



The Environmental Foundation of Jamaica

*3rd Annual Public Lecture*



**Climate Change and Jamaica:  
Sustainable Development as Strategic Adaptation**

**Dr. Michael Witter: Snr. Lecturer, Department of Economics,  
University of the West Indies, Mona  
November 9, 2007**





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*Development as Strategic Adaptation*

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## FOREWORD

Welcome to the 3rd Annual Public Lecture of the Environmental Foundation of Jamaica (EFJ).

The EFJ Public Lecture Series continues to provide an environment to build awareness and stimulate dialogue on critical issues affecting the environment and child sectors. Last year we focused on the child and this year the focus is the environment.

It is our distinct pleasure to present to you this lecture from Dr. Michael Witter, entitled “Climate Change and Jamaica : Sustainable Development as Strategic Adaptation”.

Dr. Witter is Senior Lecturer in the Department of Economics, at the University of the West Indies, Mona. He is an acknowledged expert on the vulnerability and resilience of the economic and socio-political issues facing Small Island Developing States (SIDS).

The issue of Climate Change is a topical one and goes to the very heart of our sustainability as a State. Globally, the debate and discussion on Climate Change is heating up. Yet the information and planning needed by us in our everyday lives to adapt to its impact and for the protection of not only our environment but our most vulnerable communities is still not available to all.

We hope that this lecture will not only bring greater awareness of the issue and its impact, but that it will be a catalyst for further dialogue, debate and action at the community and national levels, as we seek long term solutions towards “strategic adaptation”.

## **ABOUT THE ENVIRONMENTAL FOUNDATION OF JAMAICA AND ITS ENVIRONMENT PROGRAMME**

The **Environmental Foundation of Jamaica (EFJ)** is a grant making institution established to provide funding to Non-Governmental Organisations (NGOs) involved in the management and sustainable use of Jamaica's natural resources, and in issues of child development. Established in 1993 by formal agreement between the governments of Jamaica and the United States of America, the EFJ is an independent Foundation, which uses the proceeds from a creative debt-swap arrangement to promote sustainable development in Jamaica.

Since its inception, the priorities of the EFJ's Environment Programme have been on the following critical issues:

- Watershed & Coastal Zone Management
- Biodiversity
- Waste & Water Management
- Alternative Energy.

The Foundation has worked with a range of institutions, including Environmental NGOs, Community-Based Organisations (Churches, Farmers), National Civil Society Groups, and Academia. As silent partners with many local, community-level and grassroots groups across Jamaica, the EFJ has been able to assist in formal and informal education on environmental issues, change in behaviour to environmentally-friendly technologies and habits, academic research and development from agriculture to solid waste disposal.

Some of our more recent successes include the following projects:

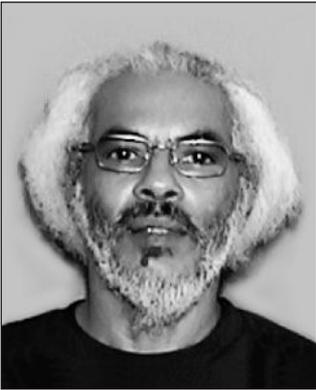
- The Jeffrey Town Farmers Association Vermicomposting, Soil Conservation and Watershed Reforestation Project: The group were the 2006 winners of the Michael Manley Foundation

Environmental Award for Community Self-Reliance for their work in utilising their limited resources in a number of innovative and creative alternative livelihoods focused on income-generating (mainly farming) and community (radio station and multi-media centre) activities in their community.

- UWI, Department of Chemistry Project to Remove Asbestos from Succaba Pen, Old Harbour: Over 500 households had been living with the public health hazard of material from a closed asbestos plant for over 30 years. The residents assisted in the clean up process and are now in the process to regularise their land ownership as a result of the project.
- College of Agriculture Science and Education (CASE) Demonstration of Alternative Energy Hybrids for Small Farmers in Jamaica: The project successfully demonstrated two small scale renewable energy hybrid systems in solar and bio gas on the CASE Tutorial Farm. The alternative energy operations have not only resulted in savings in electricity cost for the Institution, but they also now supply power to the national grid from the EFJ-sponsored wind turbine.
- Jamaica Environment Trust's Schools Environment Programme: was implemented in more than 350 schools islandwide, training more than 600 teachers and over 350,000 students in the conservation and sustainable use of Jamaica's natural resources.

The EFJ looks forward to the continuation of its environment programme in partnership with NGOs/CBOs and other development partners, towards the conservation and management of Jamaica's natural resources and environment.

## ABOUT THE AUTHOR



Dr. Michael Peter Witter is a Senior Lecturer in the Department of Economics at the University of the West Indies, Mona Campus and has recently demitted office as the Head of the Department. He has a Bachelor of Science Degree in Mathematics from the University of Illinois, a Masters Degree in Economics from the University of Wisconsin, and a PhD in Economics also from the University of Wisconsin.

Dr. Witter has co-authored 2 books, contributed chapters to over 10 others, and contributed papers to numerous other academic fora. With Economics as the basis, Dr. Witter's work is wide-ranging and diverse, but ultimately related to problems of Caribbean economic development. He has researched and written on the impact of structural adjustment on the poor, the impact of liberalization on the Jamaican economy, Caribbean economic thought, problems of planning, poverty, the informal economy, civil society and economic development, the music industry, and public expenditure on children in Jamaica.

