National Adaptation Plan
Guyana
Japan-Caribbean Climate Change Partnership
(J-CCCP)

Inception Report

Table of Contents

1. Introduction 4
2. Country summary of results and findings of desktop review 4
2.1 Country Profile 4
2.2 Observed Climate and Future Projections 5
j2.3 Guyana's Vulnerability to Climate Change 7
2.4 Guyana's Response to Climate Change 8
2.5 International Funds Accessed so far 10
2.6 A Brief Review of Guyana's Climate Resilience Action Plan 11
2.7 Observations of the Desk Review 19
3. Objective of Current Assignment 20
4. Scope of Work 20
5. Methodology 21
5.1 CRSAP Review 21
5.2 General Stocktaking and Gap Analysis 23
5.3 Review of CRSAP Five-year Roadmap 26
5.4 Update Current Climate Information, Associated Risks, and Adaptation Actions 34
5.5 Update CRSAP to NAP 39
6. Work Plan 46
6.1 Key Stakeholders that will be involved 46
6.2 Activities and Timelines 51
7. Reporting period 57
8. Roles and functions 57
9. Risk and Risk mitigation 58
10. References 59

Appendix ..... **Error! Bookmark not defined.**

1. Introduction

The National Adaptation Plan (NAP) process was established under the Cancun Adaptation Framework (CAF, 2011). It enables Parties to formulate and implement national adaptation plans (NAPs) as a means of identifying medium- and long-term adaptation needs and developing and implementing strategies and programmes to address the same. NAP is envisaged to be a continuous, progressive and iterative process which follows a country-driven, gender-sensitive, participatory and fully transparent approach.

Guyana – A Caribbean country, located within the equatorial trough zone at 5° 00' N and 59° 00'W covering an area of 214,970 km^2 is bounded by the Atlantic Ocean to the north, Venezuela to the west, Suriname to the east, and Brazil to the west and south. Guyana has a tropical climate, with two distinct rainfall seasons (April to July & November to January) and two dry seasons (February to April & July to November). The Major weather system is the Inter-tropical Convergence Zone (ITCZ) and the Major climate system is the El Nino Southern Oscillation (ENSO) (NATCOM1, 2002). Observations since 1960 within Guyana indicate a distinct rise in temperature and in recent years extreme events such as floods (2005, 2006, 2008, 2010, 2011, 2013, 2014 and 2015) and droughts (1997-8, 2009-2010 and 2015-2016) have impacted the Guyanese economy negatively.

Future projections indicate a continued rise in temperature and increase in intensity and frequency of extreme events in Guyana (McSweeney et al., 2010), which is likely in the future to impact Guyana's economy and its people adversely (Haites et al, 2002; Dalrymple 2006; UNECLAC, 2011a, UNECLAC, 2011b). Considering the ongoing impacts of climate change and future projections, the Government of Guyana (GoG) has taken pre-emptive steps and has developed a *Climate Resilience Strategy and Action Plan* (CRSAP, 2016) that provides a comprehensive and overarching framework for building resilience to climate change. The *CRSAP* provides a summary of the most significant climate risks and required resilience actions across 15 key sectors; it details four prioritized project concept notes for building climate resilience programmes; A Roadmap for the next five years, and a set of capacity building actions that enhance Guyana's capacity for national adaptation planning and to advance climate resilience.

2. Country summary of results and findings of desktop review

2.1 Country Profile

Guyana – A Caribbean country, a middle income country, with a total population of 7,41,962 (GSB, 2016) generated a GDP of 2,762.8 Million US$ at current basic prices in 2015 (GSB, 2016) . The services sector is the largest economic sector, accounting

for 60% of the GDP, followed by Agriculture, forestry, fishing and Mining and Quarrying (34%), and Manufacturing (6%).

The country is located at 5° 00' N and 59° 00'W covering an area of 214,970 km^2 and is bounded by the Atlantic Ocean to the north, Venezuela to the west, Suriname to the east, and Brazil to the west and south. For Administrative purposes, the country is divided into ten Regions, each administered by a Regional Democratic Council (RDC). The northern sections of six of these Regions (numbered 1 to 6) are located on the coast. The remaining 4 Regions (numbered 7 to 10) are located in the hinterland.

Guyana has extensive fertile agricultural land along the coastal plains and in the riverine areas; vast areas of tropical hardwood forests in various ecosystems with a diverse population of plant and animal species; abundant fishing and shrimping grounds, both in its numerous rivers and in the Atlantic Ocean to its north; and a wide variety of minerals, including gold, diamonds, a range of semi-precious stones, bauxite, and manganese. Guyana has a hydropower potential of approximately 7,000 MW. About 67 potential hydropower sites across four major river basins: Cuyuni, Mazaruni, Potaro and Essequibo have been identified that can potentially make Guyana an electricity excess country.

Guyana also falls within the middle human development category with an HDI rank of 0.636 in 2014 (GHDR, 2015). As per the Oxford Poverty and Human Development Initiative (OPHDI, 2013), 7.8 percent of the population (0,061 thousand people) are multidimensional poor while an additional 18.8 percent live near multidimensional poverty (0,147 thousand people). The breadth of deprivation (intensity) in Guyana, which is the average of deprivation scores experienced by people in multidimensional poverty, is 40.0 percent. Extreme poverty is concentrated in the interior regions of Guyana (UNECLAC, 2011a). The low lying coastal plains covering region 1 to 6 is the major economic hub of Guyana housing 90% of its total population. This area is prone to coastal flooding and hence the trends of sea level rise and rise in extreme surge events are a matter of concern for this region. Climate models indicate that these changes will exacerbate over the forthcoming century (NATCOM2, 2012).

