CLIMATE CHANGE AND THE CARIBBEAN

In the last decade, global climate change has emerged as one of the major environmental challenges facing the international community. This year we have witnessed the increased visibility of climate change issues in the international press and in pronouncements of the leaders of some of the most influential governments, the G8 , and latterly and encouragingly so, the USA. In addition the climate change issue was catapulted into public interest by the publication of Al Gore's excellent exposition "An inconvenient truth" which was later transformed into an Oscar winning documentary. Both Al Gore and Hollywood emerged as powerful interlocutors for the argument that climate change is a serious threat, is happening, is already having an impact on people's lives and needs urgent action to cope with its impacts before it is too late. Witness, too, the ground surge of activity in the USA in states like California, New York and the active role of a coalition of American city mayors to reduce their carbon footprint. Even in the conservative, evangelical circles, in the USA, concern has been expressed recently about the seeming lack of action on climate change by the administration. Witness also the constant reports of devastating floods, wild fires and storms from all corners of the earth and, surprisingly, a typhoon in the Arabian Gulf!!! All of these have collectively served to place climate change on the agenda of a much wider constituency. This increased visibility reached its zenith, recently, when the issue of climate change and global security was discussed at a special meeting of the Security Council.

Two significant developments may have triggered this "explosion" of interest and concern about a problem that has, until now, been suffocating on the backburners of international agendas. The first is the publication of the Stern report and the other the publication of the reports of Working Groups 1-3 for the Fourth Assessment Report (FAR) of the Intergovernmental Panel on Climate Change (IPCC). The Stern report was commissioned by the British Government to assess the economics of moving to a low carbon global economy, focusing on the medium to long-term perspective and drawing implications for the timescales for action and the choice of policies and institutions. Essentially, the effectiveness of the report, in drawing global attention to climate change, may be attributed to the fact that it is the first comprehensive attempt to put dollars and cents values to actions needed for countries to both reduce the level of their Green House Gas (GHG) emissions (mitigation) and to decrease their vulnerability to the projected impacts of climate change (Adaptation). Moreover, the report calls for immediate action to deal with these issues and emphasises that any delay will incur significant

increases in the costs of responding. Some of the salient findings of the Stern Report are as follows

- Climate change presents very serious global risks and demands an urgent global response.

- Action taken in next 10 or 20 years can have a profound effect on climate in the second half of this century and next.
- Mitigation must be viewed as an investment – cost should be incurred now and in the coming few decades to avoid risks of very severe consequences in future.
- The benefits of strong early action considerably outweigh the costs.

- Evidence shows that ignoring climate change will eventually damage economic growth.

- Our actions over the coming few decades could create risks of major disruption to economic and social activity later this century and the next, on a scale similar to the great wars and the economic depression of the first half of the 20th century.
- It will be difficult or impossible to reverse these changes.

- The earlier effective action is taken, the less costly it will be.

The report of Working Group 1 of the Intergovernmental Panel on Climate Change (IPCC) – a global panel of scientists, established by the World Meteorological Organization to study and report on climate change- concluded that most of the observed increase in warming since the mid 20th century is very likely due to the observed increase in anthropogenic (man-made) greenhouse gas emissions. The existence of these gases in the atmosphere is vital to life on earth - in their absence average temperatures would be about 30 degrees centigrade lower than they are today making most of the globe uninhabitable. But human activities are now causing atmospheric concentrations of greenhouse gases, including carbon dioxide, methane and nitrous oxide to rise above pre-industrial levels. Carbon Dioxide levels have increased from 280ppm in 1750 to over 379ppm today, higher than any previous levels that can be reliably measured (i.e. in the last 420,000 years). Increasing greenhouse gas concentrations in the atmosphere are causing temperatures to rise. The earth's surface warmed by approximately 0.6 degrees centigrade over the 20th century, the highest ever recorded rate of change of the earth's temperature. The Intergovernmental Panel on Climate Change (IPCC), have

projected that the average global surface temperatures, will continue to increase to between 1.4 and 5.8 degrees centigrade above 1990 levels by 2100.