He has recently begun work in environmental economics with a focus on the impact of Climate Change on Small Island developing States, and particularly the Caribbean. He represents the UWI on the Board of the Caribbean Community's (CARICOM) Climate Change Centre and recently served as the Centre's Chairman of the Organizing Committee for the successful academic conference in June on "Climate Change: Impacts on the Caribbean" held at the Mona Campus.

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**Climate Change and Jamaica**  
Sustainable Development as Strategic Adaptation



Environmental Foundation  
of Jamaica

# The Lecture





## I. BACKGROUND AND INTRODUCTION

### Traditional attitudes and behaviour



There is a lot of evidence that the physical and psychological make-up of people are influenced over time by the natural environment in which they live. People who live in the Arctic differ from people who live in the Sahara partly because of the differences in their natural environments. So too, those of us who have been nurtured by

the welcoming and benevolent tropical climate and environment of Jamaica must owe some part of our being to our island's natural environment. I am inclined to the view that there is a dialectic relationship between humans and the natural environment. As we act on Nature, it acts back on us, and in the process changes us. Sometimes I wonder whether the hurricane is the way in which Nature strikes back at us for our abuse.

Social attitudes toward the natural environment vary over time and space and sometimes are not clearly articulated. At one extreme, people see themselves as just another set of organisms in Nature, and at the other, the rest of Nature is seen as existing for the benefit of humans, the source of inputs for production and consumption, and the garbage dump for infinite waste disposal. Jamaicans seem to have a mixture of attitudes, of respect for the environment, and of taking the environment for granted, of assuming that Nature will continue to be as beneficent as it always has been, and of fear of Nature's forces. I often wonder whether the habits of the past that had been beneficial by chance to the natural environment have become harmful because the nature of our garbage has changed. In the past, we threw our coconut husks, mango skins, and yam and banana peelings in the "bush" where they would disappear into the environment



quickly, nurturing the soil and the animals. Today, we throw our plastic bottles and other non-biodegradable packaging in the same way, but these pollute the earth, the rivers and the Sea as they make their way through the environment.

Jamaica, like many of the Caribbean countries, has a production system that has historically been based on the exploitation of labour and the despoliation of the environment. The production of sugar on plantations with slave labour for export was the extreme case. Subsequent export industries have similar characteristics low paid labour, with environmentally unfriendly activities. Mining and tourism are examples here. This reinforces attitudes of disrespect and abuse that express themselves in the disposal of waste in rivers, in gullies that we know run to the Sea, in the stoning of mango trees, the killing of lizards which have no claws, no stings, no venom, no teeth, and which weigh less than an ounce. On the other hand, our people do not cut trees that are blossoming or bearing fruit. An old gardener I knew said that “God will sin you”, if you cut a tree that is bearing.

The attitudes of Jamaicans to the environment are ambiguous, and must be addressed as an essential element of strategies of adaptation to climate change, which we now know is unambiguously well underway.

## **II. THE STATE OF KNOWLEDGE ON CLIMATE CHANGE**

The two most authoritative studies on climate change to date were published in 2006 and 2007. The Stern Review was a massive (700 page) study commissioned by the British government on the economics of climate change. In its own words, it “examines the evidence on the economic impact of climate change --- explores the economics of stabilizing green house gases in the atmosphere --- and considers the complex policy challenges involved in managing the transition to a low carbon economy and in ensuring that societies can adapt to the



consequences of climate change that can no longer be avoided.”<sup>1</sup> It estimated the cost of containing current levels of greenhouse gases in the atmosphere, and not surprisingly, this was lower than the eventual cost to the economy of unrestrained emissions leading to more rapid global warming.

The Intergovernmental Panel on Climate Change (IPCC) released the Fourth Assessment report in 2007 which estimated the range of climatic changes that are likely to result from global warming. Two of our regional scholars, Professor Anthony Chen of the Department of Physics at UWI, Mona, and Dr. Leonard Nurse of Centre for Resource Management and Environment Studies (CERMES) at the UWI, Cave Hill, contributed to the report's treatment of the Caribbean in particular and Small Island Developing States (SIDS) in general. In doing so, they shared in the Nobel Prize awarded to the Panel for its work.

The current scientific consensus is that the changes in the climate are now irreversible, but the rate of change can be contained if there is a commitment to limiting the discharge of greenhouse gases to current levels.



Both of these reports should form the basis of formal education programmes in school as well as public education programmes. Further, they both suggest research agendas for Jamaica and the Caribbean since their scope, particularly the Stern review, was global, and at that scale, they were therefore unable to deal fully with the specific changes that affect our region, and the impact that these changes will have on our societies and economies. There are ongoing research programmes in the region at the University of the West Indies, and under the auspices of the Caribbean Community Climate Change Centre which need to be expanded and oriented toward informing public education and public policy.

<sup>1</sup>N. Stern, Stern Review - Executive Summary, Pi



Changes in the Earth's climate will affect the economies and societies of the Caribbean directly and indirectly. It is now well established that the global temperatures are rising as a result of the trapping of reflected sunlight by greenhouse gases methane, carbon dioxide, and nitrous oxide in particular - in the atmosphere. In addition, there is now a fairly solid consensus in the



scientific community, as reflected in the IPCC report of 2007, that the climate change is in part determined by the actions of human beings, and specifically, the discharge of greenhouse gases in the atmosphere. The natural systems for removing greenhouse gases are unable to keep up with the rate of discharge. In late October, the Guardian<sup>2</sup> newspaper

in the UK reported some research findings from the University of East Anglia that "Levels of carbon dioxide in the atmosphere have grown 35% more quickly than expected since 2000 because of inefficiency in fossil fuel use and the weakening of natural "carbon sinks". The destruction of forests for example reduces the Earth's capabilities for removing carbon dioxide. Tiny Jamaica contributes marginally to the discharge in the atmosphere, but will not escape the impact of the change in the Earth's climate.