2.2 Observed Climate and Future Projections

Guyana enjoys a wet tropical moderate climate with warm temperatures and abundant rainfall. Annually the temperature in Guyana ranges between a minimum of 16 °C to a maximum of 34 °C. Temperatures on the Coast stays between 22 °C

and 31 °C. Annual average rainfall across Guyana ranges between 1,600 mm to 3,000 mm (NATCOM2, 2012). Because of geographical influences, such as mountains and oceans, there is spatial variability of rainfall resulting in three major climate types, namely the Tropical Savannah where annual rainfall is less than 1800 mm, Very wet tropical rain forest has rainfall in excess of 2800 mm, and Wet/Dry tropical rain forests where rainfall ranges between 1800-2800 mm. In most places the rain falls in two seasons from April to July and from November to January, but in southern savannah the rainfall is only during April to August (GNATCOM2, 2012).

Observations since 1960s indicate (McSweeney et al., 2010) that the mean annual temperature in the country has risen by 0.3°C with simultaneous decrease in the number of cold days by 37 days. An increase in mean annual precipitation of about 4.8 mm per month, has also been registered. The recurrent and devastating flooding events in recent years such as in 2005, 2006, 2008, 2010, 2011, 2013, 2014 and 2015 have extensively impacted Guyanese economy as it has inadequate infrastructure to discharge excess water[5]. Flood damages in 2005 resulted in losses totaling approximately 60 per cent of the country's GDP[6] and moved it from a positive real growth position to a negative real growth position in that year. This exposure is not limited to the coast. Continuous heavy rainfall in the hinterland in 2011 resulted in the worst flooding since 1973. Droughts of 1997-98, 2009-2010 and 2015-16 have been devastating as well[5'6]. During the drought of 2015-16, Region 1 and 9, faced reduction in agriculture production, shortage of water, increase in dust pollutants, increase in bush fires, disease outbreaks amongst livestock and in human beings[6]. Climate change is an existential threat and adaptation is a matter of survival for Guyana.

Future projections (McSweeney et al., 2010), indicate that the mean annual temperature in 2030s is likely to increase by 0.4°C to 2°C, in 2060s by 0.9°C to 3.3°C and in 2090s by 1.4°C to 5.0°. Largest increases in temperature are projected for the southern portion of the country. No specific changes in annual rainfall in 2030s are seen, however, annual rainfall projections from 2060s onwards indicate a decrease with proportionate increase in heavy precipitation events. The rainfall projections are more uncertain, with different models projecting a wide range of possible changes. Meanwhile, sea level will continue to rise together with the height of storm surges.

Table 1: Projected changes in climate for Guyana for different time lines

Climate variable	2030s	240-2070s	2070s-2100
Mean Annual temperature change	+0.4°C-2.0°C	+0.9°C-3.3°C	+1.4°C to 5.0°C

Mean Annual Precipitation change	Median: 0to -4% Min.-Max.: -29% to +14%	Median: -4% to -5% Min-Max: -41% t +13%	Median: -4% to -5% Min-Max: -63% to +20%
% of rainfall that falls as heavy precipitation events	No Data	Median: +1 to +2% Min-Max: -3% to +10%	Median:+2-3% Min-Max:-8% to +12%
Sea level rise	+0.14 to 0.26 m	+0.21m to +0.43 m	+0.25 m to+0.51 m
Storm surge heights	+2.82m to +5.94 m	+2.89 m to +6.02	+2.93m to +6.19m

Source: McSweeney et al., 2010

2.3 Guyana's Vulnerability to Climate Change

It is clear that climate change will alter the characteristics of hazards Guyana is exposed to in terms of receipt of average annual rainfall, irregular seasonal rainfall, increase in intensity of rainfall, increase in number of dry days, increase in storm surges and sea level rise with consequences for Guyana's socio-economic development objectives.

The impacts are likely to be variable across its five natural geographic regions. The coastal plains which is the economic and administrative hub of the country, is subjected to coastal flooding and at risk are the human habitats, agriculture, water resources, mining activities in this region (NATCOM2, 2012). Rise in extreme temperature, and increase in number of dry days is likely to also adversely impact the natural resource based livelihoods of the indigenous people in the Savannahs. Here the communities use surface water supplied by a dense network of watersheds. The main economic activities in this region, cattle ranching and farming are also likely to be impacted due to projected changes in climate thus affecting the livelihoods of the communities and hence their adaptive capacities.

The Coastal Plain lying about 1.4 meters below mean high-tide level, and protected by natural and man-made sea defences, is the most vulnerable region in Guyana as it is subjected to recurrent flooding due to high tides. A one meter rise in sea level is projected to increase the risk of inundation across all coastal administrative regions; with regions 4 and 6 having the highest expected exposure (UNECLAC, 2012). Changes in sea level of this magnitude will cause significant increases in overtopping discharges for sea defences, increased flood volumes and frequency, enhanced coastal erosion and incursion of salt water in the ground water aquifers (Khan, 2002). Thus affecting the economy associated with agriculture, human settlements, and industrial activities amongst others, as the three most populous administrative regions, four of the five major commercial towns and the capital city, Georgetown are located on Guyana's coast. It is estimated that by 2030 Guyana

could be exposed to cumulative annual flood-related losses totaling US$150 million and that an extreme event similar to the flooding in 2005, which resulted in losses equivalent to 60% of GDP, could result in some US$0.8 billion in losses and harm to more than 320,000 people (LCDSU, 2013).

