mahon highlighted ongoing work on 1. heat and human health, 2. developing a climate driven spatio-temporal model for vector-borne disease, and 3. a climate driven spatio-temporal model for tourist arrivals to the Caribbean and stated that this is exactly the kind of co-production work that the RPA supports in the long-run.

Dr. Mahon continued by stating that at its core, the RPA supports the next generation of integrated climate information products co-produced with sectors in 5 major ways:

1. Enhanced mechanisms for the collection, management and dissemination of climate and sectoral data;
2. Improved quality of climate information and services through enhanced social science and interdisciplinary research;
3. Improved and harmonised Climate Services Information Systems to support sectors at regional and national levels;
4. Enhanced User Interface mechanisms at regional, national and sectoral levels; and
5. Strengthened Capacity Development and enabling environment for the provision and use of climate services at regional, national and sectoral levels.

Going forward, the RPA will involve interdisciplinary work across 6 climate-sensitive sectors with a possibility of adding others throughout the RPA lifespan. Dr. Mahon noted the high level of commitment from the lead regional sectoral agencies on establishing and strengthening the Consortium alliance for the governance and co-ordination of the co-production of integrated climate services in the agriculture and food security, disaster risk management, energy, health, tourism and water sectors. The regional level Bulletins are some of the early key outputs of this alliance and the RPA is yet another strategic output of the Consortium that guides the joint work programme in the long-run.



Dr. Mahon stated that the alliance and commitment continues to be strong, with partners on the third round of LoA signings since 2015. The majority of LoA signings to support the 1st performance phase (2020-2022) of the RPA implementation have already happened with only two more signings to go. In addition, many Heads of Agencies have already formally endorsed the RPA. Dr. Mahon emphasized that what was left at this stage to be done is for the technocrats and stakeholders at the regional and national levels to work together on some key deliverables like the co-development and operationalisation of interdisciplinary models to support new tailored risk based products in the 1st performance. She also noted that it would be necessary to strengthen the relationships at the national level to do co-production work. As a result, she stated that the Caribbean RCC will continue its thrust to invest in establishing National Climate Services Committees collaborating for climate risk management, National Roadmaps for Climate Services being implemented by National Committees for Climate Services, and overall capacity building in both the climate and sectoral communities to support these novel ways of working. Dr. Mahon ended her presentation by stating that the next 2 years is an exciting time and the Caribbean RCC looked forward to continuing to work with our regional partners and national stakeholders to support sectoral response to climate extremes.



Appendix I: CariCOF 2020-2021 Dry Season Agenda



*2020 Dry Season
Caribbean Climate Outlook Forum
CariCOF
26 November, 2020
10:00 am
AGENDA*



Welcome – Dr. David Farrell (Principal, CIMH)

Presentation 1 – *Dry Season climatology & Recent Climatic Conditions*
(Mrs. Shontelle Stoute, CIMH)

Presentation 2 - *Forecast for the 2020-2021 Dry Season* (Dr. Cedric Van Meerbeeck, CIMH)

Discussion – *Forecast Implications for the 2020-2021 Dry Season*

Vote of Thanks – Mr. Adrian Trotman (CIMH)





Appendix II: Forecast Implications

Early Dry Season: Dec 2020-Feb 2021

Agriculture:

- For much of the Caribbean, the growing season is likely to be extended
- Not necessarily the case in parts of the northwest Caribbean.
- In view of dry spells and potentially insufficient rainfall accumulations, crop water demands of water intensive crops may not be met especially in Cuba and the western Caribbean.
- Soil erosion may be a concern, particularly in the Guianas.
- There is also the risk of crop loss from flash floods and flooding.

Water:

- Slower than usual depletion of water reservoirs in the islands.
- Depletion of groundwater and other large reservoirs can potentially pose a concern in western Belize and northwest Puerto Rico.
- Water quality due to turbidity

DRM:

- High potential for flooding, flash floods, land slides / rock fall and soil erosion from very wet and extreme wet spells in the northern (in particular) Guianas.



Early Dry Season: Dec 2020-Feb 2021 (Cont'd)

Health:

- Little to no heat discomfort until mid-March. Morbidity from excessive heat due to high temperatures across the region should not be an issue
- Moist conditions could extend period of concern for vector borne diseases, particularly so in northern Guianas
- Where episodes of flooding may occur, particularly in the northern Guianas, cases of gastroenteritis and Lepto may increase
- Though initially low, local dust levels should be increasing towards February, particularly in areas currently experiencing short term drought - increasing the possibility of allergic rhinitis and asthma being experienced

Energy:

- Decreased cooling needs.

Tourism: To be impacted far more by COVID-19, however

- Tourism operators should maintain a state of readiness since storms and hurricanes can occur and have occurred after the official end of the Atlantic Hurricane Season.
- Tourism practitioners may experience a slight decrease in demand for cooling/hydration services (e.g. AC use and drinking water).
- Tourism facilities should enhance/upgrade their water conservation practices (e.g. rainwater harvesting and repairs to leaky pipes) ahead of the peak of the dry season.
- Potential for more sunny beach days than usual in the Bahamas, northern Belize and Cuba but fewer sunny beach days in the Southern Caribbean.

Late Dry Season: March-April-May 2021

Agriculture:

- Agricultural impacts of drought should be limited, except in western and Southern Belize, central and south eastern Cuba, eastern DR and southeastern Puerto Rico.
- Potential for heat stress in small livestock increases from April (Belize, Cuba & Trinidad) or May (elsewhere).

Water:

- This is the time of year when water resources are most depleted across the region. Depletion of groundwater and other large reservoirs can potentially pose a concern in western and Southern Belize, Central and south eastern Cuba, eastern DR and southeastern Puerto Rico.

DRM:

- Potential for flooding and related hazards decreases from March - April in the Guianas.
- Potential for flooding and related hazards is limited to moderate in April and May in Belize and the Caribbean islands.

Health:

- Potential for heat stress in the vulnerable populations increases from April (Belize, Cuba & Trinidad) or May (elsewhere).
- Increasing allergic rhinitis and asthma, in areas where there is drying of the surface and foliage. This risk may be further exacerbated during wildfires.

Energy:

- Cooling need may increase from April onwards, particularly in the northwestern Caribbean.

Tourism: still likely to be impacted more by COVID-19

- Tourism practitioners may experience a slight increase in demand for cooling/hydration services (e.g. AC use and drinking water) in this period.
- Potential for heat stress in visitors and tourism employees.