The summary of the IPCC's projections for the Caribbean are:

- 2-3 degree centigrade rise in temperatures by 2080
- Decreased rainfall, June - August
- Sea level rise 0.2-0.5 metres by 2090
- Possibly increased frequency and probably increased intensity of hurricanes

In what follows, we outline the probable impacts on Jamaica, and more often than not, it will be difficult to separate the impact on Jamaica from the

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<sup>2</sup> Guardian Unlimited, October 23, 2007i



impact on the rest of the Caribbean because of the scale of the changes that are anticipated. Measures to mitigate the emission of greenhouse gases and to adapt to the projected climate changes are reviewed. Current public policy is summarized in the context of Jamaica's international commitments with respect to climate change. The presentation concludes with some proposals for civil society to assist in the public education that is critical to the success of public policy.

### **III. IMPACT ON THE ECONOMY**

In a recently completed study of the economics of adaptation measures with reference to the Caribbean, it was noted that, “Although there is uncertainty surrounding the magnitude and rate of climate change, it is clear that the impacts will be greatest in the developing world because of their geography; stronger dependence on agriculture and because with fewer resources comes greater vulnerability (Easterling et al., 2004; Stern Review, 2006). This is particularly true in the case of SIDS



like those of the Caribbean, whose key economic sectors have pronounced dependency on the natural resource base. There are, however, other key characteristics which include their small physical size and the fact that they are surrounded by large expanses of ocean; limited natural resources; proneness to natural disasters and extreme events; relative isolation; extreme openness of their economies, which are highly sensitive to external shocks; high population growth rate and densities; poorly developed infrastructure; and limited funds, human resources, and skills, which limit their capacity to mitigate and adapt to future climate changes (CDERA, 2003; ECLAC, 2000; IPCC, 2001; UNEP, 2005)<sup>33</sup>.

<sup>33</sup> A. Abdulkadri et al, 2007, P18.



Jamaica fits much of this description with an open economy that is highly dependent on tourism, with its small size and location in the western Caribbean, and with its proneness to hurricanes. Though it is bigger than most of the Caribbean islands, it is nevertheless a relatively small land mass, with a relatively weaker economy than many, and one of the most indebted public sectors in the world. Since Independence in 1962, and especially since the mid-1990s, there has been a steady outflow of skilled persons who contribute to the largest flow of remittances in the CARICOM Caribbean.

Anarchic economic development has impacted negatively on our environment. After Emancipation, many ex-slaves built their communities in the hills and cultivated domestic crops on the steep slopes. This has been a major source of soil erosion, especially where trees are cut down to make coal for rural household energy supplies. In the last two decades, the rate of deforestation has been high as the slopes of the Blue Mountain range were cleared for commercial coffee production. This has accelerated the erosion of hillside soils, with the additional negative impact of the run-off of the very strong chemical inputs used in the coffee industry.

Rapid housing development on the St. Andrew plains has generated much of the waste that finds its way down to Kingston Harbour, and the pollution of the underground aquifers by septic pits is well documented. Similarly, the run-off of chemicals from commercial farms near rivers and golf courses near the shores has raised the nitrogen levels in the inshore sea with negative consequences for marine life. Tourist recreational activity and souvenir collection have put great pressure on the marine forests, the coral reefs. Hotel developments have too often been in breach of environmental standards and guidelines with severe consequences for tidal movement and wetlands.

The negative impacts will be accentuated in many instances with the anticipated climate changes.



## Valuation

In the current state of knowledge, only broad indications of the impact of climate change on the economy are possible. Valuing the damage to the economy poses major challenges of method and data. “Economic analyses focus on the use of market prices to approximate the value that is placed on foregone losses as a result of the implemented policies. ---Many of the damages from climate change, such as harm to ecosystems and adverse health effects for humans, would fall on entities, goods, and services that are not exchanged in markets. In the absence of market prices for certain goods and services, analysts face serious challenges in determining what people are willing to pay for them, adding another layer of uncertainty to policy analysis (Dinan and Shackleton, 2005, p. viii).

Another issue is that there is the existence of many non-market losses, namely the extinction of species and the degradation of ecosystems. These entities are regarded as public goods, the values of which are subject to the aggregate of all users' individual valuations (Dinan and Shackleton, 2005).”<sup>4</sup>

With these provisos, we indicate some of the potentially major economic costs from climate change.

## Tourism

Tourism is the number one foreign exchange earner for Jamaica and for an increasing number of other Caribbean countries that have lost their traditional agricultural export industries. This industry has always been vulnerable to severe weather conditions, as well as a host of other factors that affect demand negatively. Further the response to adverse developments is usually immediate and sharp.

The demand for Jamaican vacations by North Americans will decline as winters become warmer with less days of severely cold weather. The increased intensity, and possibly frequency, of hurricanes will also

<sup>4</sup> A.Abdulkadri et al, 2007, P.10



discourage visitors from the region in general, and Jamaica in particular.

