GOVERNMENT OF JAMAICA

Climate Change Policy Framework for Jamaica

Government of Jamaica

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FOREWORD

Hon. Robert Pickersgill, MP
Minister of Land, Water, Environment and Climate Change

For Jamaica, building resilience to the impacts of climate change is of the highest priority. Climate change is a major threat to the island's overall development as our key economic sectors such as water, tourism, agriculture, fisheries and forestry are highly dependent on natural resources and are climate sensitive. We are already seeing changes and impacts on our built and natural environments from climate change. Based on climatic trends observed over the past 100 years, climate change is likely to significantly alter the quality and available quantity of Jamaica's natural resources, thereby adversely affecting not only the environment but also the livelihoods of our people.

It is imperative that we adopt the necessary policies and actions to ensure that adaptation strategies are mainstreamed into economic and fiscal management, the development of the country's physical infrastructure, land use and coastal zone planning and management, bearing in mind that some losses are irreversible.

Jamaica will continue to actively pursue opportunities for the reduction of greenhouse gas emissions through mitigation measures that are appropriate in the national context such as energy efficiency and conservation, the use of renewable energy, and increased forest forest cover.

Among the conclusions of the Fourth Assessment Report of the Intergovernmental Panel on Climate Change (2007) is that "policies enacted to date have not been substantial enough to counteract the growth in global emissions driven by increasing fossil fuel consumption, forest clearing, and world population". It is expected that the new global climate change agreement to be adopted in 2015 will require countries to commit to reductions in greenhouse gas emissions in order to minimize dangerous disruptions in the global climate system.

The Government of Jamaica will continue, in collaboration with our international partners, to negotiate for urgent collective action to reduce global greenhouse gas emissions. Given our vulnerabilities to the impacts of climate change and the need to increase our resilience as a country, the issue of loss and damage associated with climate change impacts will be imperative for the Government and people of Jamaica. In this regard, the Government will continue to focus its energies on this issue in the international and regional negotiations on climate change.

The Climate Change Policy Framework for Jamaica outlines the strategies that the country will employ in order to effectively respond to the impacts and challenges of climate change, through measures which are appropriate for varying scales and magnitudes of climate change impacts. Given the cross-cutting nature of climate change, there is a need to develop an integrated approach in order to effectively build resilience at all levels. The relevant sectors will be required to develop or update, as appropriate, plans addressing climate change adaptation and/or mitigation. Within the Policy Framework there are also Special Initiatives based on new and existing programmes and activities which will be prioritized for early implementation.

The development of the *Climate Change Policy Framework for Jamaica* was made possible through the Government of Jamaica/ European Union/ United Nations Environment Programme (GOJ /EU/UNEP) Climate Change Adaptation and Disaster Risk Reduction Project funded by the European Union under the Global Climate Change Alliance (GCCA). We also recognize the contribution of the United States Agency for International Development (USAID) and others in the development of the Policy Framework. The USAID supported a workshop on "Climate Change: Towards the Development of a Policy Framework for Jamaica" from July 26-27, 2012. We also wish to acknowledge the contributions of Ms. Leonie Barnaby and Ms. Danielle Andrade to the development of this document.

It is my heartfelt desire that every Government sector and agency should understand the importance of addressing climate change. This Policy Framework document will provide invaluable guidance for all stakeholders including the public and

private sectors. Strategies must be implemented in all sectors so as to enhance the adaptive capacity of the country to cope with climate change impacts and mitigate the causes of climate change in a coordinated, effective and sustainable manner.

Climate change is everybody's business. Therefore, communities and individuals are encouraged to utilize the information available on climate change, including the information provided by my Ministry to enhance their knowledge on how climate change impacts their lives. This information will also bolster individuals' adaptation and mitigation actions such as increasing energy conservation and efficiency measures within households and greening communities by planting trees and creating parks and other green spaces. It is important that 'each one teach one' on the impacts and challenges that climate challenges will present and the response required.

I encourage you all to use this *Climate Change Policy Framework* to make a real difference, to spearhead action to build our nation's resilience to climate change. After all, "with climate change, we must change".

Robert Pickersgill, MP
Minister of Water, Land, Environment and Climate Change
September 2015

Executive Summary

Vision Statement

Jamaica achieves its goals of growth and prosperity for its people while meeting the challenges of climate change as a country with enhanced resilience and capacity to adapt to the impacts and to mitigate the causes in a coordinated, effective and sustainable manner.

There is growing evidence that climate change is taking place at an accelerated rate due to human activities, especially those related to the use of fossil fuels and land clearing, exacerbated by population growth. According to recent reports[1], the level of carbon dioxide in the atmosphere has now passed 400 parts per million (ppm) up from 385 ppm and alarmingly above the 'safe' level of 350 ppm.

Jamaica, as a small island developing state, is particularly vulnerable to the impacts of climate change not only in terms of our natural resources, but also our social well-being and our economic development, as sectors such as tourism, agriculture, fisheries, forestry and water are very climate sensitive.

The severe weather events which have impacted the country over the years have severely affected the country's economic growth and development. Between 2001 and 2012 Jamaica experienced 11 storm events (including 5 major hurricanes) and several flood events. These events combined resulted in loss and damage amounting to approximately J$128.54 billion (State of the Jamaican Climate 2012 Report), in one case (Hurricane Ivan, 2004) the loss was equivalent to 8.0 % of GDP. Hurricane Sandy (2012) accounted for J$9.7 billion or 0.8% of 2011 GDP in direct and indirect damage (J$9.4 billion in damage and J$0.3 billion in losses, including expenditure for vector control) as well as increased expenditure by private and Government entities. The health, housing and education sectors experienced the greatest impact accounting for 48% of the total costs in damages. One death and 291 injuries resulted from Hurricane Sandy (Economic and Social Survey Jamaica, 2012).

At the international level, Jamaica as a Party to the United Nations Framework Convention on Climate Change (UNFCCC) and its Kyoto Protocol, has been active in negotiations advocating the specific circumstances and vulnerabilities of small island developing states (SIDS) to the impacts of climate change and the need for substantial reductions in the global level of greenhouse gases (GHG) as well as the provision of adequate financing to assist SIDS in undertaking adaptation and mitigation measures at the national level. It is well recognized that SIDS are not the main contributors to global greenhouse gas emissions. Jamaica is nonetheless, playing its part in reducing its GHG emissions through 'no regrets' mitigation actions which can lead not only to reduced emissions, but also cost savings and social and environmental benefits for the country. Jamaica will also focus in the negotiations on approaches to addressing loss and damage associated with the adverse effects of climate change, including impacts related to extreme weather and slow onset events. This is especially important as where there are constraints and limitations to adaptation, then other means of addressing economic loss and damage from climate change impacts will have to be identified.

At the national level, a number of projects on adaptation to climate change have been implemented. These include community-based adaptation and initiatives to raise the awareness of the public in general, and vulnerable groups in particular, regarding the impacts of climate change and how it can be addressed. The actions taken by the Government since 2012 include raising the profile of climate change by assigning the responsibility as a named portfolio in the Ministry of Water, Land, Environment and Climate Change, establishing a Climate Change Division, with a specific mandate to address climate change issues, the appointment of a Climate Change Advisory Committee and the establishment of the Climate Change Focal Point Network to facilitate a multi-sectoral approach to climate change.

It is recognized that, given the cross-cutting nature of climate change, there is an urgent need to develop an integrated approach in order to effectively build resilience at all levels and to have the required enabling policies in place. *The Climate Change Policy Framework* was prepared under the GoJ/EU/UNEP Climate Change Adaptation and Disaster Risk Reduction (CCADRR) Project. The policy development process involved a number of consultations, using as a basis, Vision 2030 Jamaica - National Development Plan and Jamaica's Second National Communication on Climate Change to the United Nations Framework Convention on Climate Change. The first output was approved as 'The Climate Change Policy Framework and Action Plan

[1] Synthesis Report. Contribution of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change 2007

Green Paper' and was subject to extensive review in accordance with Government of Jamaica guidelines, before receiving the approval of the Cabinet.

Goal and Objectives

The Climate Change Policy Framework for Jamaica is intended primarily to support the goals of Vision 2030 by reducing the risks posed by climate change to all of Jamaica's sectors and development goals.

It outlines the objectives, principles and strategies that the country will employ in order to effectively respond to the impacts and challenges of climate change, through measures which are appropriate for varying scales and magnitudes of climate change impacts. A number of Special Initiatives have been identified for early implementation.

Specifically, the goal of the Policy Framework is to create a sustainable institutional mechanism to facilitate the development, coordination and implementation of policies, sectoral plans, programmes, strategies, and legislation to address the impacts of climate change.

The objectives of the Policy Framework are:

I. To mainstream climate change considerations into national policies and all types and levels of development planning and to build the country's capacity to develop and implement climate change adaptation and mitigation activities.

II. To support the institutions responsible for research, data collection, analysis and projections at the national level on climate change, its impacts, and appropriate adaptation and mitigation measures, to facilitate informed decision-making and strategic actions at all levels.

III. To facilitate and coordinate the national response to the impacts of climate change and promote low carbon development.

IV. To improve communication at all levels on climate change impacts and also adaptation and mitigation related opportunities so that decision makers and the general public will be better informed.

V. To mobilize climate financing for adaptation and mitigation initiatives.

It is expected that, on the basis of this Policy Framework, the relevant sectors will develop or update, as appropriate, plans addressing climate change adaptation and mitigation. In the development and implementation of sectoral climate change adaptation and mitigation plans, the following principles are to be taken into account:

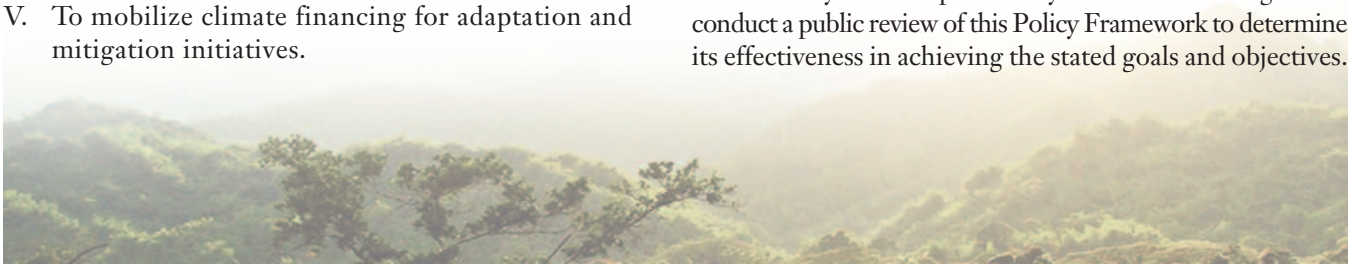
1 Sustainable use of natural resources
2 Multi-sectoral approach to climate change
3 Public participation and collaboration
4 The Precautionary Approach
5 Transparency and accountability
6 Best science
7. Polluter Pays Principle
8. Inter- and intra-generational equity

The Ministry of Water, Land, Environment and Climate Change (MWLECC) will oversee and support the implementation of *the Climate Change Policy Framework for Jamaica.* In the short-term, the Climate Change Division (CCD) within the MWLECC, will have administrative oversight and responsibility for climate change initiatives. The CCD, in its coordinating role, will ensure the systematic dissemination of information among ministries, departments and agencies and the provision of technical support and guidance to facilitate the development of sectoral adaptation and mitigation strategies and action plans. In the medium term, a Climate Change Department[2] will be established.

Climate change focal points named within all ministries and relevant departments and agencies (MDAs) will be responsible for coordinating, monitoring, evaluating and reporting on the development of their sectoral strategies and action plans. The MDAs are required to share with the CCD, relevant information and reports necessary for the proper collaboration, coordination, integration, monitoring and evaluation of climate change initiatives.

Legislation will be enacted to provide a framework for climate change mitigation and adaptation. This legislation will institutionalize the coordinating role of the CCD with regard to matters relating to climate change.

The MWLECC will present to Cabinet an annual report on measures that have been undertaken by the CCD to implement this Policy Framework. On the fifth anniversary of the date of the promulgation of this Policy Framework, the Ministry with responsibility for climate change shall conduct a public review of this Policy Framework to determine its effectiveness in achieving the stated goals and objectives.



[2] It is intended to establish a Department which will merge the functions of the Metereological Service with the functions of the Climate Change Division.

1. INTRODUCTION

1.1 Background and Rationale

Climate change refers to a change of climate that is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and that is in addition to natural climate variability observed over comparable time periods (UNFCCC 1992[3]).

