

Hurricanes and Climate Change: Is there a connection?

Since mid 1980s the world has been experiencing noticeable changes in its climate. From warmer sea temperatures, violent hurricanes causing millions of dollars in damage and lives lost, to melting ice caps and extreme climates all over the world, the smallest change in climate can have vicious repercussions.

The relentless line-up of storms since 1995 has ignited debate about the connection between hurricanes and climate change.

While it is controversial, many scientists believe that global warming is in fact creating conditions that are favourable for more severe hurricanes. As tropical Sea Surface Temperatures (SSTs) have increased in the past decades, so has the intrinsic destructive potential of hurricanes.

The key connection is between SSTs and the power of hurricanes. The basic connection between the two is fairly simple: warm water, and the instability in the lower atmosphere that is created by it, is the energy source of hurricanes. This is why they only arise in the tropics and during the season when SSTs are highest. Right?

Not any more. In recent years, hurricanes have been forming erratically and in unconventional places like the South Atlantic Basin and the much cooler waters off Canada's Atlantic coast.

In September 2003, Hurricane Juan made its way across Canada's Atlantic coast causing extensive damage across central Nova Scotia and into Prince Edward Island. The 2003 Atlantic Hurricane season also recorded Tropical Storm Ana, the first Atlantic tropical storm on record to form in April, two months before the start of traditional hurricane season.

In March 2004, the southern coast of Brazil was battered by the first hurricane ever recorded in the South Atlantic. Deemed a Category one it caused considerable damage partly because the local populace had no previous experience in responding to such storms. The hurricane came as a surprise and was never named.

In September 2004, Hurricane Ivan, which devastated Grenada, was recorded as the most southerly Category 5 hurricane on record in the Atlantic. In 2005, we saw hurricane Katrina as the costliest and one of the deadliest hurricanes in the history of the United States.

Hurricane Dean was the first Category 5 hurricane of the 2007 Atlantic hurricane season while Hurricane Felix set records as the fastest storm to ever grow from a tropical depression to a category 5 (51 hours) and with the current trend we can expect to see more.

Coincidence? Hardly. The global climate is changing and the average warming over the past century has accelerated in the past few decades. Although attributed by some natural variability, objective scientific research points to human influences. However, most

experts conclude that both a natural cycle (the Atlantic Multidecadal Oscillation) and anthropogenic (human) forces have made roughly equally large contributions to the warming of the tropical Atlantic over the past decades.

According to the world's authority on climate change, the Intergovernmental Panel on Climate Change (IPCC), the average temperature of the Earth has risen by 0.6 degrees Celsius since the late 1800s and is expected to increase by another 2.4 to 6.4 degrees Celsius by the year 2100. They have also predicted that the average SST will increase by 1.4 –5.8 degrees Celsius by 2100 and that the global average sea level will increase by 0.18 to 0.59 m by 2100. Scientists say that the increase of even the minimum increase would be catastrophic. Some of which we are already experiencing. Extreme weather conditions such as the increased number and intensity of hurricanes; plant and animal extinction, e.g. Coral beaching; and human migration from coastal areas – In December 2005, a small community living in the Pacific island chain of Vanuatu became perhaps the first to be relocated.

The 2005 North Atlantic hurricane season (1 June to 30 Nov) was the most active and destructive on record by several measures. With seven major hurricanes (Category 3+) at least 2280 fatalities and US \$128 billion, SSTs in the North Atlantic region were at record high levels at 0.9 degrees Celsius above the normal. Hurricane Katrina alone caused 1836 deaths in New Orleans, Louisiana, and across the entire Mississippi coast.

Global warming is a major concern for many countries. In 2001 NASA scientists published a major study based on observations by satellite, which concluded that the margins of the Greenland ice-sheet were dropping in height at a rate of roughly one meter a year. Now, amid some of the most hostile climatic conditions anywhere on the planet, recent updates have recorded falls as dramatic as 10 meters a year. Melting ice caps may not be an immediate concern for us here in T&T, but one thing is clear, what happens in this remote barren land has the potential to affect us all. If the ice caps were to completely disappear, global sea levels would rise by 6.5m (21 feet). *This is of great consequence for smaller islands, especially T&T, considering the highest above sea level from Caroni to Piarco is 10 meters.*

More relevant to us, global warming is heating up the oceans, and since warm waters fuel hurricanes, our warmer climate means the category five hurricanes like Katrina will be regular occurrences instead of rare natural disasters.

But how does this relate to Small Island Developing States (SIDS), especially our twin island republic of T&T? According to the EMA, SIDS produce only one percent of Green House Gas emissions but unfortunately, they are disproportionately affected by climate change, especially because of their 'islandness'. But they all have a moral responsibility to contribute to solutions.

Undeniably, T&T is a victim of climate change. According to John Agard, Chairman of the EMA, there is no need to speculate and resort to climate change models (in this case),” At the World Environment Day Conference in May 2007, Agard declared, “The

effects of coastal erosion are quite visible. We must adapt and take action, because things are happening faster than we anticipated.”

He also attributed our hotter than usual dry season due to global warming; weather related mortality due to the intensity of hurricanes caused by the rise in SSTs; the increase of infectious diseases like Dengue and the increase in air quality respiratory illness due to the traveling Sahara Dust as a result of stronger shears in atmospheric winds.