In April this year Working Group 2 (WG2) of the IPCC published its report on the assessment of the Impacts, Adaptation and Vulnerability. One Chapter in this report is devoted to Small Island Developing States (SIDS) like those in the Caribbean. The conclusions of this Chapter are also applicable to the low-lying Caribbean coastal states of Guyana, Suriname and Belize. The report concludes that small islands, whether located in the tropics or higher latitudes have characteristics which make them especially vulnerable to the effects of climate change, sea level rise and extreme events. It confirms and strengthens previous observations which show that characteristics such as limited size, proneness to natural hazards and external shocks enhance the vulnerability of islands to climate change. In most cases they have low adaptive capacity, and adaptation costs are high relative to GDP. Sea-level rise a consequence of global warming is likely to exacerbate inundation, storm surge, erosion and other coastal hazards, thus threatening vital infrastructure that supports the socio-economic well-being of island communities

The report points out that there is strong evidence that under most climate change scenarios, water resources in small islands are likely to be seriously compromised**.** Most small islands have a limited water supply, and water resources in these islands are especially vulnerable to future changes and distribution of rainfall. Many islands in the Caribbean are likely to experience increased water stress as a result of climate change.

Climate change is likely to heavily impact coral reefs, fisheries and other marine-based resources. Fisheries make an important contribution to the GDP of many island states. Changes in the occurrence and intensity of ENSO events are likely to have severe impacts on commercial and artisanal fisheries.

It is very likely that subsistence and commercial agriculture on small islands will be adversely affected by climate change due to the changing weather patterns, reduced precipitation, higher temperatures and increased occurrence of extreme events. Sea-level rise, inundation, seawater intrusion into freshwater lenses, soil

salinization, and decline in water supply will very likely adversely impact coastal agriculture.

New studies examined in compiling the report confirm previous findings that the effects of climate change on tourism are likely to be direct and indirect, and largely negative .Tourism is the major contributor to GDP and employment in many territories in the Caribbean. Sea-level rise and increased sea water temperature will cause accelerated beach erosion, degradation of coral reefs and bleaching. In addition, loss of cultural heritage from inundation and flooding reduces the amenity value for coastal users. Whereas a warmer climate could reduce the number of people visiting small islands in low latitudes, it could have the reverse effect in middle and high latitude islands. However, water shortages and increased incidence of vector-borne diseases may also deter tourists from visiting Caribbean destinations.

Another observation in the report is that there is growing concern that global climate change is likely to impact human health, mostly in adverse ways. Many small islands are located in tropical or subtropical zones whose weather and climate are already conducive to the transmission of diseases such as malaria, dengue, and food- and water-borne diseases. Other climate sensitive diseases of concern to small islands include diarrhoeal diseases, heat stress, skin diseases, acute respiratory infections, and asthma.

The report concludes that communities least able to cope with the effects of climate change are likely to be hardest hit by climate change in the future due to water shortages and reduced crop yields. People could also suffer from disease and injury due to greater risks of heat waves, more intense tropical storms, and more frequent extreme weather episodes leading to floods, drought and landslides.

Global response to climate change

In response to this emerging threat, countries negotiated and ratified the United Nations Framework Convention on Climate Change (UNFCCC) a global agreement which has, as its main objective, the stabilization of greenhouse gas concentration in the atmosphere. The convention also recognizes the fact that small developing countries, like those in CARICOM, which contribute minimal quantities to the global greenhouse gas budget stand to suffer most from the impacts of global warming. These countries, because of their inherent vulnerability, do not have the resources to put in place policies and actions to mitigate the expected long term impacts of Climate Change.

The reduction of greenhouse gas concentration in the atmosphere is referred to as mitigation and the convention calls for all countries to put in place actions that would lead to a significant reduction in their national greenhouse gas emissions. However, under the UNFCC there are no obligatory requirements for countries to reduce their emissions. This issue was first addressed under the Kyoto Protocol which called for developed countries to reduce their emissions by 5.2% of their 1990 emission levels and this between the years of 2008-2012. The Protocol, first negotiated in 1997, with the support of the Clinton administration, is a far cry from the 60% reduction from 1990 levels by the year 2000, that scientists agreed was necessary for the stabilization of GHG concentrations in the atmosphere. However, it was agreed that the modest requirements of the Protocol was a step in the right direction. Even so, the Protocol did not come into force until February 2005 with the ratification by Russia. In the meantime, American withdrew from the Protocol arguing that accession to its terms would impact negatively on the economy of the USA. It was, further, argued that, without obligatory requirements for developing countries, especially large developing countries like India, China and Brazil, the Protocol was flawed. Australia, a major coal producer and user, also refused to sign up to the Protocol. Recently, an alliance of countries - USA, Australia, China, India and South Korea - announced that they were embarking on an alternative route to reducing their greenhouse gas emission budgets. This would involve no mandatory cuts as required under the Protocol but rather pursue the development of a suite of clean technologies e.g. renewable energy, clean coal technology, fuel cells for use in their countries developing. They postulate that this is an alternative and more desirable route for mitigation than that proposed under the Kyoto Protocol. Other countries view this alliance as an attempt to undermine the very fabric of the Protocol. However, after some intense negotiations at the last global meeting in Montreal to discuss the convention, all countries including USA agreed to embark on discussions on a post 2012 i.e. post Kyoto global mitigation regime. It is necessary to note that significant mitigation actions are being implemented throughout the USA at the state and municipal levels.

