CARICOM Submission on the Talanoa Dialogue

March 2018

Introduction

The Caribbean Community (CARICOM) is pleased to make this initial submission to the Talanoa Dialogue on the topics of ***"Where are we?"*** and "***Where do we want to go?***"

For the purposes of this submission the Caribbean Community consists of fourteen (14) Member State Parties to the UNFCCC (Antigua and Barbuda, The Bahamas, Barbados, Belize, Dominica, Grenada, Guyana, Haiti, Jamaica, Saint Lucia, St. Kitts and Nevis, St. Vincent and the Grenadines, Suriname, and Trinidad and Tobago).

CARICOM countries contribute less than 1% to global greenhouse gas (GHG) emissions -- yet are among those expected to be the earliest, most severely and most disproportionately impacted by climate change in the coming decades as well as the least able to adapt to climate change impacts.

Relative isolation, small land masses, concentrated populations, infrastructure in coastal areas, limited economic base and dependency on natural resources, combined with limited financial, technical and institutional capacity, all exacerbate the vulnerability of countries in the region to extreme events and climate change impacts. [1]

As a result, reducing global GHG emissions and obtaining greater support for adaptation strategies are fundamental priorities for CARICOM and for SIDS more generally.

Where Are We?

CARICOM leaders have long advocated for global warming to be held below 1.5°C, in view of the impacts of climate change already being experienced in the region, and in view of the negative impacts that are to be anticipated at higher levels of warming.

The Paris Agreement now embeds this below 1.5°C goal; however, the nationally determined contributions (NDCs) brought forward by Parties are not yet on a pathway consistent with its achievement.

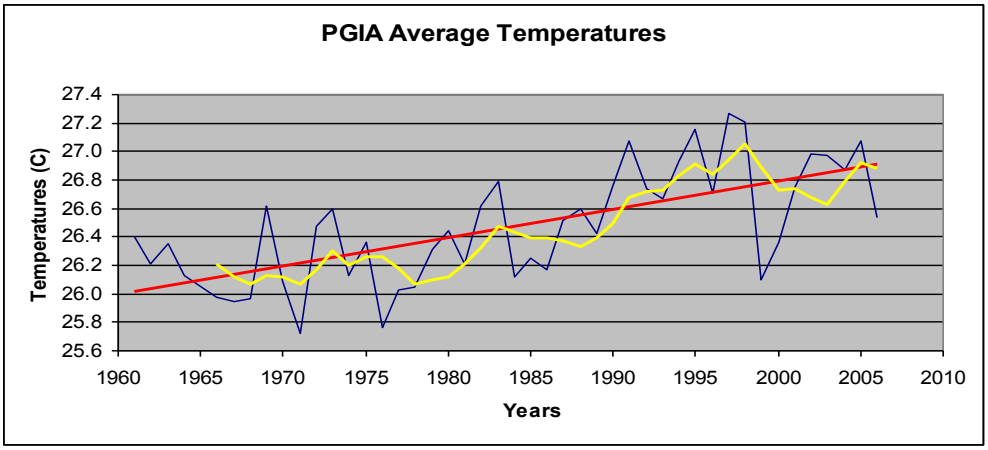
This mismatch is of great concern to CARICOM, in light of the impacts of climate impacts that are already being experienced at lower levels of warming.

The observed temperature change in the Caribbean is greater than the IPCC's stated global average:

- Meteorological and climatological records from the National Meteorological Services across the Caribbean, including those from the CARICOM Member States, show that in the past 50

[1] See Simpson, M.C., Scott, D., New, M., Sim, R., Smith, D., Harrison, M., Eakin, C.M., Warrick, R., Strong, A.E., Kouwenhoven, P., Harrison, S., Wilson, M., Nelson, G.C., Donner, S., Kay, R., Geldhill, D.K., Liu, G., Morgan, J.A., Kleypas, J.A., Mumby, P.J., Palazzo, A., Christensen, T.R.L., Baskett, M.L., Skirving, W.J., Elrick, C., Taylor, M., Magalhaes, M., Bell, J., Burnett, J.B., Rutty, M.K., and Overmas, M., Robertson, R. (2009) *An Overview of Modelling Climate Change Impacts in the Caribbean Region with contribution from the Pacific Islands*, United Nations Development Programme (UNDP), Barbados, West Indies.

to 100 years, average mean surface temperatures have risen by one degree Celsius (1°C). **This observed rise in temperature is greater than the globally observed rise in temperature** cited in the 5th Assessment Report (AR5) of the Intergovernmental Panel on Climate Change (IPCC).[2]



