7.0 Guyana

CARICOM	Caribbean Community
CCCCC	Caribbean Community Climate Change Center
ENSO	El Niño Southern Oscillation
EU	European Union
GEF	Global Environment Facility
IADB	Inter-American Development Bank
OAS	Organization of American States
RIOCC	Red Iberoamericana de Oficinas de Cambio Climático (Ibero-American Network of Climate Change Offices)
SCCF	Special Climate Change Fund
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
USDS	United States Department of State

A. Adaptation Needs and Priorities

Guyana's current climate is highly influenced by the El Niño Southern Oscillation. In its El Niño phase, ENSO provokes dry periods throughout the year and higher temperatures in July and August, whereas its La Niña phase leads to the opposite situation. Over the last century observed climatic changes have occurred in Guyana, such as an increasing temperature trend of an estimated 0.07°C per decade since 1960. In addition, rainfall has increased at an average rate of 4.8 millimeter per month per decade since 1960, but trends in seasonal rainfall are not statistically significant (UNDP Oxford 2010). It is estimated that the mean annual temperature in Guyana will increase by 0.9° to 3.3°C by the 2060s. On the other hand, projections for rainfall are very uncertain but suggest slightly negative ensemble median changes for both the 2060s and the 2090s. Disagreement over changes in future El Niño conditions adds to the uncertainty of surrounding these precipitation projections. Sea level rise in the region could be anywhere between 0.18 and 0.56 meters by the 2090s, compared to the 1980 to 1999 average level, according to different scenarios (UNDP Oxford 2010).

Guyana's First National Communication to the United Nations Framework Convention on Climate Change (UNFCCC) (Guyana, 2002) and its supplement, the Climate Change Action Plan (Guyana, 2001), identify coastal zones, agriculture, fisheries, water, energy, forestry

and land use, and waste as both important in socio-economic terms and vulnerable to climate variability and change. Priority actions identified in these documents include:

- *Coastal zones:* Inventory coastal assets and monitor changes; ocean current and vulnerability studies; fortification and use of building set-backs; shore protection and beach nourishment procedures; initiate an integrated coastal zone management program; and studies on the impacts of sea level rise for various sectors and for cities.
- *Agriculture and fisheries:* Change crops, varieties and possibly practices; improve farm-level management and productivity; identify inland areas for new large-scale agricultural areas; move crops away from the coastal zone; promote aquaculture; change export market policies; transfer of appropriate technologies; introduce new species and crops; pest control for crops; mainstream climate change into poverty alleviation program; and impact surveys and studies.
- *Water:* Water conservation, monitoring and inventory of water availability; more efficient use in agriculture and energy production; increase availability through rainwater collection, building wells inland, expanding water storage capacity, and putting stricter controls and improve management of the supply network; drainage re-use, artificial recharge of reservoirs from rivers, and removing sediments and weeds; encourage growth of low water use crops, high value per water use crops, and salt-tolerant crops and fish species; relocate fishing ponds; reduce evaporation from reservoirs; adjust energy production to balance with other uses; and closing plants during low flow times.
- *Energy:* Promote conservation techniques; fuel efficient equipment and buildings; efficient transportation; alternative power sources such as hydropower; co-generation; and wind, solar, ocean thermal and wave energy.
- *Forestry and land-use:* Introduce sustainable logging practices; forest fire protection; agro-forestry/reforestation/afforestation of commercially important species in areas likely to favor growth as a result of a shift in vegetation zones due to climate change; use previously cleared forests for human settlements; promote settlements, industry and agriculture in selected regions of the interior; and detailed studies on climate and environment.
- *Waste:* Improved water disposal management plans, managed waste sites, waste reduction measures, sewage treatment and wastewater recycling.

In addition, Guyana's Low-carbon Development Strategy (Guyana, 2010) mentions adaptation as a priority and suggests the following key measures:

- Upgrading infrastructure and assets to protect against flooding through urgent, near-term measures (such as upgrading and maintaining drainage systems, building ocean seawalls, improving sanitation and water and flood-proofing health clinics).

- Addressing systematic and behavioral concerns (such as by strengthening building codes, early warning systems and emergency response system).
- Developing financial and risk insurance measures to boost resiliency post-flooding.
- Switching to flood resistant crops.
- Establishing the climate change adaptation needs of Guyana's hinterland regions, including forest communities.
- In the longer term, further upgrading of flood protection, seawalls and expansion of drainage and irrigation is proposed.