. The Stern report had identified the following key elements of future international frameworks in such a global response should include :

- *Emissions trading*: Expansion and linking emissions trading schemes around the world is identified as a "powerful way to promote cost effective reductions in emissions and to bring forward action in developing countries.
- *Technology cooperation:* this calls for boosting the effectiveness of investments in innovation around the world. Globally support for energy Research and Development should at least double and support for the deployment of new low-carbon technologies should increase up to five-fold
- *Action to reduce deforestation*: Curbing deforestation is a highly cost-effective way to reduce emissions: large-scale international pilot programmes to explore the best ways to do this could get underway very quickly.
- *Adaptation:* The poorest countries are most vulnerable to climate change. It is essential that climate change be fully integrated into development policy and that rich countries honour their pledges to increase support through overseas development assistance. International funding should also support improved regional information on climate change impacts and research into new crop varieties that will be more resilient to drought and flood.

This latter recommendation of the Stern report is of utmost importance to CARICOM countries as they thrive to respond to the impacts of climate change.

CARICOM responses to Climate Change

In 1994 Small Island Developing States (SIDS) met in Barbados to define a programme of action to address environmental problems which threatened their sustainable development aspirations. The recommendations of the meeting encapsulated in the Barbados Programme Of Action (BPOA) accorded the highest priority to action to cope with the emerging threat of climate change. Ten years after the Barbados meeting SIDS reaffirmed the importance of the climate change issue and its threat to their future development in the Mauritius strategy which was articulated at the Barbados +10 meeting held in Mauritius. Since the Barbados SIDS meeting in 1994, SIDS have pursued several initiatives to address climate change adaptation. CARICOM countries have not been ignoring the emerging threat of climate change and since 1997 they have embarked on a series of

activities aimed at building the regional capacity to identify and implement appropiate climate change adaptation actions where necessary. More specifically, in the Caribbean, there was:

- *Caribbean Planning for Adaptation to Climate Change* (CPACC) project (1997-2001) funded by GEF. The main objective this project was to "support Caribbean countries in preparing to cope with the adverse effects of global climate change, particularly sea level rise, in coastal and marine areas through vulnerability assessment, adaptation planning and related capacity building."

- *Adaptation to Climate Change in the Caribbean* (ACCC) project (2001-2003) funded by the Canadian Climate Change Development Fund (CCCDF) which aimed to build further capacity fro climate change in the region.

Major outputs from the two regional projects were:

- Laying the groundwork for the establishment of the Caribbean Community Climate Change Centre (CCCCC);
- Establishing a Master of Science (M.Sc.) programme at the University of the West Indies (UWI) Cave Hill campus with a specialty in Climate Change;
- Development of a regional Public Education and Outreach (PEO) strategy for climate change;
- Climate change impact studies on the water, agriculture and health sectors;
- Development of guidelines for incorporating climate change adaptation in environmental impact assessments;

- Development of Risk Management guide for considering climate risks in planning; and
- Promotion of links between climate change communities in South Pacific and the Caribbean.
- Development of National Adaptation Policies and Implementation Plans in twelve CARICOM countries.
- Establishment of a climate monitoring system with the installation of 18 monitoring stations in the Caribbean.

A third regional initiative in the Caribbean is ongoing. The Mainstreaming Adaptation to Climate Change (MACC) project (2004-2008) is being funded by the GEF. The main objective of the project is to mainstream adaptation to climate change into national development planning. The project consists of the following components:

Component 1: Mainstreaming adaptation to climate change in national development planning and public and private sector strategies;

Component 2: Supporting the formulation of a regional strategy on adaptation and specific measures for adaptation (demonstration pilots);

Component 3: Expanding and strengthening the existing knowledge base to facilitate Global Climate Change impact assessment as a basis for decision making on adaptation;

Component 4: Public Education and Outreach including Cross-regional dissemination and replication; and

Component 5: Project Management.