2.4 Guyana's Response to Climate Change

Guyana became a Party to the UNFCCC in 1992 and since then it has taken several steps to address climate change domestically and through international and regional collaboration. The list of actions, programs, projects etc. undertaken by Guyana are listed in table 2 below.

Table 2: List of actions taken by Guyana to address its climate change concerns

Year	Title	Lead Institution	Description
1992	Signed the UNFCCC Convention	Office of the President	The UNFCCC was formulated in 1992. 198 countries are Party to this convention. The objective of the Convention is to stabilize greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system
2001	Climate Change Action Plan (NCC, 2001)	Office of the President	A supplement to the INC, this action plan identifies adaptation as one of nine programme areas. It links the climate change to the national development agenda.
2001	Climate Change Adaptation Policy and Implementation Plan (Khan, 2002)	National Ozone Action Unit/Hydromet	It complements the INC and Guyana Climate Change Action Plan with a more detailed focus on coastal lowlands.
2002	Initial National Communication (NATCOM 1, 2002)	Office of the President	Guyana submitted its 1st national Communication in line with the UNFCCC guidance as per decision 10/CP.2
2003	Acceded to Kyoto Protocol	Office of the President	According to this protocol Annex 1 Parties i.e. the major developed economies of he world to the UNFCCC

Year	Title	Lead Institution	Description
			agreed to collectively cut their greenhouse gas emissions by 5.1% below 1990 levels between the period 2008-2012.

2009	Became a signatory to the CARICOM Liliendaal Declaration	Office of the Presidency	It's a Regional Framework for Achieving Resilience to Climate Change for addressing common shared goals and objectives, one regional coordinating mechanism and one M&E framework. Implementation Plan
2009/2013	Low Carbon Development Strategy (LCDSU, 2013)	Office of the Presidency	The Low Carbon climate resilient strategies highlight the importance of adaptation and building resilience identified thematic priorities such upgrading infrastructure to protect against flooding, hinterland adaptation, among others
2009 onwards	Guyana REDD+ Investment Fund	Office of the President	The Guyana REDD+ Investment Fund (GRIF) is a multi-contributor trust fund for the financing of activities identified under the Government of Guyana's Low Carbon Development Strategy (LCDS).
2010 – 2013,	Mangrove Restoration Project (NAREI, 2010)	Ministry of Agriculture	The GMRP aims to respond to climate change and to mitigate its effects through the protection, rehabilitation and wise use of Guyana's mangrove ecosystems.
2009-2018	National adaptation strategy for the agricultural sector (CCCCC, 2009)	Ministry of Agriculture	The goal of this strategy is to more effectively reduce the risks posed by climate change and position the agricultural sector to adapt. Among its objectives is to build resilience and adaptive capacity within the sector
2012	Second National Communication (NATCOM2, 2012)	Ministry of Agriculture	The SNC is built on the INC.
2013-2023	Integrated Disaster Risk Management Plan (CDC, 2013)	Civil Defence Commission	The NIDRMP focuses on risk identification, prevention, financial protection and risk transfer, preparedness and recovery. Links to climate change are articulated
2015	Development agenda of a Green Economy Pathway (DoE, 2015)	Office of the President	This is a low emissions plan (adaptation and mitigation) that takes the greening initiatives beyond the forest to all sectors of the economy
2015	Nationally Determined Contribution (INDC, 2015)	Office of the President	In accordance with Decision 1/CP.19 and 1/CP.20. The NDC proposes policies, measures and actions to mitigate

			emissions mainly focusing on alternative energy and forestry measures
Year	**Title**	**Lead Institution**	**Description**
2015	Draft Climate Resilient Strategy and Action Plan (CRSAP, 2016)	Office of the President	CRSAP provides a roadmap for next five years; Project Concept Notes for four priority climate resilience programmes; and summary of the most significant climate risks and required resilience actions across 15 key sectors; A set of actions for building capacity to enhance Guyana's climate resilience ; and A strategy to finance the CRSAP inclusive of the PCNs.

2.5 International Funds Accessed so far

About 11 multilateral funds have been accessed which are indirectly or directly related to climate change. The main fund supporting climate change activity is the Norwegian fund that supports forestry as well and low Carbon Strategy of Guyana. The table below list the funds and the sectors/projects they fund.

Table 3: Multilateral funds accessed by Guyana and area of funding

Fund	Area of Funding
Global Climate Change Alliance	Ecosystem and Biodiversity
GEF Trust Fund	Energy
Forest Carbon Partnership Facility-Readiness Fund	Forestry
Inter-American development Bank	Disaster Risk Management
International Development Association	Tourism
International Climate Initiative	Forestry
Japans Fast Start Finance	Sea and River Defence Infrastructure, Water Resources
Norway's International Climate and Forests Initiative	Forestry
Special Climate Change Fund	Tourism and Water Resources

Norway's International Climate and Forests Initiative - The Guyana REDD+ Investment Fund	Activities financed so far under Guyana's Low Carbon Development Strategy (LCDS) include: i. Micro and small enterprises for building alternative livelihoods ii. Institutional strengthening iii. Amerindian development fund iv. Amerindian land titling v. Climate resilience, adaptation and water management- Cunha Canal rehabilitation Project
Green Climate Fund	Readiness and preparatory support to enhance Guyana's readiness to access and deliver international climate finance through targeted institutional strengthening.