- Data from Belize is but one example. The graphic above[3] presents data from the meteorological observing station at the Philip Goldson International Airport (PGIA), which has the best historical data and which is located near the coast. Analysis shows that from 1960 to 2005, average temperatures at PGIA rose by **0.9°C**.[4] In Central Farm, farther inland, the average temperature rose by **1.0°C** from 1966 to 2005. Along Belize's coast, temperatures have risen by 0.9°C, while in the interior they have risen by 1.0°C.[5]
- Trinidad is another example. At Piarco Meteorological Services station, annual mean temperature increased by 0.41**°C** per decade over the period 1963 to 2010; at the University of the West Indies Field Station, annual mean temperature increased by 0.33°C per decade from 1972 to 2010.[6]
- Night time temperatures have risen more sharply than day time temperatures.[7]

Sea level in the Caribbean region is rising:

- Sea level in the region has risen by around 20 cm over the past 100 years, increasing the risk of flooding.[8]

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[2] See: IPCC, 2014: Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]. IPCC, Geneva, Switzerland, 151 pp. at 2) (0.85°C over pre-industrial levels).

[3] Gonguez, D. (2008). Analyses of trends in averages and projections of temperature and precipitation. Belize City: National Meteorological and Hydrological Service

[4] Fuller, C., Gordon, A., and Bood, N., (2014). Climate Change and the Coastal Zone *In* Coastal Zone Management Authority & Institute (CZMAI). 2014. State of the Belize Coastal Zone Report 2003–2013

[5] Fuller et al., (2014)

[6] See., e.g., Beharry, S.L., Clarke, R.M., Kumarsingh, K., (2015) . Variations in extreme temperature and precipitation for a Caribbean Island: Trinidad, Theor Appl. Climatology, 122:783. https://doi.org/10.1007/s00704-014-1330-9 at Table 3.

[7] Id.; Gonguez (2008).

[8] CMEP (2017) Caribbean Marine Climate Change Report Card 2017. (Eds. Paul Buckley, Bryony Townhill, Ulric Trotz, Keith Nichols, Peter A. Murray, Chantalle ClarkeSamuels, Ann Gordon, Michael Taylor). Commonwealth Marine Economies Programme, 12pp

- The impacts of tropical storms and hurricanes on coastal areas, even at present intensity and frequency, will be compounded by sea level rise.[9]
- Over the long term, sea level rise in the northern Caribbean may exceed the global average by up to 25%, due to gravitational and geophysical factors.[10]
- It has been said that sea level rise projected in the 21st century and beyond represents a serious and chronic impediment to the sustainable development of some CARICOM nations.[11]

Heat waves are already leading to ecosystem impacts in the Caribbean:

- There are now more instances of consecutive very hot days[12] and consequent heat waves, with resultant impacts on ecosystems.[13]
- For example, from 1999 to 2000, Belize experienced an outbreak of the pine bark beetle attributed to the warm temperatures and high humidity. The outbreak destroyed over 75% of the pine forest of Belize.

Increasing sea surface temperatures are already resulting in coral bleaching in the Caribbean:

- The world's oceans have absorbed about 93% of the excess heat caused by greenhouse gas warming since the mid-20th century, making them warmer and altering global and regional climate feedbacks.[14]
- Sea surface temperatures have risen in the Caribbean, with very warm prolonged episodes noted. This has resulted in episodes of coral bleaching in 1995, 1998, 2005, 2008 and 2009.[15]
- The greatest threat to Caribbean coral arises from the direct impacts of rising sea surface temperatures (SSTs) on coral health.[16]
- Many reef systems in the Caribbean still have not fully recovered from the major global 1998 event.
- In 2005, elevated sea surface temperatures in the Caribbean again caused severe and extensive mass coral bleaching, with many areas exhibiting over 90% bleaching and over 50% mortality.[17] The U.S. lost half of its coral reefs in the US Virgin Islands.18