On the supply side, the Jamaican tourist product is built around the beach. Beaches will be affected as the coral reefs die from bleaching in warmer waters. Without them, beaches will be unprotected and less capable of

regeneration, and of course, the attraction for divers will be lost. Rising sea levels will threaten mangroves and other coastal ecosystems, and provide a platform for extraordinary wave actions in periods of severe weather, and particularly during storms and hurricanes. This can lead to soil and aquifer salination which will pollute fresh water supplies. It is anticipated that there will be longer periods of drought in a changing pattern of precipitation. With less rainfall, aquifers will take longer to be recharged.

Beyond the natural environment, the physical infrastructure of the built environment will be at risk. Rising temperatures and sea levels will occur over decades, and in a sense there is some time for adaptation measures if not mitigation. However, a direct hit from a major hurricane could severely damage the hotel industry, the beaches and related attractions, and other relevant infrastructure, such as airports and cruise ship facilities, in a matter of hours. Recall the millions of dollars of damage done in recent years by hurricanes such as Allen, Gilbert, and most recently Ivan. And of course, the Caribbean was very lucky to escape the wrath that Katrina visited on New Orleans.

Tourism is itself a contributor to the emission of greenhouse gases as a by-product from the burning of fossil fuels for air, sea and ground transportation, recreational vehicles and air conditioned buildings. Tourist recreational activities also contribute to the stress on coastal ecosystems.



To reduce the emissions footprint of the industry<sup>5</sup>, the industry must adopt a strategy of green tourism that entails energy and water conservation, the use of renewable energy sources, and the implementation of energy efficient management practices. This strategy calls for more energy efficient buildings that use solar power for lighting, cooling and heating, and more efficient use of water through measures such as low-flush toilets. The



industry must utilize energy efficient vehicles. Further, recreational activities that require petroleum-based energy sources, such as jet skis and motor-powered pleasure craft should be minimized, and where possible even replaced by activities that utilize renewable forms of energy.

Beyond mitigation, the tourist industry must develop adaptation strategies such as siting facilities further from the sea, erecting sea defences where possible, and preserving the natural defences. Wetlands, for example, serve functions such as water storage, water filtration and support biodiversity. They should be protected as critical elements of our adaptation to a changing climate, instead of being drained to reclaim land for construction. Future buildings and facilities must be designed to cope with hurricanes and other extreme wind and water events. Long run strategies for water supply and waste and sewage disposal must be designed around recycling processes so as to ensure adequate services for the industry.

Even so, the threats to the industry posed by climate change are more reasons for diversifying the tourism industry away from its excessive dependence on the beach.

<sup>5</sup>See Ulric Trotz, 2007



## Agriculture

Agriculture faces a future of increased periods of drought, punctuated by floods, reduced soil quality due to salination, and hurricanes. Agriculture has traditionally been constrained by irregular water supplies, and where irrigation schemes have been established, the costs have been prohibitive. In addition, there is the increased threat of damage from hurricanes and other extreme weather wind and rain. Over the long run, this is certainly another factor undermining the viability of the banana industry, in addition to the loss of market access. Sugar is also currently experiencing the loss of its preferential market access and its subsidized price. Ironically, the sugar cane is perhaps more resilient to extreme weather than most other crops, and this may well be a factor that encourages efforts at diversification to maintain its viability and profitability. Of course, the yields are sensitive to the supply of water and sunshine, but the plants themselves are able to withstand extreme wind events.



The net impact of changes in precipitation patterns will be to reduce the productivity of rain-fed domestic agriculture that traditionally is located in the higher altitudes that were left by the export agricultural industries. It is estimated that a 2 degree centigrade increase in temperatures will reduce the output of some crops, like red kidney beans, by 14-20%. This will surely result in higher prices for domestic food supplies and will contribute further inflationary pressure in the economy. Sea-water intrusion from rising sea levels will raise the salinity of low-lying areas and reduce soil fertility and productivity. Export crops located on the plains adjacent to the sea will be the primary ones affected by this.



The Ministry of Agriculture has adopted a strategy of protected agriculture to enhance productivity and hence the competitiveness of commercial agriculture. This requires significant investments in shaded houses with the requisite infrastructure for irrigation and the application of chemical inputs. This is one method of adapting to the increasing instability and



unpredictability of the weather patterns. But, there will always be many small farmers who have to rely on traditional practices of “following the rain”, and picking up the pieces left after extreme weather events. Research into appropriate adaptation measures for these producers will be necessary to help them to cope with the impact of

climate changes, less for the contribution of their output to the GDP, and more for their contribution to the domestic food supply and the stability of rural communities.

It is possible that the cost of imported food will also rise because of the impact of climate changes in the countries which supply Jamaica's imports, as well as the increased demand for those supplies from other countries, such as those in sub Saharan-Africa where rising temperatures will lead to acute food.

## **Fisheries**

The rise in the temperature and levels of the sea are expected to impact negatively on the supply of fish. Coastal ecosystems such as reefs and mangroves that are damaged are likely to lead to reduced abundance and diversity of fish stocks as various species change their migration patterns. It is estimated that a 0.5 degree centigrade temperature rise is sufficient to



discourage certain species from migrating to the Caribbean, and a 2 degree centigrade rise could trigger the extinction of 15-40% of marine species.<sup>6</sup>

While fishing contributes marginally to the GDP, it does supply some of the very high per capita demand for fish protein, and of course, it provides a livelihood for many families in coastal communities.