2.6 A Brief Review of Guyana's Climate Resilience Action Plan

Through Stakeholder consultation process, Guyana's Climate Resilience Action Plan (CRSAP)[3] has been prepared. It identifies low, medium, high and serious risks due to observed and projected future changes in climate. Amongst all the risks, about 38 most serious risks have been identified that pertain to Water resources, Agriculture, Fisheries, Forestry, Ecosystem and biodiversity, Indigenous people, Community and regional development, Health, Housing, Mining, Sea and river defense infrastructure, Energy, Tourism, Trade, and Transport. The details of the risks are summarily available from page 32 to 35 of the CRSAP document [3].

A dual track approach is suggested in Guyana's Climate Resilience Strategy Action Plan (CRSAP) to address these risks and for enhancing Guyana's resilience to climate change. Through Track 1 it has developed four early-start fundable, costed and evidence-based climate resilience projects (see table 4 below). The details are available from page 55 to 118 of the CRSAP document.

Table 4: Summary of fast track projects proposed for climate change adaptation

Sr no.	Project	Brief details
1	Building Climate Resilient Agricultural Systems	Objective: Improve water management, develop climate proof sustainable farm systems and build adaptive capacities of the sector to reduce vulnerability of small to medium scale farmers Location: Region 8 and 9 in Interior zones and Region 5 and 6 in Coastal zones Lead Agency: MoA; Duration: 5 Yr period ; Cost: 13.48-14.18 million USD (adj.) Potential funders: IFAD, World Bank, EU – EDF, AF, GEF-Small Grant Programme, GCF, GFDRR, Japan – Fast Start Finance, USAID, SCCF

2	Guyana's Sea defense Enhancement and Maintenance	Objective: Mangrove development and restoration and rebuilding most critical sea and river defences in low-lying coastal areas. Thus reduce flood risk in coastal communities Location: East Bank Berbice from Logsdale, Brothers, Sisters and up to Mara- Region 6 Lead agency: WSG, MoPI; Duration: 5 year period; Cost: 41.96-46.29 million USD (adj.) Potential funder: CDB, EU- EDF, GEF-Small Grant Programme, GCF, EU--GCCA, Japan – Fast Start Finance, USAID, SCCF
3	Public Health Adaptation to Climate Change	Objective: Strengthened early warning response systems and improved national health disaster risk management, enhanced access to clean water and sanitation facilities and food hygiene, reduced water-borne diseases, enhanced human output and public awareness Location: Interior zone (Regions 1, 7 and 9) and coastal zone (Region 6) Lead agency: MoPH; Duration: 3 year period; Cost: 17.35-18.60 million USD (adj.) Potential funder: USAID, IDB, Guyana REDD+ Investment Fund, AF, GEF-Small Grant Programme, GCF, Japan – Fast Start Finance, SCCF, PAHO for technical support, UNICEF for training materials.
Sr no.	Project	Brief details
4	Strengthening Drainage and Irrigation Systems	Objective: Improving capacity and upgrading irrigation and drainage networks in most critical areas; Institutional strengthening of National Drainage and Irrigation Authority (NDIA); and Developing training curriculum on drainage and irrigation. Location: Georgetown and immediate surrounding parts of Demerara Coast Lead Agency: MoA; Duration: 5 year period; Budget: 31.55-33.23 million USD (adj.) Potential funder: World Bank, EU, Japanese Government through JICA, Indian Government, IDB, FAO, DFID, CIDA, USAID, Petro Caribe, GRIF, AF, GEF-Small Grant Programme, GCF, USAID, SCCF

Recognizing that Guyana needs to continue building resilience to climate change across its national development planning themes, the 2nd track ensures that all key sectors are covered, uses the best available information on vulnerabilities, impacts and risks and develops a programme of actions in response to vulnerabilities assessed for 15 sectors. Table 3 below summarizes the key risks and number of actions identified under the 5 Pillars, namely:

- P1- Information, Research and systematic observations;
- P2- Institutional framework, Capacity Building and awareness
- P3- Policy, legal framework, and tools to Integrate adaptation in Development planning
- P4- Generation and application of technologies;
- P5- Financing Instruments