Global atmospheric concentrations of carbon dioxide, methane and nitrous oxide emissions due to human activities have grown since pre-industrial times (1750), with an increase of 70% between 1970 and 2004 (IPCC, 2007). The estimated 0.74 C rise in temperatures over the past ten decades[4] and the predicted increases over the next two decades will have significant impacts, including:

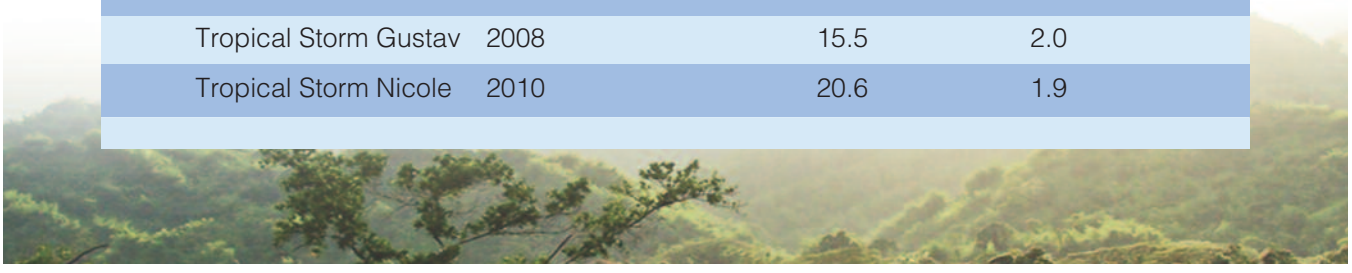
- Sea level rise which can be expected to significantly increase inundation, storm surge, erosion and other coastal hazards, thus threatening natural buffer zones which offer protection to inland assets, vital infrastructure located in the coastal zone such as major roadways, power plants, hospitals, human settlements and other real estate assets and facilities that support the livelihood of communities;
- Increased ambient air temperature;
- Ocean warming and thermal expansion;
- Increased acidification of oceans;
- Increased threats to human health, such as the spread of vector-borne diseases;
- Increased variability in rainfall patterns adversely impacting water resources;
- Increased frequency of extreme weather events such as storms, droughts and hurricanes; and
- Reduced quality and quantity of water resources due to the impacts of climate change on the hydrological cycle.

Jamaica's vulnerability to climate change impacts is further compounded by social issues such as poverty, the location of human settlements in high risk areas, environmental degradation and instances of poorly constructed infrastructure and housing.

The dependence on natural resources by key economic and climate sensitive sectors such as tourism, agriculture, fisheries, forestry and water, means that climate change is a major threat to the island's overall development based on the projected changes in climate and the expected associated impacts. The threat to development as a result of the adverse impacts of climate change will result in a reduction in the country's GDP, including a possible loss of Government revenue from unemployment, underemployment and loss of assets and corporate taxes. In addition, there will be an increase in Government expenditure to institute adaptation measures including shoreline protection. Based on recent climatic trends observed over the past 100 years, climate change is likely to alter and disturb the quality and available quantity of Jamaica's natural resources, thereby adversely affecting not only the natural environment but the livelihoods of its people.

Table 1. Impact of Extreme Climate-related Events on Jamaica's GDP 2001-2012[5]

	Year	Category	Cost (J$B)	Impact (% GDP)
Hurricane Michelle	2001	4	2.52	0.8
May /June floods	2002	-	2.47	0.7
Hurricane Charley	2004	4	0.44	0.02
Hurricane Ivan	2004	3	36.9	8.0
Hurricanes Emily and Dennis	2005	4	5.98	1.2
Hurricane Wilma	2005	5	3.6	0.7
Hurricane Dean	2007	4	23.8	3.4
Tropical Storm Gustav	2008		15.5	2.0
Tropical Storm Nicole	2010		20.6	1.9



[3] Climate Change definition under Article 1 of the United Nations Framework Convention on Climate Change (UNFCCC)

[4] The IPCC has noted that it is expected that average temperatures will increase an additional 1.8°C which would be 4°C above pre-industrial levels by the year 2100 if no action is taken. Even if there is a 1.8°C increase, this would exceed any increase in any century-long increase in temperature in the last 10,000 years

Table 2: Major Impacts Expected Across Jamaica[6]

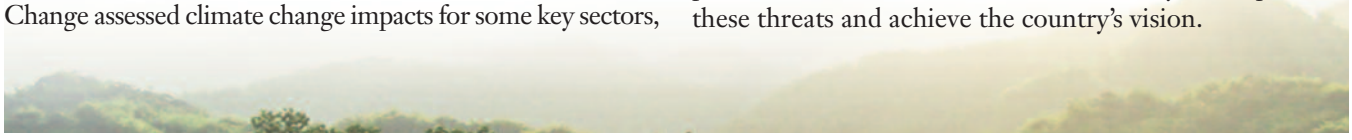
Parameter	Predicted Change
Air and sea surface temperature	Rise of 1.4°C to 3.2°C on average; seasonal variability higher
Sea level rise	Rise of 0.28 to 0.98 m
Precipitation	Less summer (June, July, August) precipitation
Extreme weather events	Greater number of flood events, land slides, droughts
Tropical storms/hurricanes	Likely (>66% certainty) increase in hurricane intensity
Marine Ecosystems	More acidic/warmer seas; coral mortality

Jamaica's sustainable development imperatives are guided by Vision 2030 Jamaica - National Development Plan. Vision 2030 Jamaica provides the framework to ensure that climate change issues are mainstreamed into national policies and development activities. The issue of adaptation to climate change is specifically addressed under National Outcome #14 'Hazard Risk Reduction and Adaptation to Climate Change'. The key related national strategies are: (i) develop measures to adapt to climate change, and (ii) develop mechanisms to influence the global rate of climate change. In addition, measures aimed at climate change mitigation are supported through National Outcome #10 'Energy Security and Efficiency' which addresses energy efficiency, conservation and renewable energy and National Strategy 12-5 'Promote Eco-efficiency and Green Economy' which promotes the use of clean technologies within the manufacturing sector.

Jamaica has, since 1995, been a Party to the United Nations Framework Convention on Climate Change (UNFCCC) which is the main international treaty on climate change. The objective of the Convention is "to stabilize greenhouse gas concentrations at a level that would prevent dangerous anthropogenic (human induced) interference with the climate system…such a level should be achieved within a time-frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened, and to enable economic development to proceed in a sustainable manner" (UNFCCC). In 1999, Jamaica also became a Party to the Kyoto Protocol to the UNFCCC, which sought to strengthen the global response to climate change, including the establishment of legally-binding emission reduction targets for developed country Parties.

Jamaica's Second National Communication (SNC) on Climate Change assessed climate change impacts for some key sectors, namely health, human settlements, and tourism, in addition to revisiting[7] agriculture, water, and coastal zones, for the years 2015, 2030, and 2050. Jamaica's SNC also includes an assessment of potential mitigation options to reduce greenhouse gas (GHG) emissions over the period 2009 to 2030 as well as to improve energy efficiency. The SNC provides an outline of proposesd strategies for awareness raising, a review of the national systematic observation systems, and a technology needs assessment.

The short- and long-term threats posed to the island from the accumulated GHGs in the atmosphere have made it imperative that Jamaica seeks to engage the international community in its efforts to mitigate and adapt to climate change. It is also important that Jamaica undertakes the development of a framework within which climate change is addressed at the local and national levels. In this regard, the decision was taken to finalize the climate change policy for Jamaica, as a key deliverable under the GoJ/EU/UNEP Climate Change Adaptation and Disaster Risk Reduction Project (CCADRR) (2011-2013). Several consultations[8] were undertaken during the policy formulation process which involved representatives of the public and private sectors, and civil society. In addition, a workshop was convened in July 2012 by the Ministry of Water, Land, Environment and Climate Change with the support of the United States Agency for International Development (USAID) involving government and non-government participants from across critical sectors to identify key ways in which climate change and other threats could affect Jamaica's long-term development goals, and the critical actions, policies, and institutional roles necessary to respond to these threats and achieve the country's vision.



[5] State of the Jamaican Climate 2012

[6] State of the Jamaican Climate 2012

[7] The SNC revisited the sectors addressed in the Initial National Communication

[8] Process of public consultations is outlined in Annex B

2. SITUATIONAL ANALYSIS

2.1 Climate Projections for Jamaica

Climate model projections show increasing temperatures for the Caribbean region that could result in changes in the frequency and intensity of extreme weather events; greater climate variability and rising sea-levels. These changes will adversely affect Jamaica's critical sectors including the fresh-water resources, coastal and marine resources, human settlements and infrastructure, terrestrial resources and biodiversity, agriculture, fisheries, tourism, human health and energy. The information listed below is taken primarily from the State of the Jamaican Climate 2012 report which summarizes the climate model projections for Jamaica and the Caribbean region.

Temperature and Rainfall

The mean annual temperature for Jamaica is projected to increase between 1.1 °C and 3.2 °C by the 2090s, based on existing models. The range of increase is 0.7°C to 1.8°C by the 2050s and 1.0°C to 3.0°C by the 2080s. There will be continuing increases in sea-surface temperatures for Jamaican waters with projected increases ranging between +0.9°C and +2.7°C by the 2080s (State of the Jamaican Climate 2012).

Projected rainfall changes range from -44% to +18% by the 2050s and -55% to +18% by the 2080s. (State of the Jamaican Climate 2012).

Storm Surges, Sea-Level Rise and Hurricanes

Increased sea levels and changes in the severity or frequency of storms are likely to result in changes to the frequency or magnitude of storm surges on Jamaica's coast. The likelihood of more severe hurricanes will increase, although the overall frequency of hurricanes remains uncertain. While thre may be an overall decrease in the frequency of tropical cyclones, there may be an increase in category 4 and 5 of such storms by the end of the 21st century (Climate Change Risk Atlas 2011 – Jamaica (CARIBSAVE); State of the Jamaican Climate 2012).

Sea level is projected to rise between 0.18m - 0.59m by 2100 relative to 1980-1999 levels (IPCC 2007). More recent studies have indicated that this upper limit may be too conservative and it could be up to 1.6m by the end of the century (Jamaica's Second National Communications to the UNFCCC; State of the Jamaican Climate 2012).

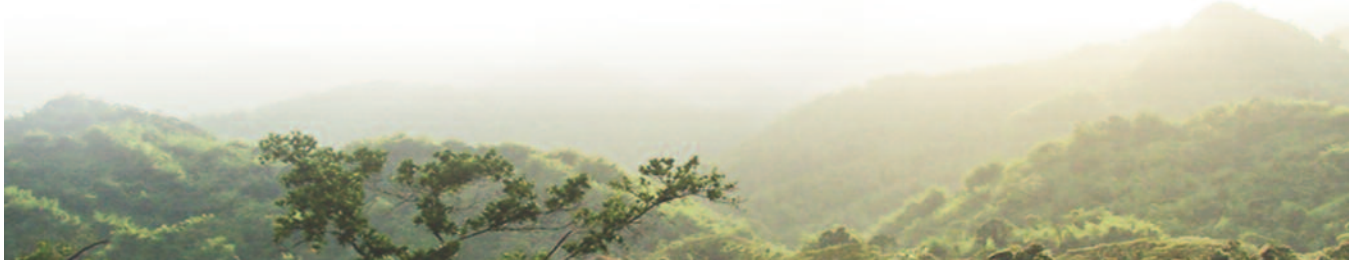
2.2 Threats and Potential Impacts of Climate Change in Jamaica

Coastal and Marine Resources

Jamaica's coastline is approximately 886 kilometres long and is the habitat for many of the island's diverse species and ecosystems including sandy beaches, rocky shores, estuaries, wetlands, seagrass beds and coral reefs. It is also the location for most of the critical infrastructure, formal and informal housing, as well as a high percentage of the island's economic activities, including tourism, mixed farming, fishing, shipping and mining. Jamaica's reef-related fisheries provide valuable jobs and revenue for the country, contributing US$34.3 million per year (Waite *et al*, 2011). The removal of mangroves, seagrass beds, and coral reefs occasioned by this multi-purpose use of the coastal zone has increased Jamaica's vulnerability to hurricanes and storm surges and poses a major threat to coastal ecosystems and marine wildlife.

The following impacts of climate change are likely to occur:

- Beaches including coastal lands will be eroded as a result of sea level rise and changing processes that affect the coastline;
- Fish production will be reduced due to increases in sea surface temperatures and a rise in sea level;
- Reduction in percentage of healthy reef cover and calcareous species due to ocean acidification;
- Fish kills and coral bleaching due to increases in sea surface temperatures; and
- Destruction of coastal ecosystems and marine habitats and spawning grounds by hurricanes and tropical storms are expected to become more frequent and intense.



