
The Issues Of Climate Change Faced By Caribbean SIDS

Climate change is an issue for all individuals globally. In spite of the homogeneity with regards to the scope of climate change occurring on a global scale, certain nations and areas are more exposed to the effects of climate change.

Small island developing states (SIDS) have long been identified as being prone to being more negatively exposed to climate change effects. As described by the United Nations in the 1992 Earth Summit held in Rio de Janeiro Brazil, SIDS are, "a distinct group of developing countries facing definite social, economic and environmental exposures". They exist over a spread encompassing The Caribbean, the Pacific and the Atlantic, Indian Ocean, Mediterranean and The South China Sea (AIMS). They face extraordinary challenges that can be intensified by the effects of climate change. These nations face challenges including thin resource base depriving them of the benefits of economies of scale; small local markets and a substantial dependence on external international markets; high costs and demand for energy, infrastructure, transportation, communication and servicing; extensive distances from export markets and import resources; low and asymmetrical international traffic volumes; little resilience to natural disasters; growing populations; high volatility of economic growth; limited chances for the private sector and a large reliance of the local economies on their public sector; and fragile natural environments.

Though they are unique in their dependence for external aid, the challenges already faced by these nations make the potential impacts of climate change of particular, and all the more acute when faced. This research essay will address the means by which the SIDS based in the Caribbean can use mitigation and adaptation strategies in order to deal with some effects of climate change. The challenges faced by the Caribbean SIDS and the importance of mitigation and adaptation strategies are made clearer when examining the particular impacts that they face regarding climate change effects. It is projected that climate change will cause : sea level rise, increasing temperatures, more frequent droughts, longer dry periods as well as more intense episodes of rainfall and changing rainfall patterns.

These issues present a major problem for many sectors of Caribbean development and existence. These nations are involved in many climate sensitive sectors insofar as it regards the economy. These include coastal based tourism, agriculture, fishing as well as timber from forested areas and the provision of clean water to operate all these sectors. Of particular importance, is the highly negative impact that the seasonal threats of hurricanes and tropical storms have on the economies and development of these islands. In 2017 alone, the Caribbean lost over 700 million dollars in potential tourism revenue because of the devastation caused hurricane Irma and Maria as reported by the Jamaica Observer in a May 2018 article. In Anguilla, The Bahamas, British Virgin Islands (BVI), Sint Maarten, and Turks and Caicos Islands (TCI), total damage was summed at 5. 4 billion USD.

Beyond the threat to the tourism economy, the Food and Agriculture Organization of the United Nations (FAO) have identified four key threats to food security in their 2012 report. Global warming and extreme climate event related drought and flooding, are projected to lead to reduction of crop yields as well as have a negative effect on forestry, fisheries and agriculture.

These factors are projected to create a situation including undernourishment of populations as well as increased food instability relating to access. The projection of droughts is also expected to increase the demand for water and lead to an increase in water washed diseases. Due to these challenges it is also projected that the Caribbean SIDS will experience high displacement of individuals based on the reduction of resources and the hazards posed by the extreme weather conditions. Following the projected exodus there is expected to be an increase in violent conflicts driven by increased poverty and economic factors in the face of these situations. Displacement may also come involuntarily to those living near coastal areas affected by sea level rise, resulting in compounding pressures.

Mitigation and adaptation in the context of climate change science have unique meanings. Mitigation in this regard refers to actions taken to reduce the magnitude of greenhouse gas (GHG) emissions by anthropogenic sources effectively reducing the re-radiation of heat. Mitigation is primarily involved in two aspects. These are, reducing or eliminating the GHG emissions at the source or sequestering GHG gasses from the atmosphere. There are various actions that Caribbean nations can take in order to achieve both goals. Mitigation practices generally consist of the same principals globally and is therefore not a unique action that must be adopted by Caribbean nations. It may be however be inherently more difficult due to the heavy dependence that Caribbean SIDS have in utilization of fossil fuels as energy. Mitigation practices always involve some level of reduction or ideally the elimination of the use of fossil fuels. This action may manifest itself in the way Caribbean nations generate electricity. Renewable sources need to be explored as a means of reduction. Wind turbines can be placed on the windward sides of many islands to harvest the kinetic energy held in the trade winds.

One challenge faced in doing so however is the limited availability of land in the Caribbean. Solar energy through the use of photovoltaics is also another highly viable option given the high level of solar insolation received in the Caribbean region. Challenging this however is the cost associated with the equipment needed to power all these islands. Due to the tectonic and volcanic activity in the Caribbean region as well, geothermal energy may also be a viable option for many Caribbean islands in reducing the use of fossil fuels. Many volcanoes in the Caribbean however are popular tourism sites and it may be difficult in preserving aesthetics in the face of geothermal energy development. The introduction and growing popularity of hybrid vehicles is also a viable option within the Caribbean transportation ecosystem. Legislation that may increase the acquisition capabilities of individuals to purchase electric or hybrid vehicles should be explored regionally, as well as development of the public transportation system to help reduce the number of private vehicles required.

Adaptation in climate science refers to responding to the actions taken in responding to the effects of climate change. These actions may either be proactive or reactive in approach. Unlike mitigation efforts which are generally homogenous globally in the actions required to achieve a mitigated effect, adaptation mechanisms must be tailored to the specific requirements based on forecasted impacts. For the Caribbean region, adaptation measures must be taken to deal with the effects of sea level rise, food production and security, economic diversification and stability. In a report produced by the UNFCC in 2005, appropriate adaptation measures needed to combat climate change were identified for agriculture, tourism, human settlements and infrastructure, public health, coastal zone management and water resource management as well as disaster management. The facets of coastal zone management were almost always directly related to the tourism management adaptation policies insofar that they both deal with strategies to protect essential infrastructure and facilities. The increased demand by the

agricultural and tourism sectors for water resources have seen a more efficient management strategy being developed in terms of the demand and supply of freshwater.

Heavy focus has also been placed on the ability of Caribbean SIDS on development of desalination plants to aid in water security long term. Disaster management systems can also be improved as a preemptive adaptation measure as it regards better response to hurricane activity as well as periods of drought. Also, as a measure to combat food shortages in the face of drought, more management systems can be implemented to develop the infrastructure regarding farming practices. A more modern approach can be taken to utilize less space and water, while simultaneously increasing production. One example of this new technology manifest itself in vertical hydroponics and aeroponics systems that utilize less space and water to produce and given an indoor setup, the climatic conditions internally can be manipulated to be ideal all year round. Public health adaptations relating to better surveillance as well as forecasting systems, vaccinations and better education systems can help to prevent an increase of diseases in the face of a reduced water supply. Regarding human settlements and infrastructure, there must be increased hazard mapping and forecasting when identifying the most affected by sea level rise. Systematically relocating zones more likely to suffer severe damage in the face of sea level rise will aid as a pragmatic approach when faced with the eventual sea level rise. Developing infrastructure capable of withstanding the rise is also a reasonable approach. Based on the information provided, it becomes clearer to see the importance of mitigation and adaptation measures in addressing climate change.

The key issues facing climate change of sea level rise, extreme weather events, food insecurity and economic instability can all be addressed in some way based through adaptation practices or slowed using the mitigation principles. These adaptation and mitigation measures however come with its own challenges in implementation given the high cost and skill required in proper development strategies and engineering.