A National Adaptation Strategy to Address Climate Change in the Agriculture Sector (CCCCC, 2009) has also been established. It lists adaptation actions for the agricultural sector that include technical and institutional capacity enhancement, infrastructure measures, policy and legislation changes, research and development, and awareness building and communication.

B. National Level Policies and Strategic Documents

Guyana has completed one National Communication so far, which was supplemented by a Climate Change Action Plan. Both documents identify largely coinciding adaptation measures for a number of sectors, but give little indication as to how these measures will be implemented or incentivized. Also, Guyana's National Development Strategy for 2001 to 2010 (Guyana, 2000) does not mention adaptation to climate change. Recently, however, a comprehensive low-carbon development strategy (Guyana, 2010) has been elaborated. Within it, adaptation is one of eight priorities, and specific short-term projects as well as longer term priorities are set out. It is proposed that the measures will be funded through Fast Track finance in the coming years (up to 2020) and mitigation finance for forests as soon as the respective mechanisms are operational. Additionally, Guyana has a National Climate Change Adaptation Policy (Khan, 2001) focusing on adaptation in its low-lying coastal areas. It is unclear the extent to which this policy has been implemented.

Finally, National Adaptation Strategy to Address Climate Change in the Agriculture Sector was elaborated through a Guyana's participation in a regional adaptation project (CCCCC, 2009). As previously noted, the strategy proposes capacity enhancements, infrastructure improvements, changes in policies and legislation, promotion of research and development and awareness building and communication measures.

Within Guyana the key authorities for climate change are the National Climate Change Committee and the Office of Climate Change, headed by a presidential adviser. Regionally, Guyana is a member of the Caribbean Community (CARICOM) and its Climate Change Center (CCCCC), and has been involved in its recent regional projects.

Table 1: Key Government Policies and Reports reflecting Adaptation Needs, Priorities and Planned Actions

Name of Policy Action		Government Division Responsible	Status	Sector(s) of Focus	Summary description
1.	Guyana Initial National Communication to the UNFCCC	National Climate Change Committee, Natural Resources and Environment Advisory Committee	Published in 2002	Multi-sectoral	Guyana's First National Communication contains climate conditions and projections, vulnerability assessments for various sectors, and an adaptation section with proposed measures for coastal zones.
2.	Guyana Climate Change Action Plan	National Climate Change Committee, Natural Resources and Environment Advisory Committee	Published in 2001	Multi-sectoral	The Climate Change Action Plan, a supplement to the First National Communication, identifies adaptation measures as one of nine program areas, and lists such measures for priority sectors. It also links the climate change agenda to the national development plan and sets out guidelines for elaborating climate change legislation.
3.	National Climate Change Adaptation Policy and Implementation Plan	National Ozone Action Unit of Guyana / Hydrometeorological Service	Published in 2001	Coastal zone management	This document was elaborated as part of a CCCCC project. It complements the above two with a more detailed focus on coastal low-lands. It lays out the foundation for a national policy.
4.	National Agricultural Sector Adaptation Strategy to Address Climate Change (2009-2018)	various	Published in 2009	Agriculture	The strategy was elaborated as part of the Mainstreaming Adaptation to Climate Change: Caribbean Community (MACC) project (see below). Its goal is to reduce the risks posed by climate change and position the agricultural sector to adapt through technical innovation and diversification to increase its competitiveness and sustainability by 2018.
5.	Low-Carbon Development Strategy	Office of the President	Third draft published in 2010	Ecosystem conservation; Forestry	The strategy sets out a path for low-carbon, low-deforestation and climate-resilient development. The document mainly deals with forests and mitigation, but also addresses adaptation and announces a Priority Adaptation Plan for the third quarter of 2010.

C. Current Adaptation Action

Guyana has participated in a series of capacity building projects implemented by CCCCC, through which adaptation strategies and plans for both its coastal areas and agriculture sector were developed. At present, its relatively low level of current adaptation programming supports efforts in the sectors of disaster risk management, coastal zone management, freshwater supply, watershed management and enhancing the capacity of government to support adaptation to climate change. Gaps in programming appear to exist in relation to human health and gender. The majority of programming is taking place through Guyana's participation in regional and global initiatives.