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[9] Muis, S., Verlaan, M., Winsemius, H. C., Aerts, J. C., & Ward, P. J. (2016). A global reanalysis of storm surges and extreme sea levels. Nature communications, 7, 11969.
[10] Simpson et al., supra n. 1, at 17, 53.
[11] Simpson et al, supra n. 1, at 54.
[12] See., e.g., Beharry et al, supra.
[13] Taylor, M. A., Clarke, L. A., Centella, A., Bezanilla, A., Stephenson, T. S., Jones, J. J., and Charlery, J. (2018). Future Caribbean Climates in a World of Rising Temperatures: The 1.5 vs 2.0 Dilemma. Journal of Climate, https://doi.org/10.1175/JCLI-D-17-0074.1 at 2908.
[14] Wuebbles, D.J., D.W. Fahey, K.A. Hibbard, B. DeAngelo, S. Doherty, K. Hayhoe, R. Horton, J.P. Kossin, P.C. Taylor, A.M. Waple, and C.P. Weaver, 2017: Executive summary. In: *Climate Science Special Report: Fourth National Climate Assessment, Volume I* [Wuebbles, D.J., D.W. Fahey, K.A. Hibbard, D.J. Dokken, B.C. Stewart, and T.K. Maycock (eds.)]. U.S. Global Change Research Program, Washington, DC, USA, pp. 12-34, doi: 10.7930/J0DJ5CTG at 16.
[15] Hooidonk, R., Maynard, J. A., Liu, Y., & Lee, S. K. (2015). Downscaled projections of Caribbean coral bleaching that can inform conservation planning. Global change biology, 21(9), 3389-3401.
[16] Simpson et al, supra n. 1, at 34.
[17] Ibid., citing Miller, J., E. Muller, C. Rogers, R. Waara, A. Atkinson, K. Whelan, M. Patterson, and B. Witcher. (2009). *Coral disease following massive bleaching in 2005 causes 60% decline in coral cover on reefs in the US Virgin Islands*. Coral Reefs 28(4): 925-937
[18] https://oceanservice.noaa.gov/facts/coral_bleach.html

- The loss of reef structure and live coral cover due to coral bleaching has resulted in declines in the biomass of commercially important reef fish.[19] The impact of coral bleaching on the region's fisheries cannot be overstated.

Ocean acidification is increasing, in turn impacting reef structure:

- An increase in atmospheric carbon dioxide (CO_2) concentration since the Industrial Revolution has led to a 26% increase in the acidity of the ocean. [20]
- Increasing acidification of the Caribbean is affecting reef structure and the growth of shellfish.[21] This has serious implications for reef growth and marine biodiversity, and for the ability of reefs to serve as buffers against storm surge.

Higher temperatures are bringing more intense rainfall events and more droughts in the Caribbean:

- Although annual rainfall has not had a noticeable change across the Caribbean[22], higher temperatures have created a more vigorous hydrological cycle, resulting in more intense rainfall events (distinct from hurricanes) and more droughts.
- Extreme rainfall events have triggered landslides, resulting in many deaths and the destruction of critical infrastructure, including transportation, water, sewage, electrical, and communication systems.
- In September 2010 Hurricane Tomas deposited over 25 inches of rain in Saint Lucia in less than 24 hours. This resulted in landslides and the destruction of water supply infrastructure, including dams and distribution mains and another water crisis.
- On Christmas Eve 2013 heavy rains triggered massive floods and landslides in St Vincent and Grenadines, resulting in a dozen deaths and destroyed homes and roads. Dominica and Saint Lucia were also affected by this system.[23]
- Saint Lucia experienced one of its most intense and prolonged droughts in 2009/2010. This led to water rationing across the island.

More intense hurricanes are already being experienced, with devastating impacts on CARICOM countries:

- Human activities have contributed substantially to observed ocean–atmosphere variability in the Atlantic Ocean, and these changes have contributed to the observed upward trend in North Atlantic hurricane activity since the 1970s.24
- Warmer sea surface temperatures have spawned and/or strengthened more intense hurricanes, i.e., of Category 3 and higher on the Saffir/Simpson Scale, with the 2017 Atlantic hurricane season the latest and most vivid example.

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[19] CMEP (2017) at 11.
[20] Id. at 8.
[21] USGRP, 2017: *Climate Science Special Report: Fourth National Climate Assessment, Volume I* ([Wuebbles, D.Jl, D.W. Fahey, K.A. Hibbard, D.J. Dokken, B.C. Stewart, and T.K. Maycock (eds)]. U.S. Global Change Research Program, Washington, DC, USA, 470 pp, doi: 10.7930/JOJ964J6. https://science2017.globalchange.gov/downloads/CSSR2017_FullReport.pdf
[22] See., e.g., Beharry et al, supra.
[23] Nurse, L. and Charley, J. (2016) Characterizing the December 2013 extreme rainfall event over the Eastern Caribbean. American Meteorological Society 28th Conference on Climate Variability and Change.
[24] USGRP, 2017: *Climate Science Special Report: Fourth National Climate Assessment, Volume I* at 268.