Water Resources

Water is a critical input for many sectors including agriculture, energy, mining and quarrying, manufacturing, tourism, housing, sanitation and health services and areas such as natural resource management, urban planning and regional development. Adverse impacts on water resources will also negatively affect these sectors.

Changing rainfall patterns, sea-level rise, extreme events and increasing temperatures are the projected associated impacts of climate change and are anticipated to have the following potential impacts on water resources:

- Changes in temporal and spatial distribution due to increased climate variability and occurrences of severe weather events in particular droughts and tropical cyclones;
- Saltwater intrusion: Contamination of ground water resources due to the intrusion of sea water into coastal aquifers as sea level rises;
- Greater levels of sedimentation in reservoirs and dams and sediment transport to coastal areas as soil erosion increases with the greater incidence of more intense rainfall and hurricane events;
- Changes in temperature are expected to result in adverse shifts in climatic conditions for agricultural cultivation;
- Increasing degradation and destruction of watersheds caused by the displacement of traditional activities/ livelihoods such as farming;
- Shortage of water during periods of prolonged droughts; and
- Damage to infrastructure (roads, bridges, electricity generation and transmission systems, seaports, airports, pipelines, dams) caused by extreme and slow onset events.

Human Settlements and Infrastructure

Currently, approximately 82% of Jamaica's population lives along the coastline, or within 5km of the coast. Jamaica's susceptibility to natural disasters has proven to be a major threat to the stability of human settlements and infrastructure. Between 2001 and 2012 Jamaica experienced 11 storm events (including 5 major hurricanes) and several flood events. These events combined resulted in loss and damage amounting to approximately J$128.54 billion (the State of the Jamaican Climate 2012 Report). In the case of Hurricane Ivan in 2004 the resulting loss and damage was equivalent to 8.0% of GDP. Hurricane Sandy (2012) accounted for J$9.7 billion or 0.8% of 2011 GDP in direct and indirect damage (J$9.4 billion in damage and J$0.3 billion in losses, including expenditure for vector control) as well as increased expenditure by private and Government entities. The health, housing and education sectors experienced the greatest impact accounting for 48% of the total costs in damage. One death and 291 injuries resulted from Hurricane Sandy (Economic and Social Survey Jamaica, 2012).

With increased development activities taking place within the coastal zone, the risk posed to human settlements from natural disasters has heightened significantly. Potentially, one of the major consequences will be increased insurance costs for properties and infrastructure. The most threatened settlements are those that have been created outside the formal physical planning system, and do not meet the required planning and building standards. It is anticipated that climate change impacts will increase the vulnerability of human settlements to floods, storm surges, sea level rise and hurricanes. In this regard, the Government continues its work on the rationalization of the land use planning and development process, strengthening of institutional capacity, development of policies and enforcement of legislation to guide settlement and infrastructural planning and development.

Agriculture

Climate change is also expected to have a range of impacts on seaports, airports and other points of entry. Ports are primarily located in wetlands and low-lying areas which are characterized by high-exposure potential and low adaptation capability.[9] Any interruption in operations at seaports, airports, other points of entry and related infrastructure resulting from climate change may potentially cause import and export delays, loss and damage to goods and other challenges in global supply chains which have severe negative implications for international trade.

The agriculture sector is one of the sectors most susceptible to climate change impacts. Agriculture remains central to the Jamaican economy primarily for employment and foreign exchange generation, despite the decline in the number of persons involved. The proportion of the labour force in agriculture has significantly decreased from a high in 1943 of 45% to 24.4% in 1994, down to 17.9 % in 2006. The sector contributed 28 % to GDP in 1943, 8 % in 1994, 5.5 % in 2006 and 5% in 2007 (Economic and Social Survey Jamaica, 1991, 1994, 2007). By 2012, the contribution of the agriculture, forestry and fishing sectors to GDP was 6.8%. Growth in the sector was pushed by strong performance in the first half of the year, when the industry expanded by 7.4%, reflecting the impact of relatively favourable weather conditions and increased yields derived from the Ministry of Agriculture and Fisheries' productivity programmes.

[9]United Nations Conference on Trade and Development, 2011: Information Note. Ad Hoc Expert Meeting on Climate Change Impacts and Adaptation: A Challenge for Global Ports

During July to December, 2012, agricultural activities contracted (2.9%) as a result of adverse weather conditions, including:

- drought conditions during July to September during which the level of rainfall was lower than the 30-year mean for two months of the quarter; and
- the passage of Hurricane Sandy, which resulted in damage to crops, especially bananas and plantains, lives stock and irrigation systems.

Evidence of the fragility of the agriculture sector and the potential for destruction from climate change impacts can be seen in the tremendous losses suffered by the sector during extreme weather events and conditions, including hurricanes and tropical storms. In 2004, Hurricane Ivan caused damage and losses of J$8.55 billion to the sector and resulted in a decrease in exports amounting to J$2.78[10] billion. In 2008, Tropical Storm Gustav resulted in damage and losses in the crop and livestock sector (including the banana, coffee, and sugar industries) of approximately J$1.6 billion and in the fisheries sector approximately J$90[11] million. The category 1 Hurricane Sandy in 2012 caused damage amounting to J$1.25 billion in domestic and agricultural crops alone.

The agriculture sector is also one of the main consumers of energy and water and, therefore, key to addressing Jamaica's GHG emissions.

Climate change will exacerbate current threats to the sector as well as introduce new ones. The potential impacts to the sector associated with climate change are as follows:

- Decrease in the availability of water resources due to increased temperatures, changes in rainfall patterns (frequency and duration) and prolonged periods of drought;
- Reduction in water quality due to saline intrusion into ground water sources caused by rising sea-levels;
- Increases in agricultural pests and diseases due to increasing temperature;
- Accelerated soil erosion due to the occurrence of extreme events (floods, hurricanes etc.);
- Reduction in soil fertility due to soil salinization caused by rising sea levels;
- Reduction in crop yields due to changes in agro-climatic conditions and occurrence of hurricanes and tropical storms;
- Loss of marine resources due to destruction of spawning grounds caused by the occurrence of severe weather events;
- Damage to agricultural infrastructure and assets due to extreme events;
- Mass disruption to food security;
- Loss of employment and income earning opportunities;
- Loss of foreign exchange due to potential reduction in agricultural exports; and
- Increased demand for foreign exchange for food imports.

Tourism

The tourism sector provides approximately US$1.9 billion annually to the foreign exchange earnings of the country (PIOJ, 2011). The local tourism product is dominated mainly by resort tourism located in coastal areas such as Montego Bay, Ocho Rios, and Negril. Tourism remains one of the most important sectors to the nation's development given the substantial linkages with other sectors (agricultural production: as a local market for local farmers; water sector; coastal and marine resources, fisheries). Hurricanes, storm surges and tropical storms have posed the greatest threat to the sector in recent times. In 2007, Hurricane Dean resulted in an estimated US$43.7 million loss to the sector. Strong winds and storm surges associated with the hurricane resulted in extensive damage to tourism infrastructure, facilities and attractions such as the island's beaches.

Impacts to the industry are expected to include:

- Damage to and destruction of hotels and other tourism infrastructure located in coastal areas susceptible to storm surges, beach erosion and sea-level rise;
- Reduction in fresh water resources and food production arising from changes in precipitation amounts and spatial distribution, loss of forest-cover and related factors. This may include increasing demand for limited water resources caused by changing rainfall patterns and possible reduction in supplies due to competing interests for the resources among tourism and other sectors;
- Altered seasonality, heat stress for Jamaicans and tourists, increased cooling costs, changes in wildlife and insect populations and distribution and infectious disease caused by warmer temperatures;
- Loss and damage to archaeological, cultural and heritage attraction sites due to sea level rise, flooding and hurricanes;
- Extensive coastal erosion caused by sea level rise, storm surges and hurricanes, resulting in the loss of beach areas;
- Increased cost to protect coastline through the erection and maintenance of sea defences;
- Increased coral bleaching and degradation of marine resources due to increases in sea surface temperature;
- Acidification of the seas and oceans
- Diminished terrestrial and marine biodiversity;

[10]Economic Commission for Latin America and the Caribbean, United Nations Development Programme and Planning Institute Of Jamaica (2004). Assessment of the Socioeconomic and Environmental Impact of Hurricane Ivan on Jamaica. http://www.eclac.cl/portofspain/noticias/paginas/0/34530/L.22.pdf

[11]Planning Institute of Jamaica (2008). An Assessment of the Socio-economic and Environmental Impact of Tropical Storm Gustav on Jamaica. Ministry of Finance, Government of Jamaica

- Increases in insurance costs/ loss of insurability and business interruption costs caused by increasing frequency and intensity of extreme storm events;
- Loss of economic returns due to the possible changes in, or loss of: coral reefs, beaches, natural forests and other natural resources and attractions; and
- Reduced visitor arrivals as a result of a higher frequency of extreme weather events such as hurricanes, as well as reduced inducement for travel as a result of higher temperatures in traditional tourism marketplaces.
- Increased cost of tickets due to carbon taxation on flights

Human Health

Human health is affected by several key factors including the physical environment, and Social and economic support systems/networks. Climate change is said to affect the most fundamental determinants of health: air, water, food, shelter, and freedom from disease. The impacts on human health will largely be determined by several factors, including available health services, the state of the natural and built environments (including air, water, and sanitation services) and the availability of life sustaining resources such as water and food.

Jamaica's vulnerability to extreme hazards and its location in the tropics also increases the risks posed to human health, as local conditions are 'favourable' for the expansion of both tropical (vector-borne) and water-related diseases. Climate change will bring about more storms, floods, droughts, and heat waves, which are all expected to threaten all the determinants of health, resulting in the following anticipated impacts:

- An increase in the incidence of vector-borne diseases (such as dengue fever, malaria, chikungunya and yell low fever) as higher temperatures favour the prolifer ation of mosquitoes and other disease carriers: a threefold increase in dengue transmission is likely in Jamaica[12];
- A higher occurrence of respiratory diseases and heat and stress-related illnesses and conditions caused by the 'urban heat island effect.' This could directly increase morbidity and mortality rates, particularly in the young and the elderly;
- An increase in water-related diseases such as dysentery, typhoid and cholera particularly following extreme rainfall events, and exacerbated by poor sanitation, unplanned settlements and pollution of water sources

It is further recognized that the impacts of climate change on coastal and terrestrial resources, food supply, water production and the various economic sectors are likely to have indirect and significant effects on human health:

- More frequent extreme weather events can lead to potentially more deaths and injuries caused by storms, floods and landslides;
- Given the vulnerability of the agricultural sector to climate variability, rising temperatures and more frequent droughts and floods can compromise food security. This could result in increases in malnutrition, given the high dependency on rain-fed subsistence farming.

Energy

Climate change threatens the efficient production of energy and given the high dependence on foreign energy sources across all sectors, this could increase Jamaica's overall economic vulnerability. Jamaica's primary energy supply is made up of approximately 90% imported fossil fuels with less than 10% derived from renewable energy sources. In 2008, the amount of oil imported was approximately 27 million barrels at a cost of US$2.7 billion, (Jamaica's National Energy Policy 2009-2030) a third of which was used by the bauxite/alumina sector. Since 2009, there has been a steady decrease in oil imports. In 2012 the total quantity of oil imported was 20.24 million barrels at a cost of US$2.21 billion. Among the factors contributing to the lower consumption were reduced output in the bauxite/ alumina sector, conservation measures adopted due to the high cost of energy and the stagnation or decline of economic activities. The energy sector remains the largest user of foreign exchange and so it is incumbent on the country to reduce its dependency on oil imports and its attendant emissions of greenhouse gases. This can be achieved by taking actions for mitigating climate change through abatement options, in particular, conservation and renewable energy production and use.