Examples of ongoing national projects include: the research focused project "Measurement of Climate Change Impacts and Ecosystem Services in Iwokrama," which provides a better foundation for adaptation measures in the areas of biodiversity and forests; and the "Conservancy Adaptation Project," one of the first projects to be financed by the Special Climate Change Fund. The project sought to improve coastal drainage capacity in East Demerara. There are also some community-based adaptation activities, such as the U.S. Peace Corps program to increase awareness and knowledge on adaptation and to implement specific local-level measures related to energy production.

Table 2: Current Adaptation Action in Guyana

Name		Objectives	Funder(s)	Implementing Agency(s)	Type of project	Duration	Priority Sector(s)	Geographic focus (if any)
National Action								
1.	Conservancy Adaptation Project[190]	The goal is to help the Government of Guyana reduce the country's vulnerability to flooding by: improving the overall discharging capacity of the East Demerara Conservancy (flood protection) during rainfall; and counteracting the effects of sea level rise by widening of key drainage relief canals, improving water flow system within the conservancy, as well as to upgrade water control structures, selected equipment purchase and installation.	SCCF, co-financing *Budget:* US$20 million	World Bank, Ministry of Agriculture	Assessment; Field implementation	2007–2011 (closed)	Disaster risk management	East Demerara
2.	Measurement of Climate Change Impacts and	This project is designed to formulate a new science program at Iwokrama which will	IADB, co-financing	IADB	Research; Field	2009 - ?	Forestry; Ecosystem	Iwokrama Forest

[190] GEF, http://gefonline.org/projectDetailsSQL.cfm?projID=3227

Name		Objectives	Funder(s)	Implementing Agency(s)	Type of project	Duration	Priority Sector(s)	Geographic focus (if any)
	Ecosystem Services in Iwokrama[191]	provide a series of studies, coordinated by a new resident scientist. The project will contribute to the provision of eco-system services, including carbon, watershed service and biodiversity. Key element of the project is to implement field works and carry out the analysis and modeling on climate change.	*Budget:* US$286,500		implementation		conservation	
Participation in Regional and Global Actions								
3.	Mainstreaming Adaptation to Climate Change: Caribbean Community (MACC)[192]	The objective of the MACC project is to facilitate an enabling environment for climate change adaptation in the Caribbean Community small islands and coastal developing states participating in this effort. Project components aimed to: (1) build regional capacity to collect and analyze data, thus expand the knowledge base on climate change impacts in order to assess the associated physical and socioeconomic vulnerabilities; (2) build in-country capacity to formulate and analyze adaptation policy options and finalize sectoral adaptation strategies for participating countries; (3) build capacity in preparation for a regional position for the United Nations Framework Convention on Climate Change; and (4) support public education and outreach programs by strengthening information access and data resources, and foster public awareness through technical assistance and capacity building.	GEF Trust Fund; co-financing *Budget:* US$16 million	CCCCC, CARICOM, World Bank, Government of Canada, GEF, Government of US	Capacity building; Knowledge communication; Policy formation and integration	2003–2009 (closed)	Government	*LAC Region:* Antigua and Barbuda, Bahamas, Barbados, Belize, Dominica, Grenada, Guyana, Jamaica, St. Kitts and Nevis, Saint Lucia, St. Vincent and the Grenadines, Trinidad and Tobago
			In Guyana: Among other things, a vulnerability and adaptation assessment was conducted in the agricultural sector, and an adaptation strategy was elaborated for this sector.					

[191] IADB, http://www.iadb.org/en/projects/project,1303.html?id=GY-T1069
[192] GEF, http://www.gefonline.org/projectDetailsSQL.cfm?projID=1084 and CCCCC, http://caribbeanclimate.bz/projects/projects.html

Name		Objectives	Funder(s)	Implementing Agency(s)	Type of project	Duration	Priority Sector(s)	Geographic focus (if any)
4.	Integrated and Sustainable Management of Transboundary Water Resources in the Amazon River Basin Considering Climate Variability and Change [193]	To strengthen, in a coordinated and coherent manner, the institutional framework for planning and executing activities for the protection and sustainable management of the water resources of the Amazon River Basin, endeavoring to realize a shared vision of sustainable development in the region based upon the protection and integrated management of transboundary water resources and adaptation to climatic changes.	GEF, co-financing *Budget:* US$ 51.5 million	UNEP, Amazon Cooperation Treaty Organization, OAS	Capacity building; Policy formation and integration	2009–2014	Watershed management	*Regional:* Bolivia, Brazil, Colombia, Ecuador, Guyana, Peru, Suriname, Venezuela
			In Guyana: Further information required.					
5.	Peace Corps Renewable Energy and Climate Change Initiative[194]	Across the Americas the Peace Corps will, among other things, increase municipal, school and communities' awareness and knowledge of climate change (including adaptation) and support community-led projects, including on adaptation.	United States Department of State (USDS)	U.S. Peace Corps, USDS	Community based adaptation; Knowledge communication	Ongoing	Energy	*LAC Region:* Costa Rica, Dominican Republic, El Salvador, Guatemala, Guyana, Honduras, Nicaragua, Panama, Paraguay, Peru, Suriname
			In Guyana: Further information required.					
6.	Global Climate Change Alliance[195]	The Global Climate Change Alliance seeks to deepen the policy dialogue between the European Union and developing countries on	European Commission, Czech	National Governments	Policy formation and implementati	2008–ongoing	Disaster risk management; Government	*Global:* 17 countries and the