## Water

Jamaica and many other small islands face a future of declining rainfall, and hence declining volumes of water harvested from rainfall, reduced river flows, and slow recharge of aquifers. Already some islands like Barbados have begun to implement adaptation strategies such as desalination and improved methods of harvesting rainwater. Jamaica has traditionally been a water surplus island, with shortages occurring more for distributional constraints than availability. Further much of the underground aquifers are being polluted by septic pits and improperly disposed of industrial waste.



The management of water is now demanding priority attention from policy makers. On the one hand, the lack of water drought leads to low food production, some of which is destroyed by spontaneous fires. Food prices rise when supplies are reduced, and drive

<sup>6</sup> A. Abdulkadri et al, 2007, P. 4, citing the Stern report



up the cost of living, particularly for the working people. On the other hand, flooding destroys homes, physical infrastructure, crops and other production facilities. In recent years, Jamaica has been alternating between drought and flood even in a single calendar year.



The future will require much more efficient use of water in agriculture and in households. Currently, agriculture is by far the largest user of water, and it is well known that there is a lot of wastage from improper irrigation practices. Similarly, households can conserve water by changing their practices of washing and bathing, and by utilizing low-flush toilets.

There is already a robust international market for the export of high quality water. Improved harvesting for agricultural and household use, recycling, and reduced pollution of existing supplies constitute a strategy for ensuring domestic supplies while generating hard currency incomes from the surplus available for export. The transformation of practices of managing supplies of water for irrigation as well as household behaviour is the essential challenge underlying these adaptation measures.

## **Physical Infrastructure**

Above, it was pointed out that Jamaica's infrastructure of roads and bridges is frequently damaged by flooding even from weather events that are not too extreme, such as low pressure systems. Apart from the private hotel facilities, the coastal public infrastructure will be particularly vulnerable to sea level rise, and the storm surges that begin on a higher platform. Reference is being made to the two international airports, the transshipment port in Kingston, the entire waterfront of the city of Kingston where the Bank of Jamaica, the private banking centre, and many commercial



establishments are sited. This is even truer for Montego Bay and other important coastal towns that have experienced severe flooding in recent times from moderate precipitation on account of blocked drains and natural water courses. Simulations of storm surges of one metre show inundation of the commercial centre of downtown Kingston and the inundation of most of the Portmore community. Similar studies for Montego Bay and major coastal towns like Negril, Ocho Rios, and Port Antonio are bound to show potential devastation. Recall the extensive damage to tourism facilities that Hurricane Ivan did in the West End of Negril which is considerably above sea level.



Bear in mind that disruption of the air and sea ports of entry strike at the vital points of the economy and society since it will cripple the export and import of goods and services, and the movement of people. Recall that the damage to port facilities from

Hurricane Ivan forced a shut down and hence loss of production and incomes, from the bauxite/alumina industry. Damage to airports will cut the flow of stop-over tourists which is the life-blood of the tourist industry.

It is important to prepare detailed maps of coastal communities, economic facilities and infrastructure so as to estimate the economic risk, as well as to develop concrete adaptation strategies. This is the kind of thing that school children could do as projects that teach them research skills, reporting techniques, and sensitize them to the importance of their environment and the threats faced from climate change.

Inevitably, many of the vital infrastructural facilities that do not have to be on the coast will have to be relocated inland. Such re-location costs will be all the greater if new developments continue to be sited in the areas at risk to



sea level rise and storm surges. Accordingly, adaptation measures will include proper zoning and the use of development orders to minimize the siting of facilities in coastal areas known to be at risk.



Apart from coastal communities, recent experience with flooding, and research on flood mapping reveal that communities have been sited in water courses that have run dry for a number of years, but which are natural conduits for flood waters. Again, adaptation measures must include more careful study of building sites as well as requiring appropriate designs to anticipate the climate changes. With regard to the latter, warmer temperatures should be anticipated by designs that maximize natural air currents for cooling, and solar energy for heating water.

## **IV. IMPACT ON THE SOCIETY**

### **The Poor**

As with natural hazards, the poor tend to be much more vulnerable to climate change than the non-poor. The direct consequence of any dislocation of economic activity will be to increase the number of unemployed and hence, the number of poor people. Poor communities are more likely to be the ones sited in vulnerable areas, such as the coasts and on flood-prone and other marginal lands. Accordingly, these are the communities more threatened by rising sea levels or at more risk from flooding.

Most of the poor live in rural communities where agriculture is at least a major economic activity, and in some locations, the principal economic activity. Above, it was pointed out that many of these small farmers would be at increasing risk to extreme weather events, and to the changing



precipitation patterns alternating between longer periods of drought and more intense rainfall.

There is a great need for research on the relationship between poverty and the state of the environment at the local level. It is well known that the poor inhabit marginal lands, and that their production practices often lead to environmental damage. The cases of farming on steep slopes leading to soil erosion, and deforestation from charcoal burning are well known.

Improper waste disposal and chemical use are other examples that are documented at the national level. It is now necessary to document these processes in their local manifestations using methodologies that educate the communities to their particular environmental challenges and the likely impact of climate change.