Under Jamaica's National Energy Policy 2009 - 2030, the country aims to increase the percentage of renewables in the energy mix with proposed targets of 12.5% by 2015 and 20% by 2030. Strategies and actions proposed in the policy include:

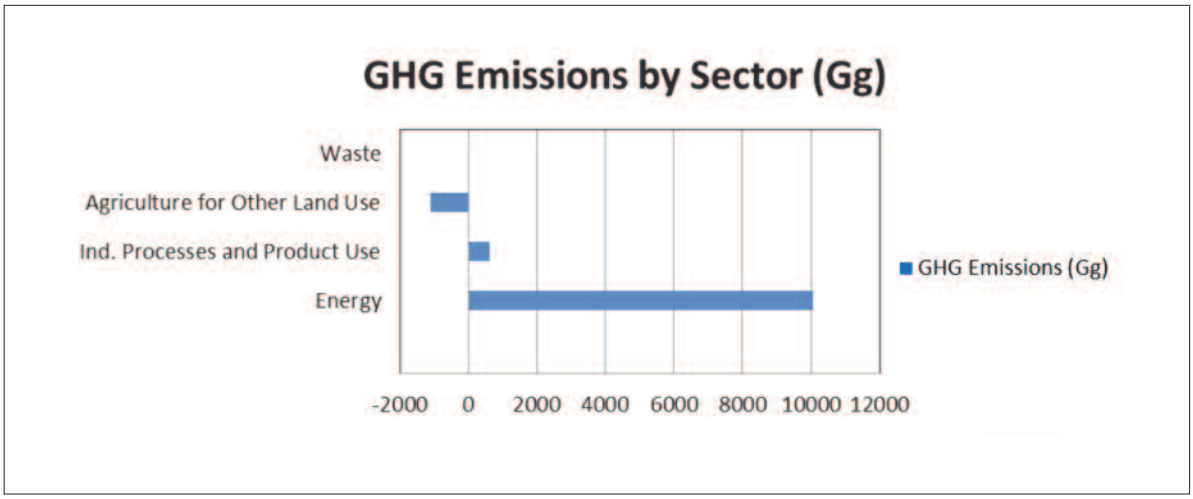
- Develop diversification priorities based on cost, efficiency, environmental considerations and appropriate technologies and competitiveness;
- Prioritize renewable energy sources by economic feasibility criteria and environmental considerations including carbon abatement;
- Promote the development of efficient and low cost renewable energy plants with a size of 15 MW or more on a competitive basis;

[12] State of the Jamaican Climate 2012

- Procure 115MW of electricity from renewable sources through a competitive process administered by the Office of Utilities Regulation (OUR).

Reliance on renewable energy initiatives to assist in mitigating climate change will not be sufficient. Jamaica's efforts to mitigate must be more far reaching and concerted to extend beyond the energy sector to implement measures that include minimizing GHG emissions. Figure 1 provides an overview of GHG emissions by sector, as outlined in Jamaica's Second National Commnications on Climate Change.

Fig. 1. GHG Emissions by Sector (adapted from Jamaica's Second National Communication on Climate Change)



2.3 Challenges Facing Jamaica in the Short-, Medium- and Long-term

2.3.1 High Incidence of Poverty

The high incidence of poverty, particularly in the rural areas of the island, has thwarted sustainable development efforts aimed at environmental protection. In 2011, the proportion of Jamaica's population living below the poverty line was 17.5% up from 9.9% in 2007 (Jamaica's Survey of Living Conditions 2009) . In order to ensure that persons live in ways that are less environmentally intrusive (e.g., harmful forestry practices), and to maximize their capacity to adapt to climate change, it is necessary to ensure that poverty alleviation remains high on the national sustainable development agenda.

2.3.2 Limited Financial Resources

In Jamaica's First National Communications to the UNFCCC on Climate Change (2000) it was estimated that a 1m rise in sea level would see US$462 million being required to protect Jamaica's coast. There is a great need for sustained sources of funding for climate change mitigation and adaptation efforts as well as for managing impacts which are beyond adaptation such as massive coral bleaching which will require significant funding for rehabilitation activities.

2.3.3 Limited Legislative and Regulatory Support for Integrating Climate Change Considerations into Policies and Plans.

There is need for greater mainstreaming of climate change considerations in several of the country's national policies and plans. Sectoral policies must take into account the issue of climate change and how global warming could affect the sustainability of their respective sectors. There is a need for integration of adaptation, mitigation and risk reduction strategies into the broader sectoral policies for key sectors such as energy, agriculture, tourism, health, water, forestry, land use (coastal zone) and natural (marine and terrestrial) resources.

Over the past ten years, a number of policies which seek to address climate change imperatives were developed, namely:

(i) The Draft Water Sector Adaptation Strategy to Address Climate Change;
(ii) Jamaica's National Energy Policy 2009-2030;
(iii) The Draft Carbon Emissions Trading Policy;
(iv) The Draft National Renewable Energy Policy - 2010-2030;
(v) The Draft National Energy-From-Waste Policy - 2010 – 2030;
(vi) The Draft Energy Conservation and Efficiency Policy;
(vii) The Draft Biofuels Policy;
(viii) The Draft Comprehensive Disaster Risk Management Policy
(ix) National Strategy and Action Plan on Biological Diversity in Jamaica; and
(x) The Draft National Policy on Ocean and Coastal Zone Management.

2.3.4 Limited Institutional and Individual Capacity

The ability of public and private sector, particularly the small- and medium- enterprises, to address climate change issues is tied directly to the broader policy and regulatory system of Government. Inadequate financial and technical resources, and the need for strengthened research and development within institutions, have limited their overall ability to develop and expedite key programmes, projects and action plans associated with climate change.

2.3.5 Strengthening of the Physical Planning System

The vulnerability of Jamaica to natural hazards is largely due to geographic and bio-physiologic factors. However its overall vulnerability has been heightened due to significant alterations made to the natural environment by the development of infrastructure and human settlements and the settlement patterns of the population, particularly within the coastal zone. With more than 70% of all major industries located within the coastal zone and approximately 82% of the population living within 5km of the coast, the country is faced with the considerable challenge of reducing the island's vulnerability, while improving its low adaptive capacity to climate change.

Steps have been taken in the preparation of development plans and orders to guide sustainable land use developments across the island. Several confirmed Development Orders were promulgated in the 2015/16 financial year[13] and work will continue on the finalization of others. It is anticipated that the entire island will be covered by Development Orders by 2016. Within the context of a changing socio-economic and environmental climate, the Orders will be used to guide and facilitate development by influencing where development ought to take place; control development/ facilitate enforcement; help to build communities; provide opportunities for people to participate actively in the planning process; provide a planning system that bridges the gap between environment and economic development; improve local governance; build research capacity; and educate stake-holders. The physical planning system has however been hampered by limited human, technical and financial resources. There is a greater need for the integration of land use planning into ocean and coastal zone management policies, in order to explicitly address all needs related to the management of natural resources.

2.3.6 Limited Research Capacity and Technological Development

Predicting future changes in climate in Jamaica has been a difficult task, given the limited technologies available to allow for more accurate predictions. Global models do not provide sufficient information on climatic conditions in the Caribbean, resulting in a limited understanding of climatic processes. Accurate climate modelling is made even more difficult, given insufficient model runs to determine regional distribution of cyclone changes, the limited number of storm surge models, uncertainty about future el Niño events, significant deviations among models to determine regional distribution of sea level rise, and uncertain and little dynamic and statistical downscaling in the Caribbean. Challenges faced by scientists in Jamaica have been significant and include limitations in available climate data for use in monitoring and modelling climatic conditions and changes, the exorbitant cost of the requisite technology to accurately collect data such as ocean pH levels.

Research and innovation needs span the spectrum of the natural and social sciences, and must address integration of science and technology into decision-making processes and resulting measures to combat the effects of climate change. Nevertheless, the limitations to scientific research and innovation and Jamaica's dependence on fossil fuel present a confluence of opportunities to address climate change mitigation, adaptation and resilience. *The Climate Change Policy Framework* embodies the will to, inter alia, foster a greater culture of scientific research, technology and innovation to address climate change.

[13] Development Orders for the following areas were promulgated in the 2015/16 financial year: the Negril and Green Island Planning Area and the parishes of Manchester, Trelawny and Portland. Work will continue on finalizing Development Orders for the parishes of Kingston and St. Andrew, St. Elizabeth and St. James.

2.3.7 Limited Integration of Environmental Considerations into Socio-Economic Policies and Strategies

Socio-economic imperatives have tended to outweigh the longer term needs of the environment. Vision 2030 Jamaica has infused climate change considerations into national development planning. However, there is need for enhanced mainstreaming of environmental and climate change issues into national social and economic policies. There needs to be greater appreciation by decision-makers of the inter-relationship between environmental protection and management and socio-economic advancements to ensure that climate change issues are effectively addressed. Advancements made in key sectors such as transport, energy, tourism and agriculture have focused primarily on the social and economic achievements/ outcomes, without due consideration to the impacts these changes may have on the environment.

2.3.8. Labour Productivity

Local labour markets have been impacted by various phenomena such as globalization which have created several threats to the labour force. Among these threats are strong competition for highly skilled labour and increased application of technology which may reduce the dependence on and use of low skilled labour.[14] The labour force grew by 0.6 % with low, and in some cases, declining labour productivity, compounding existing threats.[15]

Increasing atmospheric temperatures and relative humidity pose additional challenges for those segments of the labour force working in the open air environments. Without the appropriate adaptation measures in place, it is anticipated that there may be significant negative impacts on labour productivity, especially for wage-labour dependent households and workers engaged in open-field occupations such as construction, industry, agriculture and fisheries and some segments of the manufacturing and transportation industries.[16] In light of the conditions that are projected to arise from climate change, there will be the increased potential for heat stress, dizziness, fainting, earlier onset of worker fatigue and work-related accidents. Though legislative measures are in place such as the draft Occupational Safety and Health Act and the Factories Act, there may be need for exploration into additional targeted initiatives to create a more climate resilient labour force to protect and improve Jamaica's labour productivity.

2.3.9. Human Security

Climate change poses significant risk to human security in multiple ways. The negative impacts on livelihoods that may result from the impacts of climate change can lead to changes in migration patterns and a rise in both internal and external migration. These changes may give rise to tension and conflict within communities, changes in cultural practices and a strain on the institutions that exist to manage the settlement and integration of migrants.[17]

2.3.10 Youth and Gender

In observing International Youth Day in 2008, Secretary-General of the United Nations, Ban Ki-moon described the relationship between youth and climate change in developing countries, stating "Today's young people will bear the consequences of climate change, thanks to the unfortunate legacy of their elders. In many developing countries in particular, youth -- especially girls and young women -- are often responsible for…tasks (which) will be rendered more difficult … as climate change affects the availability of water, agricultural productivity and the survival of ecosystems." At the Economic and Social Council (ECOSOC) Youth Forum in February, 2015, the Secretary-General also stated "2015 is not just another year – it is a chance to change the course of history. Ours is the first generation with the potential to end poverty – and the last to act to avoid the worst effects of climate change."

Despite the special challenges that youth[18] will face in the short, medium and long-term, they are well placed to combat the adverse effects of climate change. Jamaica, with over 530,000 youth[19] representing approximately 19% of the total population, stands to gain significantly from the creative and transformational power of its youth. *The Climate Change Policy Framework* will therefore, support the abilities of young people to lead the country towards positive, 'climate-friendly' changes in lifestyles, infrastructure, entrepreneurship, governance and decision-making.

Children, in particular, experience extreme sensitivity to external shocks. The United Nations Children's Fund (UNICEF) has noted that children will suffer malnourishment and food insecurity due to climate change, are at risk of becoming environmental refugees and will experience higher vulnerability to disease, heatstroke and resource shortages. Policy instruments must contribute to the provision of an institutional framework that supports the building of an environment conducive to child protection and development.

Gender, like climate change, is a cross-cutting issue and presents specific challenges in tackling the adverse effects of climate change. Generally, men and women face different economic, social and environmental realities. Jamaican young men-at-risk for various forms of violence and marginalization and women-at-risk for gender-based assault, experience different vulnerabilities and have reduced capacities to adapt to climate change and therefore may have different concerns and inputs into decision making processes. The Policy Framework therefore, will support gender equitable development, in line with the Vision 2030 Gender Sector Plan and the National Policy for Gender Equality.

[14]Vision 2030 Jamaica, Labour Market and Productivity Sector Plan 2009-2030

[15]Economic and Social Survey Jamaica, 2012

[16]Summary for Policymakers, Contribution of Working Group II to Fifth Assessment Report, Intergovernmental Panel on Climate Change, 2014

[17]Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change, 2014

[18]"… the United Nations, for statistical purposes, defines those persons between the ages of 15 and 24 as youth without prejudice to other definitions by Member States" Secretary-General's Report to the General Assembly, A/36/215, 1981

[19]Figure as at the end of 2013. Statistical Institute of Jamaica, http://statinja.gov.jm/Demo_SocialStats/newEndofYearPopulationbyAgeandSex2008.aspx

2.4 Current Strategies to Address Climate Change

2.4.1 Adaptation

Adaptation planning is the main area of focus to address the impacts of climate change in Jamaica. It is an integral part of several sectors including coastal zone management and water resources. The Government of Jamaica, as part of its overall approach in addressing the newly emerging issues of climate change has reinforced the need for climate change considerations to be reflected in key policy measures, regulations and laws across all sectors. Jamaica has already developed various policies, plans and programmes which address climate change, and some of the sector plans developed under Vision 2030 Jamaica – National Development Plan include climate change considerations.