One of Tobago’s greatest tourist attractions is also dying. Heating caused major coral bleaching in 2005 with water temperatures reaching as high as 30 degrees Celsius. The Buccoo Reef represents a very precious natural resource that is important for a healthy ocean habitat as well as economic wealth for Tobago. In the Caribbean alone, scuba diving and coral reef related tourism generates between US \$1.5 to US\$3.5 billion. Corals form the structure and ecological foundation of the reef system and apart from attracting tourists, they provide services such as coastal protection from storm surges and nursery habitats for many fish species and invertebrates. Unfortunately, coral reefs are facing the stress of coral bleaching associated with warmer SST (as a result of global warming), silty run-off from rivers and high level of nutrient pollution. In 2005, 67 percent of the corals were bleached, turning them stark white. Some of them have died, remained diseased and colourless and this is threatening the livelihood of reef tour operators and scuba diving facilitators.

So what is the EMA doing to address climate change challenges?

The EMA believes that by building adaptive capacity and implementing policies T&T will be able to build its resilience and reduce its vulnerability risk as an island. Adaptation refers to adjustments in ecological, social, or economic systems in response to actual or expected climatic stimuli and their effects or impacts.

T&T is a signatory to the United Nations Framework Convention on Climate Change (UNFCCC) and its Kyoto Protocol.

The ultimate objective of the UNFCCC is the stabilization of greenhouse gases in the atmosphere at a level that would not harm food production, economic development and at a level that would allow ecosystems to adapt. In other words, any accelerated rate of climate change can prove to be catastrophic if natural and human systems cannot adapt.

Under the UNFCCC, T&T is obligated to conduct and report to the international community, its efforts and progress in implementing the UNFCCC in the form of National Communications. This information includes a national inventory of greenhouse gas emissions by sector (such as transport, industry, manufacturing etc.), the key vulnerability of various sectors, as well as the challenges T&T may face in implementing the provisions of the UNFCCC under which it has obligations.

The EMA currently chairs a Cabinet-appointed Working Group to Determine the Implications of Global Warming, Climate Change and Sea Level Rise” whose remit is to, inter alia:

- analyse relevant data on climate variability and change to establish its impacts on Trinidad and Tobago, in various sectors such as agriculture, health, coastal zones, water resources, tourism, and land use.
- Conduct vulnerability analyses on the various sectors to the adverse impacts of climate change,
- Oversee the implementation of Trinidad and Tobago’s obligations under the UNFCCC

The EMA is currently preparing the Second National Communication to the UNFCCC having prepared and submitted to the UNFCCC T&T’s First National communication in 2001. The Second National Communication is expected to include information on the greenhouse gas emissions by sector, vulnerability analyses as well as formulate options for reducing emissions and adapting to climate change.

Additionally, the EMA has completed a technology needs assessment for climate change and is also currently analyzing climate data to discern climate variability and change in rainfall patterns, humidity and other directly and indirectly affected sectors with a view to recommending policy options for consideration by government.

The EMA has indirectly enforced several measures to address climate change, some of these have been in the form of rules and mandates. The EMA has already formulated CEC rules (2000), Water Pollution Rules and designated areas and species as environmentally sensitive to protect its biodiversity.

The Certificate of Environmental Clearance (CEC) is a permit from the EMA for certain types of projects or activities. No construction can start without a CEC approval. Before granting a CEC, the EMA considers environmental issues such as the effect of noise, dust and fumes, water above and below ground and waste. It also considers flooding, landslides, beach destruction and damage to homes. We may not be able to stop global warming, but we can stop polluting our coasts. We can therefore plan our development projects in such a way as to reduce siltation.

The EMA also recently passed water rules to safeguard aquifers and rivers. Under the Water Pollution Rules, companies (or persons) releasing water pollutants are required by law to register with the EMA. The Rules govern the Registration and Permitting of water pollutants in Trinidad and Tobago, especially if their wastes run into the sea reaching corals, ESAs, and other marine animals.

The loss of Biodiversity could make us more vulnerable to climate change and diseases. The Caribbean is classified as a hotspot for biodiversity due to the hundreds of plant and animal species found here that do not exist anywhere else in the world, the EMA therefore appreciates the importance of designating Environmentally Sensitive Area (ESA) and Environmentally Sensitive Species (ESS) under the Environmentally Sensitive

Areas Rules, 2001, to protect them from environmental degradation due to pollution and climate change.

For instance, the environmental integrity of the Nariva and Caroni Swamps is being threatened by salt-water intrusion (among other factors), due to the inundated delta regions on the coast caused by global warming.

Nariva is the largest freshwater wetland in T&T, and is of international significance under the Ramsar Convention. Unfortunately it is vulnerable to the impacts of salt-water intrusion, which can cause a shift in the hydrological regime and biodiversity. Nariva is also the main habitat for the locally and globally endangered West Indian Manatee, the locally extinct Blue and Gold Macaw, which was recently reintroduced into the wild, and the Giant Anaconda.

T&T's commitment to pursue efforts geared towards greenhouse gas emissions have resulted in the advancement of several initiatives. Speaking at a public lecture entitled "The Caribbean & Climate Change: The risks ahead and the needed responses", The Honourable Penelope Beckles, Minister of Public Utilities and the Environment, stated that "Government's policy is to advance the use of new and innovative technologies such as alternative fuels that have lower levels of emissions." She also praised the National Reforestation and Watershed Rehabilitation Programme as being a major programme designated to increase the forest cover in the country, which would then increase the trapping of carbon dioxide from the atmosphere. This programme is geared towards reforestation of approximately 33,030 acres of land over a period of ten years. In addition to carbon sequestration derived from this programme, it is expected that this adaptive capacity will minimize the adverse impacts of climate change such as reducing the episodes of flooding arising from intense periods of rainfall.