### **Children and the Aged**

Children are disproportionately represented among the poor accounting for more than 22% of the poor. As such, they are subject to the general risks outlined above. Two major international organizations estimate that children comprise 50% of the victims of disasters.<sup>7</sup> While this is cause for great concern given the forecast of more intense hurricanes as climate change proceeds, the proportion of children in the population is expected to decline as the society ages. Whereas the Elderly accounted for 4.5% of the Caribbean population in 1950, their share is expected to rise to 18% by 2050. However, they too are vulnerable in natural disasters. The shock of the destruction of Hurricane Ivan in Grenada caused many elderly persons to die prematurely.

<sup>7</sup>Save the Children UK citing its own and UNHCR's experience with disasters



## Health

Global warming is impacting on the life cycle of the mosquito and other important vectors of diseases. Mosquitoes are now appearing at higher altitudes as a result of the higher temperatures there. There is ongoing research in the Caribbean on malaria and dengue transmission that indicates that the risk of mosquito infection is also great in the dry months of the year in addition to the wet months.

Nurse, who contributed to the IPCC report, notes as well that, “Shortages of fresh water and poor water quality during periods of drought, as well as contamination of fresh water supplies during floods and storms appear to lead to an increased risk of disease including cholera, diarrhoea, and dengue fever.”<sup>8</sup>



Research in the impact of climate change on human health in the Caribbean is just beginning. In addition, research is necessary on the health of the natural environment. Considerable work has been done on the health of reefs, but far more is necessary. There are other ecosystems that are important to human societies, and the health of those systems also needs to be investigated and monitored. Here again, creative methodologies that involve the communities, and especially the youth, are necessary so as to get the educational benefit of the research process as well.

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<sup>8</sup> L. Nurse, 2007, slide 24



## Security

The USA Department of Defence commissioned a study on climate change that reported that:

1. “Projected climate change poses a serious threat to America's national security” because severe weather events and the life-threatening diseases that accompany them will force major changes in the American way of life. The scale of natural and humanitarian disasters can exceed those caused by war. As such climate change can foster social and political instability where governments cannot meet the demands of the population.
2. “Climate change acts as a threat multiplier in some of the most volatile regions of the world.” The fear is that as climate change brings on instability in regions where humans are surviving marginally, the responses could require USA intervention with the consequent risks to the USA.
3. “Projected climate change will add to tensions even in stable regions in the world.” In addition to the fear of the USA being forced to intervene in natural and humanitarian disasters, and in response to political extremism, is the fear of increased flows of illegal migrants to the USA.
4. “Climate change, national security and energy dependence are a related set of global challenges.” As they saw it, dependence on foreign oil exposed the USA to hostile forces who supply the oil,





while dependence on alternate sources assisted in coping with the challenges of climate change.

The generals went on to recommend global partnerships to confront climate change that in many ways contradicted the policy positions of their government. The statement stops short of calling for a sustainable development approach to managing the impact of climate change on the American environment.

It is clear that similar disruptive effects of extreme weather events are potential threats to national security in Jamaica and the Caribbean. The stories of looting by traditionally peaceful law-abiding Grenadans after the destruction of the country by Hurricane Ivan constitute a grim testament of what is possible. The degradation of the Haitian environment is so advanced that even not-so-extreme weather events are disastrous as Hurricane Jeanne showed three years ago when it brushed the north coast of the island of Hispaniola. The Dominican Republic on the eastern half of the island of Hispaniola withstood the rains, whereas massive mudslides from denuded hills destroyed villages and claimed many lives in Haiti in the western half of the island. It is conceivable that in the future the inflows of illegal migrants to Jamaica could increase as a result of environmental destruction.

## **V. PUBLIC POLICY**

### **Mitigation and Adaptation Measures**

Mitigation refers to measures to reduce the emission of greenhouse gases. For Jamaica, the primary opportunities for this are in the substitution of renewable energy sources for oil, and the improved management of processes that use energy. Current projections are that renewable sources will contribute 20% of total energy consumption by 2020, up from 6% at



present.<sup>9</sup> The Government of Jamaica (GoJ) has indicated its intentions to use fiscal incentives to encourage the production and use of solar systems and biogas technologies, to facilitate low cost funding for solar water heating solutions, and to encourage the financial sector to fund the development of the renewable energy sector. These measures are several decades overdue. Policy-makers with short horizons and under pressure from debtors have been unwilling and unable to resist the oil lobby, and to withstand the potential anger and resistance of consumers to more expensive petroleum energy.



A small island like Jamaica needs to focus on adaptation measures. GoJ must take the lead through the instrument of the development order to ensure that selected locations are protected from flooding, drought, sea level rise, soil subsidence, and at the same time have access to protected services. Adaptation to climate change should receive primary consideration in the design of buildings and infrastructure to improve the resilience of the economy and society.

GoJ must lead, but as in almost all aspects of development, it is important to build partnerships with the relevant institutions in the private sector and in civil society, and to conduct an on-going public education programme to mobilize the general public and get buy-in to the United Nations Framework Convention on Climate Change (UNFCCC) process. The public should be briefed regularly and completely on international developments relevant to climate change and especially adaptation measures.

<sup>9</sup> L. Barnaby, 2007, slide 6



## International Commitments

Jamaica signed the UNFCCC in April 1995. The Convention has now been signed by 187 countries, with a view to limiting the discharge of the greenhouse gases in the atmosphere. In 1997, the Kyoto protocol to the UNFCCC identified the countries (the so-called Annex 1 countries, primarily developed industrial countries) that were required to reduce their emissions of greenhouse gases by 5% of 1990 levels between 2008 and 2012. Jamaica signed the protocol in June 1999.