Examples of national plans and policies that address climate change, include:

- The 2015 Policy Guideline on Rainwater Harvesting which will guide members of the public, developers and the planning authorities by providing information, standards and criteria/requirements for mandatory rainwater harvesting and use. Additionally, it aims to encourage citizens to partner with government to mitigate this negative effect of climate change.
- The 2001 Forest Management and Conservation Plan and the Strategic Forest Management Plan 2010-2014 which set out the targets for reforestation and afforestation programmes that remove carbon dioxide from the atmosphere.
- The Forest Policy Green Paper tabled in The Houses of Parliament in March 2015 which addresses climate change through reforestation, afforestation, and prevention of degradation of forests (carbon sequestration) as well as carbon trading and REDD+[20] .
- The draft National Water Sector Adaptation Strategy to address climate change in Jamaica. This was prepared under the Mainstreaming Adaptation to Climate Change Project led by the Caribbean Community Climate Change Centre (CCCCC). The Strategy provides an assessment of the water sector's vulnerability to climate change and outlines the duties of the Government and other key stakeholder groups in helping to build the resilience of the sector against climate change and other potential hazardous impacts.
- Jamaica enacted a Disaster Preparedness and Emer gency Management Act in 1993 to facilitate and coor dinate the development and implementation of inte grated disaster management systems. The National Disaster Plan sets out mitigation[21], preparedness, response and recovery procedures for natural and man-induced hazards and a Hazard Mitigation Policy details the Government's policy for evacuation, communications, mass casualty events, aircraft accidents, pandemics and pest infestations, among others.
- An Evacuation Plan has been developed for Portmore, one of the low-lying areas of St. Catherine which is vulnerable to sea-level rise. This will be expanded to facilitate the preparation of evacuation plans for other low-lying coastal areas both in rural and urban areas.
- A National Building Code has been developed which establishes new guidelines for the construction of hurricane resistant buildings across the island, including the use of hurricane straps and water tanks. The code outlines the building standards for construction within the coastal zone, and takes into consideration physical planning standards, such as coastal setbacks.

2.4.2 Mitigation

Although the focus is on adaptation measures, the Government is committed to implementing the 'no-regrets' mitigation measures such as demand side management in electricity production and using alternative energy sources such as solar, wind, hydropower, and bio-fuels to produce energy. Mitigation related policies, plans programmes and initiatives include:

- *The National Energy Policy 2009-2030*

This Policy, approved by the Cabinet in October 2009, aims to facilitate a comprehensive programme of energy modernization, to provide high quality, affordable, environmentally friendly energy, and to reduce the country's dependence on high-cost imported oil. The policy outlines seven (7) priority areas that will ensure that the country mitigates the effects of volatile and rising crude oil prices, takes advantage of renewable and non-renewable resources and promotes conservation and efficiency in use of energy resources amongst all sectors of the society. These are: (i) Security of Energy Supply through diversification of fuels as well as development of renewable energy sources (ii) Modernizing the country's energy infrastructure (iii) Development of renewable energy sources such as solar and hydro; (iv) Conservation and efficiency in use of energy (v) Development of a comprehensive governance/regulatory framework for the energy sector (vi) Enabling Government ministries and agencies to be models/best practice for the rest of society in terms of energy management and (vii) promoting eco-efficiency in industries.

- *The draft National Carbon Emissions Trading Policy*

  The Policy is part of Jamaica's overall move to address climate change. The policy represents the commitment

[20] REDD+: refers to reducing emissions from deforestation and forest degradation in developing countries; and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries

[21] Disaster Mitigation is defined as " The lessening or limitation of the adverse impacts of hazards and related disasters." United Nations Office for Disaster Risk Reduction

of the Jamaican Government to participate in the Clean Development Mechanism and Kyoto Protocol. More importantly, the policy establishes the guidelines and terms under which Jamaica will participate in carbon markets to not only assist the country in realizing a portion of its quantified emission reduction targets but at the same time move it towards achieving the national sustainable development goals.

- *The development and implementation of renewable energy projects.*

  An example is the establishment of the Wigton Wind Farm phases I and II in the parish of Manchester with estimated capacities of 20.7 megawatts and 18 megawatts of power, respectively.

- *The implementation of island wide efficiency projects.*

  Examples include the Government of Jamaica (GoJ)/ Inter-American Development Bank Energy Efficiency and Conservation Programme, and the GoJ/IDB Kingston Metropolitan Area Water Supply Improvement Programme.

- *Participation in Clean Development Mechanism (CDM) projects and other mitigation mechanisms*

  The Wigton Wind Farm Phases I and II, are initiatives of the Petroleum Corporation of Jamaica (PCJ) and the Government of Netherlands, and are Jamaica's only registered CDM Projects.

  The experiences gained from the Wigton Projects will be applied to other mitigation mechanisms as they emerge, such as Nationally Appropriate Mitigation Actions (NAMAs), Intended Nationally Determined Contributions (INDCs)or the successor to the Kyoto Protocol of the UNFCCC.

2.4.3 Public Education and Awareness

A National Communication Strategy and Action Plan entitled "Communication for Climate Resilience (2012-2017)" has been prepared for the Pilot Programme for Climate Resilience (PPCR) as well as a 2012 Report on Climate Change Knowledge, Attitude and Behavioural Practice Survey.

A climate change awareness campaign was implemented under the GOJ/EU/UNEP Climate Change Adaptation & Disaster Risk Reduction Project 2011-2013, funded by the European Union which greatly assisted the Government in raising awareness of climate change at the local level. In addition, there were also interventions in watershed and coastal areas in which awareness raising activities were carried out.

2.4.4 Climate Change Research

A number of tertiary institutions across Jamaica have been conducting climate change research in specific areas. These include the Climate Studies Group, Mona (CSGM); the Centre for Marine Science, University of the West Indies (UWI); the School of the Built Environment - University of Technology; Northern Caribbean University; and the Sir Arthur Lewis Institute of Social and Economic Studies, UWI, Mona.

A number of research students at these tertiary institutions have conducted PhD research in their respective fields. The CSGM has, for example, participated in several projects including: (1) The Threat of Dengue Fever - Assessment of Impacts and Adaptation to Climate Change in Human Health in the Caribbean (2) Analyzing and Understanding Climate Variability in the Caribbean Islands, (3) Sugar Cane Yield and Surface Energy Studies to analyze the effect of climate on sugar cane yield.

The State of the Jamaican Climate 2012 and the Summary for Policy-Makers were prepared under the PPCR by the CSGM.

3. THE CLIMATE CHANGE POLICY FRAMEWORK

3.1 Vision Statement

Jamaica achieves its goals of growth and prosperity for its people while meeting the challenges of climate change as a country with enhanced resilience and capacity to adapt to the impacts and to mitigate the causes in a coordinated, effective and sustainable manner.

3.2 Goal

This Policy Framework will create a sustainable institutional mechanism to facilitate the development, coordination and implementation of policies, sectoral plans, programmes, strategies, and legislation to mitigate as well as adapt to climate change.

3.3 Objectives

I. To mainstream climate change considerations into national policies and all types and levels of development planning and to build the country's capacity to develop and implement climate change adaptation and mitigation activities;

II. To support the institutions responsible for research, data collection, analysis and projections at the national level on climate change, its impacts, and appropriate adaptation and mitigation measures, to facilitate informed decision-making and strategic actions at all levels;

III. To facilitate and coordinate the national response to the impacts of climate change and promote low carbon development;

IV. To improve communication at all levels on climate change impacts and also adaptation and mitigation related opportunities so that decision makers and the general public will be better informed;

V. To mobilize climate financing for adaptation and mitigation initiatives; and

VI. To encourage the private sector to embrace climate change imperatives and promote the development and implementation of technologies and processes that contribute to climate change adaptation and mitigation initiatives.

3.4 Principles[22]

The relevant Ministries, Departments and Agencies will take into account the following principles in the development and implementation of sectoral climate change adaptation and mitigation plans:

1. Sustainable use of natural resources

Recognizing that the resilience of the natural environment is key to adapting to climate change, the response to the climate change challenge must be linked to the sustainable use of natural resources, the maintenance and restoration of ecosystems and an ecosystem based approach to disaster risk management.

2. Multi-sectoral approach to climate change

The Government will mainstream climate change adaptation and mitigation considerations in the development of legislation, policies, strategies, programmes, plans and projects of all Ministries, Departments and Agencies of Government.

3. Public Participation and Collaboration

The Government will employ a consultative and collaborative approach to respond to climate change. Information on the impacts of climate change and proposed response measures will be provided to the public to ensure awareness and understanding and also to encourage changes in attitudes and practices. The Government, in the development of strategies and approaches to address climate change, will engage interested and relevant stakeholders which include local communities, media, academia, research institutions, public and private sectors, NGOs, and CBOs as well as those most vulnerable to climate change impacts, including women, children and the poor.

4. Precautionary Approach

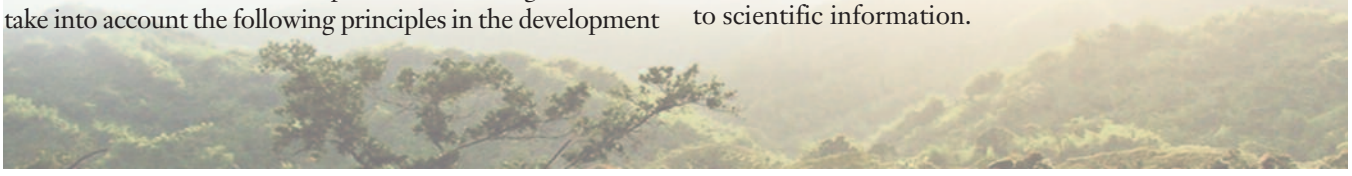
The Government will apply the necessary strategies and measures to ensure an effective response to the impacts of climate change even in the absence of full scientific certainty.

5. Transparency and accountability

The Government will employ measures to ensure that there is transparency and accountability in the development and implementation of adaptation and mitigation plans.

6. Best science

The Government will apply sound technical and scientific analysis and principles and new scientific findings consistent with the precautionary approach. Traditional knowledge is recognized and will be utilized as an important complement to scientific information.



[22] Several principles are defined in the Glossary

7. Polluter Pays Principle

The Government will apply the polluter pays principle in the implementation of the Policy Framework.

8. Inter-and Intra-generational equity

The Government will utilize the principles of inter-and intra-generational equity to ensure that the rights to development of both current and future generations are equitably fulfilled.

3.5 Strategies

3.5.1. Development of a Climate Financing Strategy

The MWLECC , through the CCD and in collaboration with key stakeholders will develop a National Climate Change Financing Strategy. This Strategy will address:

- climate finance readiness to ensure effective access, management and disbursement in accordance with relevant fiduciary standards;
- the development of co-financing instruments (e.g. public-private partnerships)
- opportunities for debt-for-adaptation/mitigation swaps;
- the establishment of a national climate fund for the centralization and coordination of the management of climate finance;
- the mobilization of private financing, including through the utilization of incentives and disincentives;
- leveraging existing and emerging climate finance regimes such as CDM, NAMAs, REDD+, the Green Climate Fund, the Adaptation Fund and the Climate Investment Funds;
- the sourcing of bilateral and multilateral aid and concessionary finance for adaptation and mitigation; and
- innovative financing options to meet the needs of mitigation and adaptation initiatives (e.g. credit guarantees, leasing options, crowd-funding, carbon taxation and carbon trading)

3.5.2 Development of Research, Technology, Training and Knowledge Management

The MWLECC and the CCD will work with national agencies and academia to seek financing to support capacity building as well as the development of research, data collection and analyses, technology, training and knowledge management. Actions to be taken include:

- Establishment and updating of the National Climate Change Database and information system within the Ministry with portfolio responsibility for climate change to be used by all relevant agencies and the general public. Information obtained from local stakeholders including fishermen and farmers will also be utilized in populating the database;
- Improvement of assessment tools for observing and researching the impacts of climate change at the sector and community levels;
- Improvement of the national systems for climate change impact modeling;
- Assessment of the most appropriate mitigation actions per sector taking into account mitigation potential, cost, sector "buy-in", co-benefits and alignment with sectoral and national development priorities;
- Provision of training opportunities in climate change for academia and scientific, technical and managerial personnel within public, private and research institutions;
- Identifying and highlighting access to various global climate change sources of finance for climate change adaptation and mitigation programmes and projects; and
- Assessment of technological needs for adaptation and mitigation strategies.

