

Climate Change Projections



In previous articles, we introduced the concept and scientific basis of climate change, and discussed the changes in climate that have been observed over the last century, and the impacts of these changes on Guyana and the rest of the world. This week we will discuss the climatic changes that are projected to occur by the end of the century, and the impacts that these changes may have on Guyana.

Projecting Climate Change

We have learnt that changes in climate have occurred and these have been mainly linked to high levels of Greenhouse gas (GHG) emissions. Scientific studies such as the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, 2007 (IPCC FAR) indicate that continued GHG emissions at or above current rates, would cause further warming which could lead to catastrophic changes for the Earth.

To understand how these changes will affect us in the future, climate change scientists use computer-based climate models to generate projections of future climate scenarios for coming centuries. Projections of future climate change are generated using Atmosphere-ocean general circulation models (AOGCMs), which are founded on accepted physical principles and can project aspects of climate, such as temperature and rainfall, for several decades or more into the future. AOGCMs can give different projections of future climate depending on which Special Report on Emissions Scenarios (SRES) scenario is used.

Projected Climate Changes for the world

The IPCC SRES developed a set of climate change scenarios that show various combinations of demographic, economic and technological driving forces could affect future GHG emissions. The various emissions projections under different SRES scenarios are widely used in the assessments of future climate change.

The IPCC projects that the increase in global temperature by the end of this century is likely to be in the range of 1.1 to 6.4°C, depending on which SRES scenario is used.

The projected effects of global warming include sea level rise (in the range of about 0.2 to 0.6 metres above 1990 levels by the end of the century), which will threaten low lying coastal areas, especially small islands and coastal cities, and melting glaciers, which will increase the risk of flooding. Other effects include the contraction of snow cover, permafrost and sea ice, increased frequency of heat waves, and more intense tropical cyclones.

Precipitation is projected to increase in many parts of the world and this can lead to an increased risk of flooding in many areas.

Temperature increases are likely to cause major changes in ecosystem structure and function, and could place 20 to 30 percent of plant and animal species at increased risk of extinction. Changes in temperature and rainfall will have a damaging effect on terrestrial ecosystems, such as forests and savannahs. Climate change is also projected to greatly reduce water resources.

Declining crop yields due to higher temperatures will threaten food security and worsen malnutrition and starvation in many parts of the developing world, especially Africa. Human health would also be at risk due to an increase in vector-borne diseases such as malaria and

dengue fever, and an increase in deaths due to heat stress as well as extreme cold in higher latitudes is predicted.



Developing countries are particularly vulnerable to the negative effects of climate change due to their geographic location (often in areas that are prone to drought, flooding and tropical diseases), their reliance on climate sensitive primary sectors such as agriculture and fisheries, and their low income which limits their capacity to adapt. The poorest people are likely to be affected earliest and most severely, due to their dependence on subsistence agriculture, and their limited access to capital which restricts the possibilities for adaptation or insurance against possible losses.

Projected climate changes for Guyana

In Guyana, studies project that by the end of this century, temperatures can increase by up to 4°C, weather patterns will become more extreme and sea level is projected to rise to as much as two feet.

Many sectors of the country will be affected negatively. The agriculture sector, for example, is very likely to be negatively affected by climate change through decreasing yields caused by greater drought-like conditions mainly.

Sea level rise will inundate wetlands and lowlands; accelerate coastal erosion; exacerbate coastal flooding; threaten or destroy coastal structures; raise water tables and increase the salinity of rivers and aquifers.

Some effects of climate change, such as changes in rainfall, temperature patterns, and sea level rise, will potentially result in a number of changed health outcomes.

All the changes projected may translate into ecosystems disruptions, floods, landslides, storm surges and droughts, among other impacts. These threats will impose severe social and economic constraints to Guyana and would need to be addressed with effective adaptation measures.

With 90% of the population and 75% of the main economic activities concentrated on the low-lying coast, Guyana is particularly vulnerable to negative effects of climate change on its economy, human livelihoods and ecosystems. As noted in the previous article, Guyana is already suffering greatly from changes in climate.

In the new week, the IPCC will release its Fifth Assessment Report which is expected to provide updated projections for climate change.



In order to avert the potential disaster that climate change poses to the world in general and developing countries in particular, a concerted international effort is required, with leadership and cooperation from developed and developing countries alike. Guyana has taken significant efforts to address climate change

In next week's article, we will discuss approaches to addressing climate change globally and in Guyana.

Information used in this feature was extracted from the following reports: The Fourth Assessment Report of the Intergovernmental Panel on Climate Change, 2007 (IPCC FAR), Guyana's Second National Communication (SNC) in Response to its Commitments to the UNFCCC (2012) and The Economics of Climate Change: The Stern Review (2007)

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