[193] IW-LEARN, http://iwlearn.net/iw-projects/Fsp_112799471058 and http://www.otca.org.br/gefam/
[194] ECPA, http://www.ecpamericas.org/initiatives/default.aspx?id=35
[195] GCCA, http://www.gcca.eu/pages/1_2-Home.html

Name		Objectives	Funder(s)	Implementing Agency(s)	Type of project	Duration	Priority Sector(s)	Geographic focus (if any)
		climate change; and to increase support to target countries to implement priority adaptation and mitigation measures, and integration climate change into their development strategies. The program's five priority areas for funding are: improving the knowledge base of developing countries to the effects of climate change; promoting disaster risk reduction; mainstreaming climate change into poverty reduction development strategies; reducing emissions from deforestation and degradation; and enhancing participation in the Clean Development Mechanism.	Republic, Sweden, 10th European Development Fund *Budget:* € 140 million		on; Knowledge communication			Pacific region,[196] including: Jamaica
			In Guyana: Focused on mangrove restoration, the objective of the project is to abate climate change (carbon sequestration) and mitigate its effects (sea defense, biodiversity); rehabilitate mangrove fields; map mangroves for better monitoring; mainstream mangrove issues into the Forest Plan; raise awareness in the general public and nearby local communities. *Duration:* 2010–2014 *Focus area(s):* mangrove management and public awareness raising *Budget:* Euros 4.2 million *Implementing partners:* Ministry of Agriculture, Sea Defenses Division of WSG, Guyana Forestry Commission, Environmental Protection Agency, University of Guyana and Honey Producers Association.[197]					
7.	Preparedness for Climate Change[198]	The aim of this program was for the Red Cross and Red Crescent National Societies in countries particularly vulnerable to climate change to gain a better understanding of climate change and its impacts to identify country-specific adaptation measures in line with risks. Activities could include organizing a workshop on risks, assessment of risks through preparation of a background document, capacity building programs, and	Red Cross/Red Crescent Climate Centre	National Red Cross/Red Crescent Societies	Capacity building; Policy formation and integration	Phase 1: 2006–2009 Phase 2: ongoing	Disaster risk management	Global project: 39 countries *South American participants in Phase 1:* Argentina Bolivia

[196] These countries are Bangladesh, Belize, Cambodia, Ethiopia, Gambia, Guyana, Jamaica, Malawi, Maldives, Mali, Mauritius, Mozambique, Nepal, Pacific region, Rwanda, Senegal, Seychelles, Sierra Leone, Solomon Islands, Tanzania and Vanuatu.
[197] GCCA, http://www.gcca.eu/usr//GUYANA_FICHE.pdf
[198] IFRC, http://www.climatecentre.org/site/preparedness-for-climate-change-programme

Name		Objectives	Funder(s)	Implementing Agency(s)	Type of project	Duration	Priority Sector(s)	Geographic focus (if any)
		developing climate change resilient plans.						Colombia Guyana
			In Guyana: To be confirmed					

D. Proposed Adaptation Action

There are two documents among Guyana's polices and strategies that list specific adaptation actions, including budgets, timelines and potential funding sources. The National Adaptation Strategy for Agriculture (CCCCC, 2009) proposes 52 actions for the agricultural sector, ranging from infrastructure measures to communication. Further, Guyana's Low-carbon Development Strategy (Guyana, 2010) proposes a series of larger programs dealing with: coastal infrastructure; water and agriculture in the hinterland; early warning systems and emergency response; financial instruments; and agricultural research and technology. These measures are projected to cost around US$400 million and are expected to be funded through Fast Track Funding (2010 to 2012) and 2013 to 2020 financing commitments contained in the 2009 Copenhagen Accord (Guyana, 2010).