3.5.3 Regional and International Engagement and Participation

The MWLECC shall maintain regional and international engagement and participation in climate change-related negotiations and initiatives. Actions which will be explored include:

- Support for active and effective participation in all regional and international climate change fora, particularly the UNFCCC negotiation processes, through the provision of funding, technical assistance and capacity building;
- Pursuit of regional and international financing, capacity building and technology transfer mechanisms that provide support for climate change adaptation and mitigation actions;
- Engagement in climate change activities and programmes established by regional and international bodies including AOSIS, CCCCC, SIDSnet, SIDSDock; UNDP and UNEP;
- Implementation of the strategies and actions for climate change as outlined in SIDS- specific documents, including the Barbados Programme of Action for the Sustainable Development of SIDS (BPOA), Mauritius Strategy for the further implementation of the BPOA and the SIDS Accelerated Modalities of Action (SAMOA Pathway);

- Encouragement and promotion of the further development of regional and international synergies with other multilateral environmental agreements.

3.5.4 Promotion of Consultative Processes and Communication to Improve Public Participation in Mitigation and Adaptation Response Measures

The MWLECC through the CCD shall promote consultative processes to improve public participation in mitigation and adaptation response measures. Actions which will be explored include:

- Design and implementation of public consultation procedures in climate change-related projects and programmes;
- Engagement of the private sector in partnership to embrace climate change imperatives and to promote the development and implementation of technologies and processes that contribute to climate change adaptation and mitigation initiatives.
- Provision of different access points for the communication of information including through online information portals such as social media to the public on climate change impacts and national strategies. Special emphasis will be placed on providing information geared towards children, youth and other vulnerable groups;
- Publication of periodic reports on projected climate change impacts, observations projects, programmes and activities;
- Engagement of communities in vulnerability assessments and adaptation planning programmes that are self-orientated and self-sustaining[23] and
- Exploration of opportunities for the integration of climate change issues in the academic curriculum at all levels and engagement of children in climate change-related activities.

3.5.5 Strengthening Climate Change Governance Arrangements

The MWLECC will collaborate with relevant stakeholders at the local, national, regional and international levels to improve the governance framework related to climate change. Actions will include:

- Coordination of the development and implementation of sector strategies and action plans;
- Enhancing institutional capacity at the local and national levels to undertake coordinated, and effective adaptation and mitigation initiatives;
- Establishment of the Climate Change Department, Climate Change Focal Point Network and the Climate Change Advisory Board; and
- Proposing climate change legislation to provide a framework for the mitigation of and adaptation to climate change.

3.5.6 Develop and incorporate mechanisms and tools to mainstream climate change into ecosystem protection and land-use and physical planning

The MWLECC will collaborate with relevant stakeholders at all levels to enable mainstreaming of climate change considerations into the planning and protection of the island's ecosystems. Actions to be explored include:

- Establishing screening procedures for climate change impacts within the decision-making process for planning approval of projects (e.g. through the use of environmental impact assessments (EIAs) and risk assessment of the proposed project);
- Incorporating natural resource valuation tools and methodologies into the decision-making process for planning approval (e.g. EIA process);
- Reviewing and enforcing building codes, setback limits, standards and guidelines for developments to assist in addressing challenges such as the urban heat island effect, among others.
- Reform zoning plans including 'no-build' zones;
- Identifying and delineating vulnerable areas (including marine areas) in the formulation of a National Spatial Strategy which will utilize hazard mapping;
- Developing and implementing a National Land Use Policy and Management Plan that incorporates climate change concerns;
- Creating and conserving marine protected areas to prohibit destructive fishing practices and increase the resiliency of marine ecosystems to withstand acidification;
- Expanding and strengthening coastal monitoring and data collection to facilitate decision making;
- Promotion and facilitation of a national assessment of coastal areas and of coastal and fisheries resources at risk; and
- Identifying measures to restore coastal wetlands as a defence to storm surges.

3.6 Institutional Arrangements

There is need for greater coordination among sectors in the development and implementation of climate change related activities. Efforts to coordinate a multi-sectoral approach to responding to climate change include various initiatives by the Planning Institute of Jamaica, namely,

[23] See for example the Community Vulnerability and Adaptation (CV&A) programme developed by SIDS in the South Pacific. The model emphasizes collaboration with NGOs and other organizations who specialise in areas such as tourism, fishing and environmental issues.

mainstreaming of climate change considerations into national development planning, and the facilitation of collaboration with international development partners, *inter alia*. Other approaches include the creation of the Thematic Working Group on Hazard Risk Reduction and Adaptation to Climate Change (HRRACC) under Vision 2030 Jamaica - National Development Plan, the appointment of the Climate Change Advisory Board, establishment of the Climate Change Focal Point Network (CCFN) and community-based networks under the CCFN.

An effective response to climate change requires the development of institutional arrangements to ensure coordination, integration, monitoring and knowledge sharing across sectors and to avoid duplication of efforts. This Policy Framework outlines the institutional arrangements to respond to climate change including the institutionalization of the Climate Change Department and Focal Points in critical sectors.

i) The Environment and Risk Management Division

The Environment and Risk Management Division (ERMD) is the policy division within the MWLECC with responsibility for the periodic monitoring, review and subsequent revision of this Policy Framework, as appropriate. The Division is also responsible for formulation of the legislative framework for climate change.

ii) The Climate Change Department

The Ministry with portfolio responsibility for climate change will have responsibility to oversee and support the implementation of this Climate Change Policy Framework. A Climate Change Department (CCD), which will operate as a Division in the first phase[24] , will be established under this Ministry as the focal institution to coordinate existing and proposed initiatives in addressing climate change.

The CCD will ensure that systems, institutions, and monitoring and evaluation mechanisms are in place to address climate change as an inclusive development priority that empowers local communities and strengthen resilience, especially in the most vulnerable populations. In this regard, the CCD will, inter alia:

(i) coordinate and monitor the work of the ministries, departments, agencies involved in climate change resilience building;

(ii) facilitate the provision of technical support and guidance for the development of climate change sectoral strategies and actions plans and the mainstreaming of climate change considerations into development plans and policies;

(iii) ensure the effective communication and dissemination of information among ministries, agencies and departments as well as the general public on the current and anticipated impacts of climate change and the appropriate adaptation and mitigations measures;

(iv) coordinate the development of financial and resource mobilization strategies to finance the development and implementation of sectoral strategies and action plans and programmes;

(v) coordinate Jamaica's representation at regional and international climate change negotiations and other fora to advance the country concerns and interests;

(vi) act as the national focal point for climate change programmes and activities spearheaded by regional and inter-national bodies (e.g. Caribbean Community Climate Change Centre and the Climate Technology Centre and Network [CTCN]); and

(vii) establish a national climate change database and information system to facilitate research and inform development planning and decision-making.

Legislation will be enacted to provide the framework for climate change mitigation and adaptation. This legislation will, inter alia, institutionalize the coordinating and monitoring role of the CCD with regard to matters relating to climate change.

iii) Climate Change Focal Point Network (CCFPN)

Climate change focal points will be appointed in all ministries, selected departments and agencies and representation will be invited from civil society groups and the private sector. The focal points will be responsible for coordinating the development and implementation of their respective sectoral strategies and actions with respect to climate change, and the mainstreaming of climate change considerations into their respective policies, plans and programmes. Also, the focal points will ensure the preparation of periodic monitoring reports on these strategies and action plans to the CCD. The main sectors for the development of climate change strategies and action plans are tourism, agriculture, fisheries, forestry, water, energy, industry, human settlements and coastal resources, marine resources, human health, transportation, waste management, education, finance and disaster risk reduction and response management. At the parish level, it is anticipated that a community- based network of the CCFPN will be established and comprise, inter alia, the Chair of the respective Parish Development Committees, the Social Development Commission Officer of each parish and the Chair and at least one other member of the Association of Local Government Authorities.

The selected departments and agencies of Government to be included alongside the focal points from the ministries and the Cabinet Office to constitute the Climate Change Focal Point Network are as follows:

[24]It is anticipated that the CCD will transition into a statutory body or executive agency in the medium- to long-term

- Development Bank of Jamaica
- Fisheries Division
- Forestry Department
- Jamaica Information Service
- Meteorological Service of Jamaica
- Mines and Geology Division (MGD)
- National Environment and Planning Agency (NEPA)National Irrigation Commission
- National Solid Waste Management Authority (NSWMA)
- National Water Commission (NWC)
- National Works Agency (NWA)
- Office of Disaster Preparedness and Emergency Management (ODPEM)
- Petroleum Corporation of Jamaica (PCJ)
- Planning Institute of Jamaica (PIOJ)
- Rural Agricultural Development Authority (RADA)
- Scientific Research Council (SRC)
- Social Development Commission
- Urban Development Corporation
- Water Resources Authority (WRA)

The Ministry with portfolio responsibility for climate change and the CCD shall work with the CCFN to:

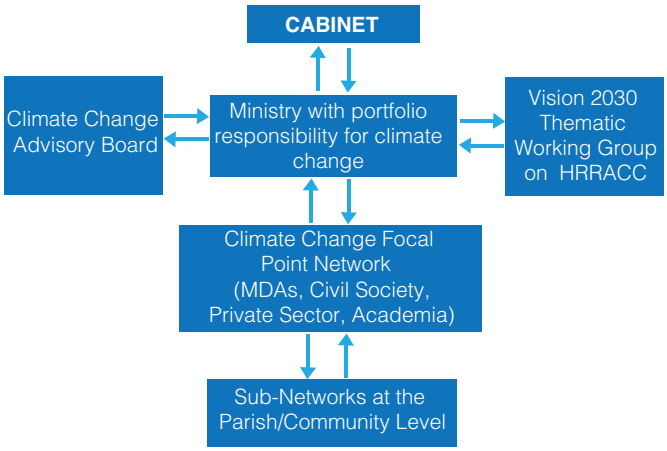
1. Develop procedures for the coordination, development and implementation of action plans and methods for evaluating the performance of approved actions;
2. Set timelines for the development of sector strategies and action plans;
3. Review and ensure the approval of the sector strategies and action plans by the respective sectors;
4. Identify and prioritize adaptation and mitigation actions in sectors;
5. Identify technological, financial, human and other resource needs of ministries, departments and agencies;
6. Develop a financial and resource mobilization strategy to fund the development and implementation of adaptation and mitigation plans. It would be important to have a portfolio of programmes and projects that can be presented to the donor community to quickly leverage the necessary technical and financial support;
7. Develop a comprehensive monitoring and evaluation framework; and
8. Coordinate the monitoring, development and implementation of cross-sectoral strategies, including the "Special Initiatives" outlined in Section 3.9.

iv) The Climate Change Advisory Board

The Climate Change Advisory Board (CCAB) shall comprise representatives of the public and private sectors, academia and non-governmental organizations appointed by the Minister with portfolio responsibility for climate change. This Board will provide a platform for the exchange of scientific and technical information on climate change and related issues of importance to Jamaica and advise the Minister and the CCD, accordingly. The CCAB will also provide recommendations to MWLECC/CCD on the possible elements of a national climate change research agenda as well as potential implementation partners.

The CCAB will meet periodically, as determined by their terms of reference. Secretariat support to the CCAB will be provided by the CCD. In addition, the membership of the Board will include ex officio officers, namely the Permanent Secretary of the Ministry with portfolio responsibility for climate change or designate and the Head of the CCD. Ad-hoc Committees of the CCAB will be established as required to address specific issues.

Figure 2. Institutional Arrangements



3.7 Policy Application

This Framework will provide guidance to all Government Ministries, Departments and Agencies, civil society, the private sector as well as the general public in addressing climate change.

3.8 Implementation

The Government of Jamaica in partnership with key stakeholders will ensure that the necessary steps are taken to achieve the fulfillment of the objectives, principles and directives of this policy framework. The Government will play a lead role in facilitating access to the necessary financial and technical support for the implementation of this policy framework, as appropriate. In addition, the CCD shall coordinate the development of sector action plans and will

collaborate with stakeholders in the implementation of these plans. These activities may be enabled by grants and other forms of financing from domestic sources, development partners and through bilateral and multilateral cooperation. The respective sector action plans will detail specific activities to be undertaken by relevant stakeholders within given timelines and will identify sources of financing for their implementation.

As part of the implementation activities, training and sensitization programmes for parliamentarians and senior public sector officers will be developed and implemented.

a) Accountability

The Ministry with portfolio responsibility for climate change will have responsibility for the monitoring and evaluation of the CCD's performance of its functions. The CCD will have administrative oversight and responsibility for climate change initiatives, including public education and awareness. All Ministries or Agencies with responsibility for implementing specific activities or programmes to address climate change shall share with the CCD all relevant information and reports necessary for the proper collaboration, coordination, integration, monitoring and evaluation of climate change initiatives, as required.

b) Monitoring and Evaluation

The CCD is responsible for the overall implementation of this *Climate Change Policy Framework for Jamaica*, including the coordination of the Ministries, Departments and Agencies in the development and execution of their respective sector action plans. Monitoring and evaluation of the implementation of the Policy Framework shall be undertaken by the MWLECC through the ERMD, in accordance with its policy role.