Table 3: Summary of risks and number of actions suggested

1	**Water Resources**	
	No. of Risks Identified: 6, Most Serious: 5.	
	Climate Drivers	*Risks*
	Sea level rise leading to saline intrusion	freshwater systems and water supplies affected
	Incremental warming and increase in frequency of droughts	household water supplies in areas reliant on surface water resources at risk
	Incremental warming and increase in frequency of droughts leading to drying up od surface and ground water resources	drinking water and community health and wellbeing affected in hinterland and riparian regions
	Increase in extreme rainfall leading to coastal flooding	overflowing drainage canals affecting water distribution and sewage pumping systems in Georgetown and in interior townships
	Decrease in mean annual rainfall leading to reduced groundwater recharge	water shortages across the region , however recharge pattern will be variable depending on hydrogeology of the area.
	No. of Actions Recommended: P1: 3, P2: 3, P3: 3, P4: 3, P5: -	
2	**Agriculture**	
	No. of Risk Identified: 27, Most Serious: A1-A6	
	Climate Drivers	*Risks*
	Sea level rise leading to saline intrusion	Damage to agricultural threatening sustenance of rural and commercial settlements
	Incremental warming and increase in extreme events	Decrease agricultural production and related employment both direct and indirect
	Incremental warming and increase in extreme events	Decrease Agriculture production and hence agriculture revenue and enterprise
	Increase in extreme rainfall events and sea level rise leading to flooding	Reduced discharge window of coastal drainage affecting sugar cane crops, associated Rural livelihoods & Commercial Enterprises.
	Increase in extreme rainfall events and sea level rise	Decrease in rice paddy production ans other agriculture production-threatening Food Security and rural livelihoods
	Incremental warming and increase in extreme events	Fall in water levels below levels feasible for irrigation in East Demerara Water Conservancy (EDWC)
	No. of Actions Recommended: P1: 22; P2: 13, P3: 13;P4: 11; P5: 9	
3	**Fisheries**	
	No. of Risks Identified: 13; Most Serious: Fi1	
	Climate drivers	*Risks*
	Sea level rise and rise in SST leading to changes in the nature and distribution of nursery habitats	Decrease in fish production and revenue loss

	No. of Actions Recommended: P1: 9; P2: 3; P3: 6; P4: 2; P5: 7	
4	**Forests**	
	No. of Risks Identified: 7; Most Serious: Fo1	
	Climate drivers	*Risks*
	Incremental changes in climate and increase in extreme events	Loss in critical forest ecosystem services such as soil erosion protection and water purification, consequentially degrading the environment.
	No. of Actions Recommended: P1: 4; P2: 7; P3: 6; P4: 1; P5: 4	
5	**Ecosystem and Biodiversity**	
	No. of Risks Identified: 9, Most Serious: Ec1 – Ec5	
	Climate drivers	*Risks*
	Changes in climate & increase in extreme weather events leading to decrease in Groundwater and surface water	Degradation of the ecosystem and environment affecting human health, livelihoods and associated economies
	Increase in storm surge heights leading to coastal flooding and erosion / deposition	Damage mangroves besides environmental degradation
	Extreme rainfall events leading to floods, landslides and soil erosion	Water contamination, human health and rural livelihoods
	Enhanced pressure or changes in ecosystems and habitats	may enhance tension between different interested stakeholder groups
	Increase in the Sea Surface Temperature	Will affect biodiversity in the sea and cause degradation of the sector
	No. of Actions Recommended: P1: 3; P2: 6; P3: 5; P4: 3; P5: 1	
6	**Indigenous People**	
	No. of Risks Identified: 12; Most Serious: IP1 – IP6	
	Climate drivers	*Risks*
	Increase in climate change and extreme droughts	Decrease in agricultural production due to water shortages affecting related indigenous peoples' livelihoods
	Increase in extreme rainfall events leading to Floods	Loss in agricultural yields as crops will rot (e.g. cassava), leading to food deficit and impacting health due to mosquito invasion and malaria;

		contamination of drinking water, nutritional deficit etc.
	Sea level rise and extreme events leading to flooding in low lying coastal areas	Livelihoods of indigenous communities living along the waterways threatened
	Sea level rise leading to floods	Settlements of indigenous people living on coastal plains affected. May necessitate relocation of with recognition of ancestral land rights

	Incremental climate change and extreme events (droughts) will lead to increase in frequency of forest fires	Destruction of savannah and farms, wildlife with consequent impacts on human health impacted as pollutants including dust in the air increase; restricted access to potable water and loss in productive time in search of water
	Incremental climate change and extreme events	Decline in farm productivity and traditional hunting and fishing will increase reliance on store food which have socio-economic and health implications (weight, diabetes, etc.)
	No. of Actions Recommended: P1: 3; P2: 9; P3: 9; P4: 2; P5: 2	
7	**Community and Regional Development**	
	No. of Risks Identified: 11, Most Serious: CRD1 – CRD4	
	Climate Driver	*Risks*
	Heavy rainfall leading to increase in flooded areas	Infrastructure such as roads, housing and utility structures, and human life threatened
	Sea level rise leading to coastal flooding and erosion	Damage to Agricultural land consequently regional development and socioeconomic growth threatened in coastal areas.
	Extreme events increase chance of climaterelated disasters	Physical and socio-economic damage expected and loss of life in concentration of population in coastal zones
	Extreme events leading to floods and droughts	Detrimental to mining operations and riverine landforms affecting livelihoods and health of rural communities in the hinterland
	No. of Actions Recommended: P1: 5; P2: 6; P3: 6; P4: 3; P5: 4	
8	**Human Health**	
	No. of Risks Identified: 12; Most Serious: H1 – H3	
	Climate drivers	*Risks*
	Incremental climate change and extreme events	decrease in agricultural production and revenue at enterprise, community and smallholder level impacting community services such as health and education
	Decrease in mean annual rainfall and increase in drought frequency leading to water scarcity	Negative impact on human health as access to clean drinking water and good sanitation gets affected and inequalities are exacerbated (e.g. gender, educational, poverty)
	Incremental climate change and extreme events	Deteriorating / unsuitable living and working conditions leading to internal and external migration and health impacts
	No. of Actions Recommended: P1: 3; P2: 1; P3: 1; P4: 8; P5: 1	
9	**Housing**	
	No of Risks Identified: 7. Most Serious H01 to H03	