All of these activities are designed to determine the following:

- the extent of the risk arising from climate change which the region will be exposed to in future.
- The vulnerability of the region's natural, human and socioeconomic systems to climate change.
- The impacts of climate change on the natural and socioeconomic systems of the region.
- Regional/National responses to mitigate those impacts and what are the costs for implementing.
- Implementation of the mitigative actions (ADAPTATION)
- Building regional capacity to carry out the above actions

With respect to the climate the region is expected to experience in the future the work being carried out is expected to answer the following:

- What is expected change in-
  - Temperature
  - Sea level
  - Frequency of weather extremes – El Nino, La Nina
  - Frequency and intensity of hurricanes
  - Frequency in return periods of extreme events – floods , droughts
  - Patterns and intensity of precipitation.

With this information at their disposal regional planners and policy makers will be able to make rational decisions about our future investments in the region's development and ensure that such investments take into consideration how the

long term impacts of global climate change might undermine the sustainability of the benefits to be derived from these investments. They should be able to decide for example on appropriate setbacks for coastal development, building codes that would enable structures to withstand anticipated storms, land use plans that ensure that people are not exposed to hazards in vulnerable areas, new agricultural practices to cope with changing weather patterns, early warning systems for the onset of extreme events and proactive interventions in the health care system to deal with vector , water borne diseases and the onset of respiratory diseases.

The Way Forward

It is very difficult to argue a case for government intervention to address an issue which is, at present, being defined in terms of time slices of 2020-2040 and to the end of this century. This, especially, in the case of governments strapped for resources required to address current development priorities. The fact remains, however, that even without future predicted climate change, Caribbean countries are vulnerable to the impacts of present day climate variability. Most of the disasters in the region are triggered by climate related factors – drought, floods, hurricanes, landslides. Increasingly, in the last fifteen years, there has been a noticeable trend of increased occurrence and severity of these events leading to increased losses of life, livelihoods and property and, consequently, to a disruption of the development agenda. Scarce resources earmarked for development have had to be diverted to disaster relief. The present state of disrepair of physical infrastructure (drainage, sea defences), the deterioration of natural ecosystems which provide shoreline protection (mangroves), settlement in highly vulnerable areas along the coast, all contribute to increasing the exposure of the population to these present day climate risks. It is in our interest, therefore, to address those risks as a matter of regional/national priority. In doing so we would have started to lay the groundwork for adaptation to the longer term issue of adaptation to climate change.

Caribbean countries need to "mainstream" climate issues into national development planning, as a way of "climate proofing" national development plans. This requires the incorporation of climate information when looking at plans for agriculture, water, housing, health, sea defences, drainage and making adjustments to accommodate the anticipated impacts. Future settlement along the coast should be informed by some analysis of the exposure of the proposed settlement to

inundation under present day and projected extreme events. Guyana, Suriname and Belize, unlike the small island states of the Caribbean, have the option of retreating from the coast and is an option to be considered for relocation of critical infrastructure, human settlement and socioeconomic activities. There should be a long term strategy for this type of relocation – retreat. Indeed after hurricane Hattie devastated the city of Belize in 1961, the government relocated the country's capital inland away from the low lying coast. Simultaneously the realistic, affordable option will be one of protection and possible accommodation. Protection would involve such activities as revisiting drainage and sea defence systems designed for coastal areas, especially the highly populated areas and rehabilitating and upgrading these systems. For the future, the question of adequately preparing these systems to cope with more intense and more frequent extreme events and sea level rise should be addressed.
More precise indications of the extent of this increased climate risk, should soon be available, from the work being undertaken under the present regional Mainstreaming of Adaptation to Climate Change project. Our mangrove ecosystems provide a line of first defence against rising sea levels and resultant coastal inundation, yet they are constantly being degraded as a result of human activity. Mangroves are also an important nursery for the country's fisheries resource. Implementation of mangrove ecosystem rehabilitation and management plans should, therefore, be a matter of national priority. We need to revisit our building codes, map areas particularly vulnerable to inundation and design settlements where exposure to climate risks is minimal. The insurance and mortgage financial sectors can be great allies in this endeavour, by offering concessionary rates for compliance with nationally agreed building codes and land use plans. In agriculture there is a need to develop greater capacity in the farming sector to utilize climate information in planning production schedules. Development of salt tolerant varieties of seed, as is being done for rice in Guyana to cope with estuarine salinization and possible soil salinization from sea level rise and adjustment of agricultural practices to suit new climate conditions, will be necessary. With the inundation of coastal areas, aquaculture seems to be a viable adaptation option.