One of the early actions of the CCD will be the development of the monitoring and evaluation strategy that will operate at the various levels of accountability. Members of the CCFPN shall report on a quarterly basis to the MWLECC through the CCD. The MWLECC shall present to Cabinet an annual report on measures that have been undertaken by the CCD to implement this policy framework. On the fifth anniversary of the date of this policy framework, the MWLECC shall conduct a public review of this policy to evaluate its effectiveness in achieving its goals and objectives.

3.9 Special Initiatives

Recognizing the urgent need for an immediate adaptation response to the impacts of climate change and the existence of several sectoral policies and measures to address the challenges of climate change, priority Special Initiatives will be developed and implemented. These Special Initiatives are programmes comprising new initiatives and the scaling up of existing initiatives which can be implemented in the short-term while adaptation and mitigation plans are being prioritized and developed. These Initiatives will focus on addressing the impacts of climate change that are multi- sectoral in nature and will require a multi-agency approach in the implementation of actions.

The CCD will exercise oversight of the Special Initiatives using these to test its own coordinating role and the efficacy of the governance and accountability mechanisms established by this framework. The relevant Ministries with core responsibility for the Special Initiatives selected, will collaborate with the CCD and will see to the creation of a framework for each initiative. Each framework will consist of, inter alia,:

- A programme for implementation of specific actions under the initiative;
- A detailed analysis of mitigation or adaptation outcomes expected to result from the programme;
- A detailed analysis of the Special Initiative and related activities to ascertain whether or not adaptation measures are sufficiently addressed;
- A proposal for realising local sustainable development benefits, including employment, poverty alleviation, industrial development, reduction in air pollution and others; and
- An accountability framework.

The Government of Jamaica has identified an initial list of special initiatives covering both adaptation and mitigation measures.

a) Special Initiative for Water Resources Management

Water is a critical input for many sectors including energy, mining and quarrying, agriculture, manufacturing, tourism, natural resource management, urban planning and regional development, housing, and health services. Adverse impacts to water resources will also negatively impact these sectors. MWLECC, the Water Resources Authority and the National Water Commission will play the lead role in this Special Initiative to develop programmes that address water resources management including watershed protection and the scaling up of conservation programmes (e.g. rainwater harvesting).

b) Special Initiative for Low Carbon Development

Greenhouse gas emissions are strongly associated with energy systems, from which the bulk of anthropogenic GHGs are emitted. Moreover, inasmuch as high dependence on foreign energy sources across all sectors leads to an increase in

Jamaica's overall economic vulnerability, climate change mitigation, energy production and economic development are linked issues. Jamaica's National Energy Policy 2009-2030 recognises these linkages, and aspects of the implementation of the National Energy Policy constitute this Special Initiative. MSTEM will play the lead role in this Special Initiative to develop programme(s) that include the scaling up of renewable energy and energy conservation programmes.

c) Special Initiative for Disaster Risk Financing

Jamaica's susceptibility to natural disasters is a major threat to the stability of human settlements and infrastructure and vulnerable sectors including agriculture and tourism. The Ministry of Finance and Planning will play the lead role in this Special Initiative to develop a financial strategy, which reduces the country's fiscal vulnerability to the occurrence of events related to climate change. The Ministry will evaluate different measures such as disaster risk financing and micro-insurance.

d) Special Initiative for Ecosystem Protection

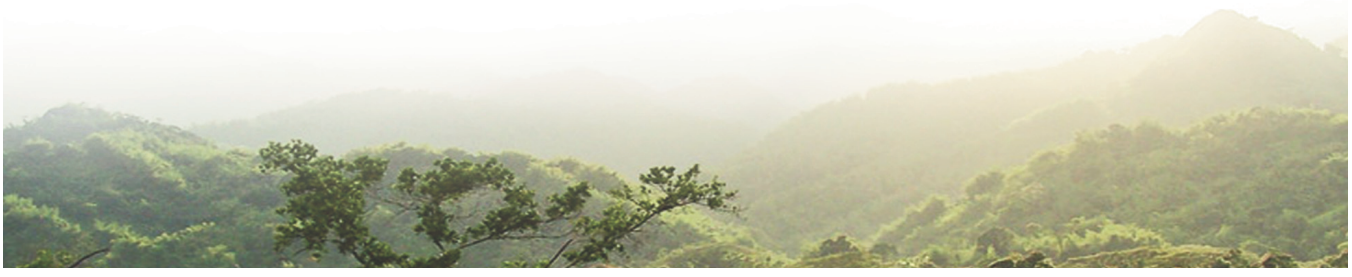
The MWLECC in collaboration with the key public sector agencies and civil society will strengthen the legal and policy frameworks to ensure ecosystem protection and resilience of the natural environment which are key to adapting to climate change.

e) Special Initiative for Land Use Planning

The MWLECC will play the lead role in this Special Initiative to rationalize land use planning and development processes including preparing a National Spatial Strategy and enacting regulations for Environmental Impact Assessments of proposed developments.

f) Special Initiative for Communication

The MWLECC will undertake the implementation of a broad-based communication strategy to educate all levels of the Jamaican society, with the emphasis on the youth and vulnerable populations, that the climate is changing and will continue to change and to articulate the impacts of climate change, and society's role in climate change adaptation and mitigation.



ANNEX A

KEY POLICY IMPLEMENTATION ACTIONS

STRATEGY	ACTION	TIMELINE				
		1	2	3	4	5
Development of a Monitoring and Evaluation Plan	Develop a strategic set of indicators,	x				
	Develop process for information gathering	x				
	Develop formats and system for reporting	x				
Development and Implementation of a Climate Financing Strategy	Undertake an assessment of financing requirements for key sectors and prioritize accordingly	x				
	Identify and facilitate access to climate financing from national regional and international sources to respond to prioritized needs (project concepts/proposals)		x	x	x	x
	Develop monitoring tools for tracking climate financing across sectors		x	x	x	x
	Establish and operationalize the national climate fund		x	x	x	x
	Promote the climate financing strategy among key partners		x	x	x	x
Develop sectoral strategies and action plans	Convene meetings with sector groups to identify, address, evaluate and prioritize adaptation and mitigation actions by sector including cross-sectoral issues.	x				
Develop Research, Technology, Training and Knowledge Management	Establish and update of the National Climate Change Database and information system within the Ministry with portfolio responsibility for climate change		x	x	x	x
	Improve the systems for impact modeling and assessment tools (observations and research) for climate change impacts		x	x	x	x
	Undertake assessment of the most appropriate mitigation actions per sector.		x			
	Provide training opportunities for academic, scientific, technical and managerial personnel within public, private and academic institutions	x	x	x	x	x
	Undertake assessment of technological needs for adaptation and mitigation strategies.		x	x	x	x

KEY POLICY IMPLEMENTATION ACTIONS *CONT'D.*

STRATEGY	ACTION	TIMELINE				
		1	2	3	4	5
Regional and international engagement and participation	Support active and effective participation in all regional and international climate change fora	x	x	x	x	x
	Seek regional and international financing, capacity building and technology transfer mechanisms that provide support for climate change adaptation and mitigation actions.	x	x	x	x	x
	Engage in climate change activities and programmes established by regional and international bodies	x	x	x	x	x
	Implement the strategies and actions for climate change as outlined in SIDS specific documents		x	x	x	x
	Encourage and promote the further development of regional and international synergies with other multilateral environmental agreements.		x	x	x	x
Promotion of consultative processes and communication to improve public participation in mitigation and adaptation response measures	Design and implement a communication strategy to increase public awareness and understanding of significance of Climate Change and the measures which must be undertaken to mitigate and adapt for greater resilience.		x	x	x	x
	Publish annual reports on projected climate change impacts, observations projects, programmes and activities.	x	x	x	x	x
	Engage communities in vulnerability assessments and adaptation planning programmes that are self-orientated and self-sustaining.		x	x	x	x
	Explore opportunities for the integration of climate change issues in the academic curriculum at all levels.			x	x	x

KEY POLICY IMPLEMENTATION ACTIONS *CONT'D.*

STRATEGY	ACTION	TIMELINE				
		1	2	3	4	5
Strengthening Climate Change Governance Frameworks	Develop and implement sector action plans.	x	x	x	x	x
	Enhance institutional capacity at the local and national levels to undertake coordinated and effective adaptation and mitigation initiatives		x			
	Establish the Climate Change Department, Climate Change Focal Point Network and the Climate Change Advisory Board	x				
	Enact climate change legislation to provide a framework for the mitigation of and adaptation to climate change			x	x	

ANNEX B

CONSULTATION PROCESS

The Government of Jamaica approved the Green Paper on the Climate Change Policy Framework and Action Plan (Green Paper No.1/2013) in November 2013. The draft policy was developed through funding received from the European Commission and the Global Climate Change Alliance (GCCA) to implement the Climate Change Adaptation and Disaster Risk Reduction Project. The objective of the project included the finalization of Jamaica's Climate Change Policy Framework and Action Plan.

In accordance with the Cabinet Guidelines for Policy Documents a series of island wide public consultations were undertaken in 2012 to inform the development of the draft policy and again in 2014 on the Green Paper, following approval in the Houses of Parliament in November 2013.

Consultation during the development of the draft policy

A stakeholder consultation "Climate Change Workshop: Toward the Development of a Policy Framework for Jamaica" was held in Kingston on July 26 and 27, 2012, organized by MWLECC and the United States Agency for International Development (USAID). Representatives from ministries, agencies, and other entities within the Government of Jamaica; NGOs; academia; the private sector; and international development partners attended. Following this workshop, a series of three island wide stakeholder consultations were undertaken under the CCADR project in the parishes of Kingston and St. Andrew, Manchester and St. James during the period October 30 – November 2, 2012 to garner input from stakeholders to contribute to the development of the climate change policy and action plan.

Consultations on Green Paper 1/2013

The draft Climate Change Policy Framework and Action Plan was approved by the Cabinet in September, 2013 and tabled in The Houses of Parliament in November, 2013. Public consultations were held on the Green Paper during the period February 14 – 20, 2014. In addition, consultations were convened with the Vision 2030 Thematic Working Groups on Hazard Risk Reduction and Adaptation to Climate Change, Environment and Planning, and Tourism in March 2014. Based on feedback from the public consultations on the Green Paper, the Ministry adjusted its strategy and decided that instead of preparing a Climate Change Policy Framework and Action Plan, the Action Plan would be removed and detailed sector action plans would be prepared by the MWLECC in collaboration with the relevant stakeholders.

Objective

The objective of the public consultations was to obtain and record input from relevant stakeholders including the public and private sectors, Non-Governmental Organizations, Civil Society and the general public on the Climate Change Policy Framework and Action Plan (Green Paper No. 1/2013). A synthesis report of comments and recommendations received as a result of the consultations contributed to the amendments to the Green Paper.

Methodology

Four public meetings were held during the period February 14 – 20, 2014 on the Draft Policy. The attendance of stakeholders was facilitated by the chartering of buses to transport participants from nearby parishes to the meetings.

DATE	PUBLIC MEETING
February 14, 2014	St. Mary Parish Church Hall, Port Maria, St. Mary (St. Mary, St. Ann, Portland)
February 18, 2014	Sharon Baptist Church Hall, Santa Cruz, St. Elizabeth (St. Elizabeth, Manchester, Clarendon)
February 19, 2014	Wexford Court Hotel, Montego Bay, St. James (Hanover, Westmoreland, St. James, Trelawny)

Notification and access to the draft policy

The Green Paper was published on websites for the Government Agencies and hard copies deposited at various locations island-wide.

1. Parish Libraries
2. Parish Councils
3. The National Association of Parish Development Committees
4. Jamaica Institute for Environmental Professionals (JIEP)
5. Best Communities Competition secretariat
6. Jamaica Hotel and Tourist Association

Websites

www.mwlecc.gov.jm (Ministry of Water, Land, Environment and Climate Change)
www.nepa.gov.jm (National Environment and Planning Agency)

Participants were invited to submit any additional comments in writing to the Ministry of Water, Land, Environment and Climate Change by the end of February 2014. A record of the public meetings was published on the website for MWLECC.