	Climate Drivers	*Risks*
	Increase in extreme rainfall events leading to floods	Damage to housing infrastructure and communities displaced

	Increase in extreme rainfall events	Flooding of Georgetown due to overflowing drainage canals with the consequence that houses and other infrastructure are damaged or destroyed and communities are displaced
	Sea level rise	Increase in storm surge height, causes coastal flooding and erosion with the consequence that households and lives are threatened
	No. of Actions Recommended: P1: 3; P2: 4; P3: 7; P4: 2; P5: 3	
10	**Mining**	
	No. of Risks Identified: 14; Most Serious: M1 – M6	
	Climate Drivers	*Risks*
	Increase in extreme rainfall events leading to flooding and land erosion	Flooding, erosion and land instability damages roads, disrupts transportation of mining materials, results in loss of revenue for commercial enterprises
	Extreme events particularly droughts leading to water scarcity	Water scarcity affects hydraulic mining- the main mining method in Guyana, resulting in disruption in operations
	Increase in extreme rainfall events leading to floods in mines	Drainage and tailings management will be compromised, resulting in overflows in waterways, increase in turbidity levels and pollution of interior waterways.
	Increase in extreme rainfall events leading to floods	Flooding damages roads and transport of food and other vital resources for workforces disrupted, resulting in cessation of work and loss of revenue for commercial enterprises
	Increase in extreme rainfall events leading o flooding of mines	Disrupted mining operations, jeopardized workforce health and safety resulting in loss of revenue for commercial enterprises
	Increase in extreme rainfall events leading to erosion and land instability	Erosion and land instability affecting mine works as . pit walls get washed out resulting in environmental degradation
	No. of Actions Recommended: P1: 3; P2: 2; P3: 3; P4: 4; P5: 1	
11	**Sea and river defense**	
	No. of Risks Identified: 7; Most Serious: SRD1 – SRD5;	
	Climate Drivers	*Risks*
	Sea level rise and increase in storm surges leads to overtopping of current seas defence structure	Overtopping of current sea defence infrastructures causes widespread inland flooding

	Sea level rise and increase in storm surges causing change in water velocity and increase in currents	Changes in water velocity and currents increase rate of movement of mud bands and erosionaccretion cycle
	Sea level rise destroys mangroves	The destroyed mangroves and associated subsidence / erosion further compromise sea defence system
	Sea level rise and increase in storm surge	Affect aging sea defence infrastructure stressed, drainage and irrigation systems , and consequently socioeconomic development objectives compromised
	Increase in storm surge height leading to coastal flooding and coastal erosion	coastal infrastructure damaged or destroyed
	No. of Actions Recommended- P1: 6;P2: 4; P3: 8; P4: 4; P5: 1	
12	**Energy**	

	No. of Risks Identified: 7; Most Serious: En1 – En2	
	Climate Drivers	*Risks*
	Increase in the no. of extreme 'Hot days'	Energy demand will increase and so will be the losses due to transmission and distribution impacting energy supply and hence security
	Increase in extreme rainfall events leading to flooding	Critical energy infrastructure affected
	No. of Actions Recommended- P1: 3; P2: 3; P3: 1; P4: 1; P5: 3	
13	**Tourism**	
	No. of Risks Identified: 6; Most Serious: TO1 – TO3	
	Climate Drivers	*Risks*
	Sea level rise leading to coastal flooding and erosion	Coastal flooding and erosion will affect tourism assets and supporting infrastructure. Increase incidence of water and vector-borne diseases is likely to reduce tourism-related revenue generation
	Increased rainfall leading to flooding	Flooding will affect tourism assets and supporting infrastructure. Increase incidence of water and vector-borne diseases and affect revenue from tourism
	Decreased rainfall will lead to droughts	Drought will impact tourism in areas such as the Rupununi resulting in revenue.
	No. of Actions Recommended- P1: 3; P2: 3; P3: 3; P4: 1; P5: 2	
14	**Trade and Industry**	
	No. of Risks Identified: 5; Most High Risk: T1	
	Climate Drivers	*Risks*

	Increase in extreme rainfall events will flood riverine areas	riverine flooding with the consequence that wharves and stelling's that provide coastal and inland linkages will be damaged and riverine transportation disrupted, with detrimental consequences for trade and industry
	No. of Actions Recommended- P1: 3; P2: 2; P3: 2; P4: -; P5: 4	
15	**Transport**	
	No. of Risks Identified: 9; Most High Risk: TP1, TP2, TP4 – TP7	
	Climate Drivers	*Risks*
	Increase in extreme rainfall events leading to flooding	overflowing drainage canals likely to damage or destroy critical transport infrastructure (roads, bridges and culverts) particularly along the coastal lowlands and in the hinterland
	Increase in extreme rainfall events leading to flooding and landslides	Rural transport networks are likely to be damaged or destroyed, and communities and commercial enterprises in the hinterland will be cut off
	Increase in extreme rainfall events causes riverine flooding	Wharves and stelling's that provide coastal and inland linkages, are likely to be damaged and riverine transportation disrupted, with detrimental impacts for trade and industry
	Decrease in mean and annual rainfall will lead to lower river levels	rivers may no longer be navigable and infrastructure along the banks (e.g. wharves and stelling's) no longer accessible, with detrimental impacts for trade and industry
	Increase in number of extreme 'hot days'	May melt paved (tarmac) airport runways and impact airport operations and maintenance costs may increase
	Increase in mean annual temperature and increase in number of extreme 'hot days'	Aircrafts will underperform as aviation equipment may operate near or above critical temperature thresholds, affecting maximum weight and fuel consumption, resulting in weight restrictions (especially at airports with short runways) and additional costs.
	No. of Actions Recommended- P1: 2; P2: 1; P3: 3; P4: - ; 5: 1	

Further, the CRSAP (CRSAP, 2016) lists some of the capacities that need to be enhanced that can enable Guyana to implement the CRSAP.