In addition, Jamaica has signed the following international agreements that relate to the environment.

- Convention on Biological Diversity
- UN convention to combat desertification
- UN Convention on the Law of the Sea
- Vienna Convention for Protection of the Ozone Layer
- Montreal Protocol on Substances that Deplete the Ozone Layer
- London Amendment to the Montreal Protocol
- Copenhagen Amendment to the Montreal Protocol

Much of existing public policy has been driven by the range of international commitments that the government has given and ratified. 'Towards the end of the 1990s there was also recognition that environmental issues were normally not incorporated in policy-making processes of GoJ. As a result, in 2001, the Cabinet commissioned a review of the integration of environmental considerations into the Government of Jamaica's decision-making machinery as a first step in developing guidelines for Strategic Environment Assessment (SEA) of proposed government policies, plans and programmes.'<sup>10</sup>

In recent years, the GoJ has formulated a range of policies that will assist in the mitigation of and the adaptation to climate change. Some of them are:

<sup>10</sup> Government of Jamaica, Policy on Strategic Environmental Assessment, P.14



- The Forest Policy and the National Forest Management and Conservation Plan
- The National Land Policy
- The Watersheds Policy
- The National Energy Sector Policy
- National Biodiversity Strategy and Action Plan
- National Hazard Mitigation Policy



Compared to the rest of the CARICOM Caribbean, and to all SIDS, Jamaica is once again in the forefront with the formulation of policy in support of its international commitments. However, there remains the challenge of implementation. Many government agencies themselves are not aware of the commitments, and by its very nature, climate change is a cross-cutting issue

that affects every part of the government. This is one of the dimensions of the challenge of mainstreaming climate change in public policy.

Beyond the government is the private sector and civil society which have their respective roles in supporting the implementation of public policy in general, and the policies that are relevant to climate change in particular.

The first requirement is dissemination of information about the threat of climate change to the economy, and society and the implementation of measures to mitigate greenhouse gas emissions and to adapt to projected changes. Many of these measures entail doing things differently so as to minimize the risks associated with the impact of climate change. Energy conservation and the development of alternate renewable sources are high on the agenda. So is the conservation of water through more efficient use.



It means compliance with various regulations governing the design and siting of buildings and other development projects. These can only be achieved in the context of a broad consensus that is built around national responses to climate change as a central element of our strategies for socio-economic development.

## **VI. SUSTAINABLE DEVELOPMENT AS STRATEGIC RESPONSE TO CLIMATE CHANGE**

It is now 15 years since the United Nations Conference on the Environment and Development in Rio de Janeiro, Brazil at which the world's leaders committed themselves to sustainable development in the sense of ensuring that development projects today do not deny succeeding generations of people access to the resources for their livelihoods. Since then, the concept of sustainable development has been broadened to embrace socio-economic issues, and deepened to include the modalities of organizing and governing our societies. It is clear that human poverty persists on the basis of economic inequalities, and that the survival strategies of the poor are often unfriendly to the environment. Equally, it is clear that wasteful consumption threatens the resource base of the next generation. Dirty technologies implicitly assume a low value for the environment and/or that it has an infinite capacity to absorb harmful wastes.

It is now accepted that democratic governance in the broad sense of inclusiveness in policy formulation and implementation is an essential prerequisite for sustainable development. It is the way to harness the wisdom of the populace, and, to use a crude term, to get popular buy-in to public policy, not to mention honouring the basic human right of people to participate in their own governance.

Jamaica must look to articulating, developing and implementing a strategic approach with the relevant measures to adapt to the now well-established



processes of climate change over the next 60-70 years. To repeat, even if the discharge of greenhouse gases was contained at the current levels, we can expect the climate changes as indicated above – warming, rising sea levels, more intense hurricanes, and changes in the pattern of rainfall. It will be all the more challenging if the world does not succeed in getting the major polluting countries to make the drastic changes necessary to contain their discharge of pollutants in the atmosphere.

The strategies for adaptation revolve around changes in our consumption patterns of energy and water, changes in our shelter designs and settlement patterns, changes in our siting of economic and social facilities near the coasts and in dry waterways, and changes in our agricultural practices. All the changes will need to be guided by an appropriate policy framework that is formulated and implemented by a genuine partnership among the public sector, the private sector and civil society. It must seek to protect the most vulnerable sections of the population, and foster consumption and production activities that do not abuse, and where possible, nurture the natural terrestrial and marine environments. It will require more information and knowledge about the climate changes specific to Jamaica, and the specific impacts of those changes. Appropriate research programmes must tap local observation and knowledge in ways that will serve to educate communities in the direction of the necessary changes in lifestyles and their relationship to their natural environments.

Managers will have to re-engineer their production strategies to utilize new and clean technologies within longer term horizons than the traditional short-term profit maximizing that passes on costs to the society and to the natural environment. This will be a major shift for an economic system that is yet to find profitable activities that are not based on cheap labour and under-valuing the environment. That is, eliminating poverty and protecting the environment are essential to the measures required to adapt to climate change. These are the essential tenets of sustainable development. The government of Jamaica has long committed the country



to this path of development, but it is becoming more urgent that the commitment in policy be matched by implementation in practice.