Government Consultations

The government convened public consultations on the Green Paper as follows:

PUBLIC MEETINGS
St. Mary Parish Church Hall, Port Maria, St. Mary (February 14, 2014)
Sharon Baptist Church Hall, Santa Cruz, St. Elizabeth (February 18, 2014)
Wexford Court Hotel, Montego Bay, St. James (February 19, 2014)
Pegasus Hotel, Kingston and St. Andrew (February 20, 2014)

GLOSSARY AND DEFINITIONS

Acidification (ocean)

A decrease in the pH of sea water due to the uptake of anthropogenic carbon dioxide, nitrous oxides and sulfur oxides.

Adaptation (to climate change) IPCC 2007

Adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities.

Agro-climatic conditions

The relation of growth rate and yields of agricultural crops to various climate conditions

Best Science

The most appropriate, adaptable and current technologies, processes and methodologies, which also include community knowledge and practice

Carbon abatement

Reduction of the amount of carbon dioxide that is produced when fossil fuels are burned

Carbon dioxide *IPCC 2007*

'A naturally occurring gas, and also a by-product of burning fossil fuels and biomass, as well as land-use changes and other industrial processes. It is the principal anthropogenic greenhouse gas that affects the Earth's radiative balance. It is the reference gas against which other greenhouse gases are measured and therefore has a Global Warming Potential of 1'

Carbon Market

A trading system through which countries may buy or sell units of greenhouse-gas emissions in an effort to meet their national limits on emissions, either under the Kyoto Protocol or under other agreements, such as that among member states of the European Union.

Clean development mechanism

A mechanism under the Kyoto Protocol to the United Nations Framework Convention on Climate Change to assist developing countries which are Parties to the Protocol in achieving sustainable development, and to assist developed countries which are Parties in achieving compliance with their quantified emission limitation and reduction commitments under the Protocol.

Climate

The long-term average weather of a region, including typical weather patterns, the frequency and intensity of storms, cold spells and heat waves.

Climate change *UNFCCC*

A change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and is in addition to natural climate variability observed over comparable time periods.

Climate departure *University of Hawaii Manoa 2013*

The year past which the annual (or monthly) average value for a climate variable, such as surface temperature, moves and stays outside of the range of historical annual (or monthly) means.

Climate variability *IPCC 2007*

Climate variability refers to variations in the mean state and other statistics (such as standard deviations, the occurrence of extremes, etc.) of the climate on all spatial and temporal scales beyond that of individual weather events.

Variability may be due to natural internal processes within the climate system (internal variability), or to variations in natural or anthropogenic external forcing (external variability).

Coastal erosion

A long-term trend of shoreline retreat and/or loss of beach sediment volume over several decades.

Coral bleaching *IPCC 2007*

The paling in colour which results if a coral loses its symbiotic, energy-providing organisms (micro algae –zooxanthellae).

El Nino

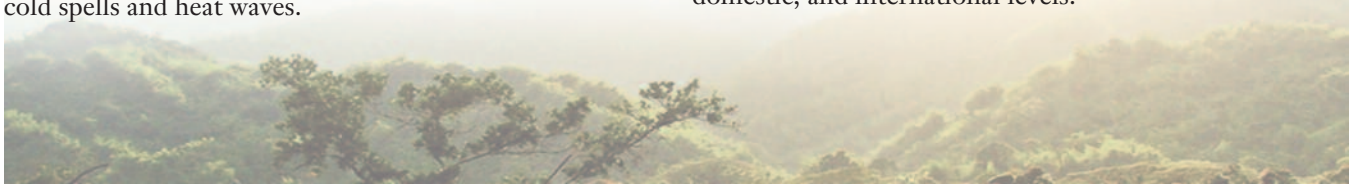
El Niño conditions refer to periods when the eastern Pacific Ocean off the coast of Peru and Ecuador is abnormally warm. (La Niña refers to the opposite conditions when the eastern Pacific Ocean is abnormally cold.) During an El Niño event, the Caribbean (and Jamaica by extension) tends to be drier than usual. There is also a tendency for reduced hurricane activity during El Niño events.

Emissions

The release of substances (e.g. greenhouse gases) into the atmosphere

Emissions trading *IPCC 2007*

A market-based approach to achieving environmental objectives. It allows those reducing greenhouse gas emissions below their emission cap to use or trade the excess reductions to offset emissions at another source inside or outside the country. In general, trading can occur at the intra-company, domestic, and international levels.



Energy efficiency

Reducing the amount of energy used for a given service or level of activity in order to produce the same level of end-use service.

Fossil fuels

Hydrocarbons such as coal, oil and gas, formed from the organic remains of prehistoric plants and animals

Greenhouse gases *IPCC 2007*

'Greenhouse gases are those gaseous constituents of the atmosphere, both natural and anthropogenic, that absorb and emit radiation at specific wavelengths within the spectrum of infrared radiation emitted by the Earth's surface, the atmosphere and clouds. This property causes the greenhouse effect. Water vapour (H2O), carbon dioxide (CO2), nitrous oxide (N2O), methane (CH4) and ozone (O3) are the primary greenhouse gases in the earth's atmosphere. Moreover, there are a number of entirely manmade greenhouse gases in the atmosphere, such as the halocarbons and other chlorine and bromine-containing substances, dealt with under the Montreal Protocol. Besides carbon dioxide, nitrous oxide and methane, the Kyoto Protocol deals with the greenhouse gases sulphur hexafluoride, hydrofluorocarbons, and perfluorocarbons.'

Inter-generational equity

Resources and assets which do not 'belong' to any generation but are to be administered and preserved in trust for all future generations.

Inter-governmental Panel on Climate Change (IPCC)

The IPCC surveys world-wide scientific and technical literature and publishes assessment reports that are widely recognised as the most credible existing sources of information on climate change. The IPCC also works on methodologies and responds to specific requests from the UNFCCC's subsidiary bodies. The IPCC is independent of the Convention.

Kyoto Protocol

The Kyoto Protocol is an international agreement linked to the United Nations Framework Convention on Climate Change, which commits its Parties by setting internationally binding emission reduction targets. Recognizing that developed countries are principally responsible for the current high levels of GHG emissions in the atmosphere as a result of more than 150 years of industrial activity, the Protocol places a heavier burden on developed nations under the principle of "common but differentiated responsibilities."

Mitigation *IPCC 2007*

In the context of climate change, a human intervention to reduce the sources or enhance the sinks of greenhouse gases. Examples include using fossil fuels more efficiently for industrial processes or electricity generation, switching to solar energy or wind power, improving the insulation of buildings, and expanding forests and other 'sinks' to remove greater amounts of carbon dioxide from the atmosphere.

Natural disaster

Any event or force of nature that has catastrophic consequences, such as an earthquake, a flood, forest fire, hurricane, lightning, tornado, tsunami, or volcanic eruption.

No-regrets mitigation

Mitigation actions that reduce greenhouse gas emissions and generate direct or indirect benefits that are large enough to offset the costs of implementing the mitigation actions, resulting in negative net mitigation costs.

Polluter Pays Principle

An environmental policy principle that requires that the costs of pollution be borne by those who cause it and that the burden of proof in demonstrating that a particular technology, practice or product is safe will lie with the developer.

Precautionary approach

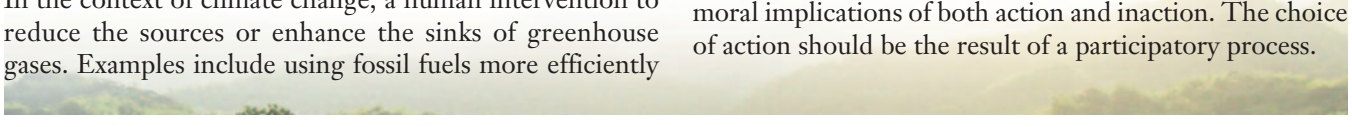
Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation.

The Precautionary Principle is defined as follows:
When human activities may lead to morally unacceptable harm that is scientifically plausible but uncertain, actions shall be taken to avoid or diminish that harm. Morally unacceptable harm refers to harm to humans or the environment that is

- threatening to human life or health, or
- serious and effectively irreversible, or
- inequitable to present or future generations, or
- imposed without adequate consideration of the human rights of those affected.

The judgement of plausibility should be grounded in scientific analysis. Analysis should be ongoing so that chosen actions are subject to review. Uncertainty may apply to, but need not be limited to, causality or the bounds of the possible harm.

Actions are interventions that are undertaken before harm occurs that seek to avoid or diminish the harm. Actions should be chosen that are proportional to the seriousness of the potential harm, with consideration of their positive and negative consequences, and with an assessment of the moral implications of both action and inaction. The choice of action should be the result of a participatory process.



Reforestation

'The direct human-induced conversion of non-forested land to forested land through planting, seeding and/or the human-induced promotion of natural seed sources, on land that was forested but that has been converted to non-forested land.

Renewable energy

Is obtained from the continuing or repetitive currents of energy occurring in the natural environment and includes non-carbon technologies such as solar energy, hydropower, wind, tide and waves and geothermal heat, as well as carbon-neutral technologies such as biomass.

Resilience

The ability of a social or ecological system to absorb disturbances while retaining the same basic structure and ways of functioning, the capacity for self-organization, and the capacity to adapt to stress and change.

Sea level rise *IPCC 2007*

Sea level can change, both globally and locally, due to (i) changes in the shape of the ocean basins, (ii) changes in the total mass of water and (iii) changes in water density. Factors leading to sea level rise under global warming include both increases in the total mass of water from the melting of land-based snow and ice, and changes in water density from an increase in ocean water temperatures and salinity changes. Relative sea level rise occurs where there is a local increase in the level of the ocean relative to the land, which might be due to ocean rise and/or land level subsidence.

Sequestration

Carbon storage in terrestrial or marine reservoirs. Biological sequestration includes direct removal of CO2 from the atmosphere through land-use change, afforestation, reforestation, carbon storage in landfills and practices that enhance soil carbon in agriculture.

Sink *IPCC 2007*

Any process, activity or mechanism that removes a greenhouse gas, an aerosol or a precursor of a greenhouse gas or aerosol from the atmosphere.

Storm surge *IPCC 2007*

The temporary increase, at a particular locality, in the height of the sea due to extreme meteorological conditions (low atmospheric pressure and/or strong winds). The storm surge is defined as being the excess above the level expected from the tidal variation alone at that time and place.

Sustainable development

Development that meets the needs of the present without compromising the ability of future generations to meet their own needs.

Urban heat island

An urban area with significantly higher temperatures than surrounding areas due to anthropogenic activities.

Vector borne diseases

Diseases that result from an infection transmitted to humans and other animals by blood-feeding arthropods, such as mosquitoes, ticks, and fleas. Examples of vector-borne diseases are dengue fever, viral encephalitis, lyme disease and malaria.

Vulnerability *IPCC 2007*

The degree to which a system is susceptible to, or unable to cope with, adverse effects of climate change, including climate variability and extremes. Vulnerability is a function of the character, magnitude, and rate of climate variation to which a system is exposed, its sensitivity, and its adaptive capacity.

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ABBREVIATIONS AND ACRONYMS

AOSIS	Alliance of Small Island States
CCCCC	Caribbean Community Climate Change Centre
CDM	Clean Development Mechanism
CCD	Climate Change Division
CH4	Methane
CO2	Carbon dioxide
EIA	Environmental Impact Assessment
EU	European Union
GDP	Gross Domestic Product
GHG	Greenhouse Gas
GoJ	Government of Jamaica
IPCC	Intergovernmental Panel on Climate Change
Met Office	Meteorological Service of Jamaica
MLGCD	Ministry of Local Government and Community Development
MOAF	Ministry of Agriculture and Fisheries
MOE	Ministry of Education
MOFP	Ministry of Finance and Planning
MOH	Ministry of Health
MIIC	Ministry of Industry, Investment and Commerce
MOTE	Ministry of Tourism and Entertainment
MSTEM	Ministry of Science, Technology, Energy and Mining
MTWH	Ministry of Transport, Works and Housing
MWLECC	Ministry of Water, Land, Environment and Climate Change
N2O	Nitrous Oxide
NAMAs	Nationally Appropriate Mitigation Actions
NEPA	National Environment and Planning Agency
NGO	Non-governmental Organisation
NSWMA	National Solid Waste Management Authority
NWC	National Water Commission
NWA	National Works Agency
ODPEM	Office of Disaster Preparedness and Emergency Management
PCJ	Petroleum Corporation of Jamaica
PIOJ	Planning Institute of Jamaica
RADA	Rural Agricultural Development Authority
REDD+	Reducing Emissions from Deforestation and forest Degradation
SAMOA	Small Island Developing States Accelerated Modalities of Action
SIDS	Small Island Developing State
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
USAID	United States Agency for International Development

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