

MONITORING AND UNDERSTANDING
CLIMATE CHANGE AND IMPACTS

(CHAPTER NINE)

Anthropogenic Climate Change and its impacts can affect all sectors of socio-economic development in Guyana. It is therefore essential that the people of Guyana be fully prepared to respond to the adverse impacts. This will require actions to be undertaken to observe the effects of global warming and to conduct studies into the possible future impacts and response mechanisms. The education system must be involved in acquainting students with the effects of global warming and the issues that are being addressed at the national and international levels. An aggressive public awareness programme and training from the university levels down to the primary school level and at the community level will be necessary if Guyanese are to cooperate in responding to the adverse impacts of climate change.

CHAPTER 9

SYSTEMATIC OBSERVATION AND RESEARCH

To detect climate change, long periods (over 100 years) of reliable weather data have to be available for a network of locations which can indicate the regional variations in the climate. A relatively long period of impact monitoring is also required if accurate deductions, on the impacts, are to be made. Research is needed in order to analyse the records and to make projections into the future and on the details of the response mechanisms which will be required in order to adapt to and mitigate climate change.



A wireless weather station

9.1 INTRODUCTION

In Guyana, weather observations started since the 1800s. However, the records are not continuous due to discontinuities caused by temporary closure of stations, missing data and equipment failure. The transformation of the database from the old hardcopy format to a computerised one is proceeding but at a very slow pace due to the weakness of the human and technological resource bases. Sector -specific data collection is being done but not as a collective effort to effect analyses for detection of impact signals. Research into climate change and related issues are not currently being done in Guyana. However, the Government has been building a human resource base by ensuring that Guyanese participate in training workshops and courses whenever these are available.

9.2 DATA COLLECTION AND SYSTEMATIC OBSERVATION

The Hydrometeorological Service of the Ministry of Agriculture maintains a network of climatological stations in Guyana. At present, the network consists of eight synoptic stations located on the coast, in the savannahs and in the rainforest regions. In addition, there are ninety rainfall stations located around the country. The Guyana Sugar Corporation operates seventy-three rainfall stations and six climatological stations on the coast in the sugar estates. Linden Mining Company assists this Service with human resource at a climatological station in the inland region.

There are fifteen surface water hydrological, one A-sand aquifer and two shallow wells stations being maintained in Guyana. These are all owned by the Hydrometeorological Service. The efficient operation of the Networks are hindered mainly by inadequate staff to do timely maintenance.

Under the CPACC project, two tide gauges have been installed at the mouth of two large rivers. These are located at Parika on the Essequibo River and Rosignol on the Berbice River. Sea levels and climatological data are transmitted to a regional centre at the University of the West Indies in Trinidad, which is quality checked and then posted on the Internet.

The Hydrometeorological Service maintains a hydrological database and a climatological database using HYDATA 3.0 and CLICOM Version 3.1 softwares. These softwares were made available under the Voluntary Cooperation Programme of the World Meteorological Organization. There are quite a number of years for which records are not processed because of a lack of human resources and equipment (and training) for digitizing chart data.

9.3 RESEARCH INSTITUTIONS

These are: -

- Hydrometeorological Service
- University of Guyana
- National Agriculture Research Institute
- Institute of Applied Science and Technology
- Guyana Natural Resources Agency
- IWOKRAMA Rainforest Project
- Guyana Rice Development Board.
- TROPENBOS

While all of these institutions are capable of being involved in research in climate change, only the Hydrometeorological Service has been addressing research into detecting climate change. IWOKRAMA and TROPENBOS have been working on carbon changes in the forestry sector. There is the need for a coordinated approach towards addressing detection of climate change and the impacts resulting from global warming.

9.4 DATA COLLECTION NEEDS

For the Hydrometeorological Service to address systematic observation, it will require substantial inputs in the following areas:

9.4.1 Equipment

Modern observing equipment needs to be deployed within the networks with capability for real-time monitoring, dissemination and processing of data. This is likely to be strengthened somewhat through the World Bank El Nino Emergency Assistance Project, which will provide several sets of automatic equipment to improve data collection in some areas. The equipment needs include sensors for gaseous emissions, transmission tools and computerized processing systems.

9.4.2 Training

The staff requires training in GIS, computer processing, use of satellite data (such as LANDSAT and SPOT imageries and TOPEX-Poseidon/Jason 1 for Sea Level monitoring) and data analyses and interpretation.

9.4.3 Field Observations

The networks need to be revised and extended to satisfy the requirements under the World Climate Programme.

9.5 IMPACT OBSERVATIONS BY SECTOR AGENCIES

All the sectors will require training and equipment to carry out routine impact observing. The human resources required to do these tasks will also have to be recruited. Data collection will also be required to conduct studies into baseline emissions and emission conversion factors.

9.6 RESEARCH NEEDS

The needs are primarily to address detection and prediction of changes in the climate; and to detect and predict the impacts and responses to climate change.

9.6.1 Climate Change Detection and Prediction

- Downscaling data from GCMs for modelling of climate and climate scenarios in Guyana.
- Analysing data collected in Guyana to detect signals of climate variability and change.
- Predicting regional shifts, in climate, within Guyana and its Exclusive Economic Zone.
- Predicting changes in the sea surface temperature, etc. of the coastal waters of Guyana.
- Shoreline changes and erosion due to sea level rise.
- Studies in extreme weather events, including storm surges.

9.6.2 Impacts Detection And Responses Prediction

- Vulnerability and adaptation of sugar and rice to different climate scenarios.
- Transport of pesticides and agrochemicals in the soil.
- Efficiency of the recharge of Guyana's aquifers and the influence of changing rainfall patterns on ground water availability.
- Efficiency of energy production from biomass.
- Efficiency of energy use in the transport sector.
- Lowering of GHG emissions in all sectors.
- Emissions baseline studies in the major sectors.
- Emission conversion factors in energy, agriculture and forestry sectors.

9.0 SYSTEMIC OBSERVATION AND RESEARCH

- Impacts of climate change on major crops and on animal production.
- Effects of climate change on socio-economic development.
- Studies into the impact of climate change on human settlements and Impact of climate change on water resources.
- Studies into the impact of climate change on health of ecosystems.

9.7 DATA STORAGE

There is the need for a central data bank for storage of all climate and climate change data. The formation of a climate change information centre will allow for this to happen. It will require equipment, trained personnel and office space.

9.8 CONCLUSION

The major need is for equipment, staff and limited area computer models for climate change prediction and for monitoring and detecting impacts of climate change. The capacity of sector agencies will require to be strengthened.