Table 3: Proposed Adaptation Actions in Guyana

Name		Objectives	Type of project	Priority Sector(s)	Geographic focus (if any)
1.	Recommended Actions in the National Adaptation Strategy to Address Climate Change in the Agriculture Sector	The document proposes 52 actions in the categories of institutional and technical capacity enhancement, infrastructure, policy and legislation, research and development and awareness building and communication. A timelines, possible funders and collaborating agencies are mentioned for each action.	Capacity building; Research; Knowledge communication	Agriculture	
			Notes:		
2.	Upgrading infrastructure and assets to protect against flooding through urgent, near-term measures	Maintaining and upgrading the intricate drainage and irrigation system of Guyana; construction and rehabilitation of sluices, kokers, revetments and embankments; continuous dredging and de-silting of Guyana's major rivers and creeks; reinforce the ocean sea wall that protects most of the low-lying coastal areas from the Atlantic; constructed of groynes and additional drainage pumps in	Field implementation	Coastal zone management	Coasts, rivers
			Notes: From Guyana's Low-carbon Development Strategy. Estimated cost is US$225 million.		

Name		Objectives	Type of project	Priority Sector(s)	Geographic focus (if any)
		strategic locations across the coastline; upgrade the East Demerara Water Conservancy that protects Georgetown, the East Bank and most of the East Coast from excess water; and strengthen other conservancies around the country.			
3.	Hinterland Adaptation Measures	Development, reproduction and distribution of plant varieties and crop management techniques that are suitable for hinterland communities; construction of all-weather roads and bridges which are crucial for the transport of agricultural inputs; training and educational programs and introduction of additional drainage and irrigation equipment in particularly vulnerable areas; solar and wind power for water distribution; facilities for rainwater harvesting; creation of systems to guarantee access to safe drinking water during crisis situations; and incorporation of the environmental impacts of climate change into building designs, particularly for clay, sandy and loam areas.	Field implementation	Freshwater supply; Agriculture	Hinterland
			Notes: From Guyana's Low-carbon Development Strategy. Estimated cost is US$10 million.		
4.	Addressing systematic and behavioral concerns	Revamping Guyana's early warning system and improving the timely and accurate of collection and dissemination of data and information on weather related events and their impacts on the ground; set up an emergency response system that will minimize the risks to public health and ensure that crucial civil structures, such as the major infrastructure, safe drinking water systems and electricity and communications networks, are maintained in a functioning state; and provide training and education campaigns of the wider population.	Capacity building; Knowledge communication; Field implementation	Disaster risk management; Freshwater supply; Human health	
			Notes: From Guyana's Low-carbon Development Strategy. Estimated cost is US$33 million.		
5.	Developing innovative financial risk management and insurance measures to resiliency	Develop and introduce instruments suitable in the Guyana context that will aim to introduce incentives to avoid and reduce all possible sources of risk while aiming to transfer risks that are outside of the control of individuals and firms to third parties, which will compensate the insured in the event of an extreme event. Significant investments will need to be channeled towards training, data collection and transmission systems, particularly in relation to vital weather and hydrological information.	Capacity building; Research	Multi-sectoral	
			Notes: From Guyana's Low-carbon Development Strategy. Estimated cost is US$10 million.		

Name		Objectives	Type of project	Priority Sector(s)	Geographic focus (if any)
6.	Switching to flood resistant crops	Funding research to identify flood resistant crops that are applicable to the context of Guyana, creating flood-proof germplasm banks, and the introduction of new technology that allows for the cultivation of crops during prolonged flood conditions.	Research	Agriculture	
			Notes: From Guyana's Low-carbon Development Strategy. Estimated cost is US$10 million.		

E. Assessment

Guyana is a small nation with less than 1 million in habitants, yet it has made impressive advances in terms of defining its adaptation priorities, developing strategies and policies, and proposing concrete actions. The coastal and agriculture sectors appear to be the highest priorities, considered in key documents such as the First National Communication and sectoral adaptation strategies. Fisheries, water, energy, forests and waste are also mentioned. Moreover, concrete action is already taking place in coastal infrastructure, with a large conservancy project funded through the Special Climate Change Fund. Further, Guyana has proposed a number of specific projects to be financed by Fast Track financing and other funding included in the Copenhagen Accord. Through these efforts, the country is well placed to make significant advances in terms of concrete adaptation action over the next decade.

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