- Guyana has now several institutions that have climate change as their central mandate and many more are working on addressing climate change issues in parallel to their core mandate. But the climate change adaptation mandate will require to be further broad based to implement the multi sectoral CRSAP action

plans. This will also enable mainstreaming of climate change in planning, programs, projects, and budgets.

- GoG has made significant strides to create policy, regulatory environment and implementation of focused projects for addressing climate change concerns of the most vulnerable sectors such as towards building sea defence (EPA, 2000) including restoration of mangroves (NAERI, 2010), making agriculture climate smart (CCCCC, 2009), and towards an integrated disaster risk management (CDC, 2013). Climate change policy and regulatory environment need to also be created for the other 13 sectors addressed in the CRASP for them to be implemented successfully.
- With regard to financing climate change adaptation, it is envisaged that Guyana will require a significant amount of additional funds to address the risks associated with climate change and building resilience. It is estimated that up to US$ 1.6 billion additional investments have to be made till 2025 for adaptation and resilience building (Haites et al., 2013), even though the GoG continues to undertake activities towards development of water management infrastructure; sea defences rehabilitation; improving water supply and sanitation; and towards introducing new agricultural techniques (CRSAP, 2016).
- This additional funding will also include measures for upgrading Guyana's limited human resources, technical and institutional capacities for climate change management. The GoG has to have permanent capacities for generating, collating and disseminating climate projections; and a comprehensive suite of vulnerability, risk and adaptation assessments for providing information to endusers on a regular basis. This service is now sporadic in nature and is only carried out by a set of public and non-governmental organizations in consonance with the preparation of National Communication to the UNFCCC, which till now happened around 2002 and again in 2009 (CRSAP, 2016).

2.7 Observations of the Desk Review

Preliminary observations while doing the review of the CRSAP indicates that for it to be updated to a National Adaptation Plan (NAP), some of the issues that need to be addressed are follows:

- The climate projections need to be updated as per the new CMIP5 data sets available from Coordinated Regional Down scaling EXperiment (CORDEX) for South American region along with storm surge modeling scenarios
- Stakeholders need to be made aware of the new climate scenarios for them to evaluate the extent of vulnerability and associated risks of their respective sectors
- Actions stated under the Pillars 1 to 5 for making the 15 sectors climate resilient need to be recalibrated if necessary as per the new climate projections.

- Overall adaptation goal and objectives of the country needs to be defined and ways to mainstream the same in all institutions needs to be explored for NAP to be implemented effectively nation wide ○ An overarching institutional framework for implementation of CRSAP (or NAP as it will be called when CRSAP gets updated in line with NAP guidelines) with defined roles and responsibilities of the agencies involved for coordination, implementation and monitoring needs to be in place.
- An overarching Monitoring & Evaluation (M&E) framework to regularly review Guyana's overall climate change adaptation objectives, the envisaged adaptation actions and to capture and disseminate best adaptation practices. The ongoing developmental programs of the Government need to be mapped and avenues for integrating climate adaptation within them also needs to be explored. For example the Ministry of public health has 14 ongoing programmes some of which need to be made climate resilient. Integration requires an overarching national and sector specific vision and strategic plan.
- A road map for role of private sector in climate change adaptation ○ A mechanism to regularly monitor, review, and evaluate adaptation goals. objectives, and adaptation actions from time to time to assess effectiveness of implementation; a mechanism to update new areas of action required as climate continues to change; and a registry to track and update all adaptation projects that are being and will be implemented under in readiness for the global collective stocktake on climate change adaptation in 2023 as per Article 14 of the Paris Agreement (UNFCCC, 2015).

3. Objective of Current Assignment

To provide technical assistance to the Government of Guyana (GoG) to update the CRSAP and to align it with the UNFCCC's guidance on National Adaptation Plans (NAPs) prepared by the Least Developed country Expert Group (LEG).

4. Scope of Work

The scope of the work has been developed with guidance from the Government of the Republic of Guyana including the Office of Climate Change in the Office of the Presidency, other relevant government counterparts, and in consultation with the J-CCCP Project Management Unit (PMU), UNDP Barbados and the OECS sub regional office, UNDP Country Office in Guyana. It is as follows:

1. Review of CRSAP ○ Review the draft framework and identify gaps and areas for update ○ Determine the amendments necessary to ensure alignment with UNFCCC framework for NAPs

2. General Stock Taking and Gap Analysis- through review of J-CCCP base line assessment and any other previous studies and identify additional information needed to address the gaps in the CRSAP and for a complete in country assessment of national adaptation actions.