We return to where we began: that our identity as a people is partly influenced by our natural environment, and in turn impacts on our natural environment. As that environment changes, so too will we. And how quickly we change away from disrespecting, to respecting our environment will determine how well we manage the adaptation to climate change. In another context, we will highlight the importance of managing anti-social behaviour for our socio-economic development prospects. The challenge is to re-centre our development efforts around more cooperative relationships among our people and between our people and the natural environment. The strategy of sustainable development helps us to maintain that focus.



## APPENDIX

### List of Conventions signed by Jamaica<sup>11</sup>

- International Plant Protection Convention, Rome, 1952?
- Convention on Territorial Area and Contiguous Zone, Geneva, 1958
- Convention on the Continental Shelf, Geneva, 1958
- Convention on the High Seas, Geneva, 1958
- Convention on Fishing and Conservation of the Living Resources of the High Seas, Geneva, 1958
- Treaty Banning Nuclear Weapons Tests in the Atmosphere, in Outer Space and Underwater, Moscow, 1967
- Treaty on Principles Governing Activities of States in the Exploration and Use of Outer Space including the Moon and Other Celestial Bodies, London, Moscow, Washington, 1971
- Treaty on the Prohibition of the Placement of Nuclear Weapons and Other Weapons of Mass Destruction on the Sea Bed and the Ocean Floor and the Subsoil Thereof, Washington, 1971
- Convention on the Prohibition of the Development, Production and the Stockpiling of Bacteriological (Biological) and Toxic Weapons and Their Destruction, London, Moscow, Washington, 1971
- Convention Concerning the Protection of World Cultural Natural heritage, Paris, 1972
- Convention on the Prevention of Marine Pollution by Dumping Wastes and other Matters (as amended), London, Moscow, Mexico City, 1972
- International Convention on the Prevention of Pollution from Ships, London, 1973 (MARPOL)
- Protocol of 1978 relating to the International Convention for the Prevention of Marine Pollution from Ships, London, 1973
- United Nations Convention on the Law of the Sea, Montego Bay, 1982 (UNCLOS)

<sup>11</sup> extracted from Jamaica National report to the World Summit on Sustainable Development, Johannesburg, South Africa, 2002



- International Convention for the Civil Liability for Oil Pollution Damage (CLOPD)
- International Convention for the Prevention of Pollution of the Sea by Oil, London 1954 (OILPOD)
- International Convention on Oil Pollution Preparedness and Cooperation (OPRC), 1990
- International Convention for Safety of Life at Sea (SOLAS)
- Vienna Convention for the Protection of the Ozone Layer, Montreal, 1987
- London Amendment to the Montreal Protocol on Substances that Delete the Ozone Layer, London, 1990
- Copenhagen Amendment to the Montreal Protocol on Substances that Delete the Ozone Layer, Copenhagen, 1992
- Montreal Amendment to the Montreal Protocol on Substances that Delete the Ozone Layer, Montreal, 1997
- United Nations Framework Convention on Climate Change, New York 1992
- Kyoto Protocol on the United Nations Framework Convention on Climate Change, Kyoto, 1997
- Convention on Biological Diversity, Rio de Janeiro, 1992 (Agenda 21 and the Rio Declaration)
- Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES)
- Convention on Wetlands of International Importance Especially Water Fowl habitats (Ramsar)
- United Nation Convention to Combat Desertification, Paris, 1994
- Convention on the Protection and Development of the Marine environment of the Wider Caribbean Region, Cartagena de Indias, 1983 (Cartagena Convention)
- Cartagena Protocol on Biosafety to the Convention on Biodiversity, 2001



### **1. Accession to the following is under consideration**

- Protocol to the Cartagena Convention on Specially Protected Areas and Wildlife (SPAW Protocol)
- Protocol to the Cartagena Convention concerning the Land Based Sources of Pollution of the Marine Environment (LBS Protocol)
- Convention on Migratory Species (CMS)
- Convention on the Transboundary Movement of Hazardous Waste and their Disposal (Basel Convention)

### **2. Local Environmental Policy**

- Jamaica National Environmental Plan (JANEAP) 1995-1998 and 1999-2001
- JANEAP annual status report, annual
- State of the Environment Report
- Beach Policy (1997)
- National System of Protected Areas (1996)
- National Environment Education Action Plan for Sustainable Development (1998)
- National Land Policy

### **3. Policy under Consideration**

- Green Paper: Towards a Watersheds Management Policy for Jamaica
- Green Paper: Towards a Coastal and Ocean Resources policy for Jamaica
- Green Paper: Environmental Management Systems Policy and Strategy
- Green Paper: national Biodiversity Strategy and Action Plan
- Hazardous Waste Management Policy



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## *Mission Statement*

The mission of the Environmental Foundation of Jamaica is to serve the public good by promoting and implementing activities designed to conserve and manage the natural resources and environment of Jamaica in the interest of sustainable development and to improve child survival and child development.

## *Vision*

The EFJ will be a national leader in the Child Development and Environment Sectors by the year 2012, with effective partnerships to ensure sustainable development in the programmes, policies and practices of the public sector, private sector and civil society.

## *Core Values*

- Good governance that dictates transparency of process and accountability.
- Supporting partnerships and development initiatives consistent with our mission.
- Respecting the value of initiatives coming from the public and private sectors and channeling this interest into partnerships with community groups and other organizations of civil society.
- Developing and maintaining relationships that are consistently ethical while being effective and efficient in doing the organization's business with members, clients and staff.
- Non-discrimination in relation to gender, race, creed and age.



## NOTES

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