It is not possible in this address to give a full account of the adaptation options which countries can embark upon. What is important is the realisation that action, now, to cope with present day vulnerability to climate related risks will lay the groundwork for a successful response to the longer term threat of global climate change. These actions include common sense, "no regrets' responses, which make sense, with, or without global climate change and which will contribute to the country's sustainable development agenda. Further as pointed out in the Stern

report action now will be decidedly cheaper to implement than if postponed to a later date.

To guide the process of climate change adaptation, some countries have established cross sectoral climate committees to ensure the participation of critical shareholders in the process of planning for adaptation It is important that these entities should be given maximum political support possible to ensure that their findings and recommendations feed into national development planning. In fact they should have a line of communication with national cabinets and may be more effective if operating under the aegis of the Ministry of Finance or the office of the President/ Prime Minister. The national meteorological departments in most CARICOM countries are severely understaffed and under resourced should be strengthened, with the appropriate professional staff and resources provided for the installation of an up-to-date and functional climate change monitoring systems throughout these countries. This would facilitate the generation of the relevant climate information for sectoral planning.

Although adaptation is of primary concern to the region it should not ignore the opportunities offered under the Clean Development Mechanism (CDM) of the Kyoto Protocol to facilitate "greening of the region's energy sector' through investments in demand and supply side energy efficiency projects and renewable energy facilities. Under the CDM developed countries can invest in these types of projects in developing countries and be eligible to claim credit for the Certified Emissions Reductions (CERs) which accrue as a result of the implementation of the project. The driving force of the CDM is economic and takes into account two facts. The first is that carbon is now a global commodity that can be traded, and its removal from the atmosphere in New York has the same overall global impact as removing the same amount from the atmosphere in Suriname. However it is cheaper to remove that carbon in a poor developing country than in the metropolis. The CERs generate extra finance for the developing country for the investment as they are sold to the investor, and the latter can then claim credit under the Protocol for reducing their own national emissions in accordance with their agreed obligations under the protocol. Jamaica has implemented a 15 MW wind energy CDM project and the region should explore modalities to exploit this facility . Opportunities exist for instance for upgrading the physical plant of our energy generating facilities, investing in renewables – wind, solar, geothermal, tidal, transforming our struggling sugar industry into an energy industry – ethanol and cogeneration from bagasse -, landfill gas and biomass. Most of our countries spend a significant percentage of our GDP to purchase fossil fuel. Opportunities now exist for us as a region to significantly reduce this dependency on imported fossil fuel and hopefully this will be given prominence in the Regional Energy Policy

Document now being developed . At the individual level our population can take simple actions like replacing incandescent bulbs in their homes with energy saving fluorescent bulbs, purchase energy efficient appliances, conserve on use of water and energy , use car pools etc.
Currently the world is about to decide on a successor to the Kyoto Protocol when this expires in 2012. Countries are talking about a stabilization of global temperatures at about two degrees centigrade above present day temperatures. It is important that CARICOM countries make their voices heard in this debate. Our position is clearly that with global carbon dioxide emissions at 397 ppm we in the Caribbean are already suffering from the vagaries of present day climate. A two degree increment on present day temperature which translates in a stabilization of global emissions at about 550ppm will be intolerable. Our position should be to encourage the developed countries to adopt more aggressive mitigation policies as soon as possible. We also need to insist on significant curbs by the emerging economies in countries like China and India and to encourage the industrialized countries to comply with the letter of the convention and provide the resources and technical assistance required for CARICOM and other developing countries to adapt to climate change..

Finally, a continuous national discourse, involving all stakeholders, with a strong input from civil society, to set national priorities for climate change adaptation, should be embarked upon. In this dialogue, our indigenous communities where they exist must be engaged, as we need to capture their traditional knowledge of coping with climate stressors over time as part of our national effort to deal with the question of coping with climate change risks. Climate change and the projected threats it poses, to the Caribbean and globally, will threaten the life and livelihoods of all of us and will require in each Caribbean country a non-partisan national endeavour by all its citizens, regardless of race, colour or creed to cope with the it's destructive potential.