- In 2017, hurricane activity was well above average, with 17 named storms, 10 hurricanes, and 6 major hurricanes. This compares to the long-term averages of 12 named storms, 6 hurricanes, and 3 major hurricanes. One unnamed tropical depression also formed in 2017. These systems caused scores of deaths in the islands and hundreds of millions of dollars in damages. **Hurricanes Irma and Maria** devastated two CARICOM member states, Antigua and Barbuda and Dominica and severely impacted island territories of the US, the United Kingdom, France and the Netherlands.
- Hurricanes Irma and Maria were **the first recorded Category 5 hurricanes to ever affect the Leeward Islands** - and occurred within two weeks of each other.
- In **Dominica**, Hurricane Maria resulted in total damage of USD 931 million and losses in economic activity of USD 380 million.[25] Losses and damages amounted to 224% of the country's 2016 GDP; estimated recovery needs are almost USD 1.4 billion.[26]
- In **Antigua and Barbuda**, the Irma/Maria events resulted in total damage of USD 136 million, and losses of approximately USD 19 million.[27] Hurricane Irma damaged or destroyed an estimated 95% of all public and private properties the structures on **Barbuda** and resulted in the evacuation of the island's entire population to Antigua.
- Total recovery needs for **Dominica, Barbuda, and the British Virgin Islands** from Hurricanes Irma and Maria have been estimated at over USD 5 billion.28
- Hurricane Maria made landfall in the US territory of **Puerto Rico**, resulting in widespread flooding across the island, and incapacitating the central electric power system, leaving the entire island without power. The overall cost to Puerto Rico has been variously estimated at between USD 50-100 billion and recovery efforts are still underway.

In sum, countries and territories in the CARICOM region are already in a situation in which their physical and economic survival is threatened and their adaptive capacity is challenged or potentially exceeded.

Where do we want to go?

According to the US's Fourth National Climate Assessment, Executive Summary, with significant reductions in the emissions of greenhouse gases, the global annually averaged temperature rise could be limited to 3.6°F (2°C) or less; without major reductions in these emissions, the increase in annual average global temperatures relative to preindustrial times could reach 9°F (5°C) or more by the end of this century.[29]

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[25] UNDP (2017) Regional Overview: Impact of Hurricanes Irma and Maria: Conference Supporting Document, available at https://reliefweb.int/sites/reliefweb.int/files/resources/UNDP%20%20Regional%20Overview%20Impact%20of%20Hurricanes%20Irma%20and%20Maria.pdf

[26] Id.

[27] Id.

[28] Id.

[29] Wuebbles, D.J., D.W. Fahey, K.A. Hibbard, B. DeAngelo, S. Doherty, K. Hayhoe, R. Horton, J.P. Kossin, P.C. Taylor, A.M. Waple, and C.P. Weaver, 2017: Executive summary. In: *Climate Science Special Report: Fourth National Climate Assessment, Volume I* [Wuebbles, D.J., D.W. Fahey, K.A. Hibbard, D.J. Dokken, B.C. Stewart, and T.K. Maycock (eds.)]. U.S. Global Change Research Program, Washington, DC, USA, pp. 12-34, doi: 10.7930/J0DJ5CTG at 6. Available at https://science2017.globalchange.gov/downloads/CSSR2017_PRINT_Executive_Summary.pdf

Under the Paris Agreement, all Parties have committed to pursuit of a 1.5°C limitation in global average surface temperature increase above pre-industrial levels. Mitigation pathways have been identified in the literature that are consistent with the Paris Agreement's long-term temperature goal.

In view of the impacts that can increasingly be projected at higher levels of warming, these below 1.5C pathways must represent the way forward.

Efforts are underway within the Caribbean region to provide detailed assessments of the impacts of warming at 1.5C.

In 2017, the United States released portions of its Fourth National Climate Assessment. Volume II of this document, addressing "Climate Change Impacts, Risks, and Adaptation in the United States", analyses the impacts of global change and will have a section on the Southeast and the Caribbean. This Volume is likely to be of relevance to the Caribbean and to the Talanoa Dialogue inquiry and should form an input into Dialogue synthesis papers.

Conclusion

The Caribbean is already experiencing the adverse effects of climate change in a climate that is one degree warmer then pre-industrial times. Temperatures increase is already greater than the global average and SLR is predicted to exceed the global average. These impacts will be even greater as temperatures rise in response to future GHG emissions.

The current pledges of Parties in their Nationally Determined Contributions (NDCs) to the Paris Agreement are not yet in alignment with the trajectory of achieving the long term goal of the Paris Agreement, and these pledges, if implemented fully, are only estimated to limit global warming to 3.2°C in 2100.[30] Impacts at that level of warming will severely threaten the survival of many SIDS in the Caribbean and elsewhere.

CARICOM expects that the scientific evidence presented through the Talanoa Dialogue to highlight the need for Parties to bring forward new and updated NDCs that are more ambitious by 2020, in line with the Paris goal of limiting warming to below 1.5°C, to enable vulnerable communities such as those in SIDS to survive.

[30] See: Climate Action Tracker at: http://climateactiontracker.org/publications/briefing/288/Improvement-in-warming-outlook-as-India-and-China-move-ahead-but-Paris-Agreement-gap-still-looms-large.html