3. Review the five-year roadmap and financial strategies for assessing Guyana's ability to address current national needs and priorities and provide Training Needs and Capacity Development Plan to address gaps

4. Update the CRSAP with current information on current climate trends, climate projections, climate risks and vulnerability assessments to support the planning processes of climate sensitive sectors in the country

5. Revise and update the CRSAP, guided by UNFCCC's Least Developed Countries Expert Group (LEG) technical guidelines for NAP development[1] thereby ensuring that it reflects current climate information and has gaps bridged. Validate the document, and finalize amended draft CRSAP for submission to national government for review and national approval.

5. Methodology

The following section indicates the methodology through which Guyana's CRSAP will be aligned with the UNFCCC guidelines for NAP. The entire process will be under the guidance of the Office of Climate Change, Office of the Presidency. Further consultation will be made with all government and nongovernment stakeholders to enable the CRSAP to evolve into a comprehensive climate change policy document for the Government of Guyana with provisions of reviewing and updating the same as science evolves.

5.1 CRSAP Review

The CRSAP will be reviewed with respect to the National Adaptation Plan (NAP) technical guideline lens in line with Table 3, page 25 of NAP guidelines prepared by the Least Developed Country Expert Group (UNFCCC, 2012). A preliminary review of the CRSAP vis a vis the NAP guidelines is presented in section 2.7. The list of elements to be reviewed and the methodology that will be used are detailed below. The elements of review and methodology of review is presented in Table 5 below.

[1] ht2tps://unfccc.int/files/adaptation/cancun_adaptation_framework/application/pdf/naptechguideli3nes_eng_high__res.pdf

Table 5: Elements of review of CRSAP and methodology

Sr.no.	Elements of Review	Methodology
1	Review Climate Information basis for formulation of CRSAP	Review the climate information provided vis a vis its adequacy in assessing climate risks across sectors
2	Human and Institutional capacities	The requirement vs what is existing in the country will be evaluated in line with the guidance available in the NAP
3	Long term Vision and Mandates	Determine whether there exists overarching long-term vision or mandates and vision and mandates for all 15 sectors for which the adaptation actions have been developed.
4	Implementation arrangements	The elements that will be reviewed will include overarching institutional arrangement for the CRSAP to ensure technical rigor of the actions, smooth coordination and implementation, a mechanism to provide feedback, and a mechanism to ensure political support and guidance. Further a review of the adequacy of the institutional arrangement mentioned for implementing the actions across the 15 sectors will be made as well.
5	Mainstreaming efforts within planning	The CRSAP will be reviewed in view of the long term sustainable development goals of Guyana, the Green Growth Strategy and Low Carbon Development Strategy and its commitment to the UNFCCC and the Paris Agreement.
Sr.no.	Elements of Review	Methodology
6	Extent of participation of stakeholders in developing the CRSAP	To ensure that the NAP process develops useful information for all stakeholders, a comprehensive review of the stakeholders involved in the CRSAP will be undertaken keeping in view the players who are involved in policy making, observation, research and implementation of developmental programmes. Gaps in stakeholder involvement will be identified if any and their potential roles reviewed and vetted by the OCC. This will be also useful for ensuring participation for workshops that are perceived for aligning the CRSAP to the NAP.
7	Gender sensitivity of the CRSAP	The CRSAP will be reviewed to understand the overall approach towards integrating gender perspective in the CRSAP process. The consultant will identify the gaps using the Least Developed Country Expert Group Guideline on Strengthening gender considerations in adaptation planning and implementation in the least developed countries(UNFCCC, 2015).

9	Monitoring and Evaluation (M&E) Framework	The CRSAP currently mentions prioritized project specific and action specific M&E framework. These will be reviewed in view of the purpose of an M&E framework as outlined in the NAP guidance. However, an overarching M&E framework will need to be introduced that ensures smooth implementation, evaluation of actions from time to time, integration of good practices amongst others. The overarching M&E framework will also be guided by the NAP Technical guidelines and other relevant M&E literature that focus on climate change adaptation.

Output: NAP assessment report containing review of CRSAP document of Guyana

5.2 General Stocktaking and Gap Analysis

A stocktaking exercise for assessing national adaptive capacities in Guyana was undertaken using the GIZ SNAP tool (GIZ, 2014). See section 1.2.3 Adaptive Capacity, page 12 of the Final draft of CRSAP. It was done through a consultative workshop involving relevant stakeholders. The process reviewed 7 aspects of national capacities which if adequate ensures success in National adaptation planning. The capacities reviewed were o Capacity for generating climate information; o Human and institutional capacities; o Capacities for implementation of climate adaptation actions; Mainstreaming adaptation in development planning; o Long term national adaptation vision mandate; o Inclusive and extent of participation in adaptation planning; and o M&E frameworks.

The CRSAP identifies the following as key factors that are inhibiting the adaptive capacities of Guyana

1. Inadequate human resources and technical capacities for generating climate information, internalizing the same for informed decision making, undertaking climate change impact and vulnerability assessments, for undertaking long term observations of climate impacts and for designing and implementing adaptation technologies. Strategies have been laid out in the CRSAP to address these gaps.
2. Inadequate access to finance. It is estimated that Guyana will require up to US$ 1.6 billion in the period to 2025 for adaptation and resilience building. Strategies have been laid out in the CRSAP to address this gap.
3. Inadequate mainstreaming of climate change in national and sectoral policies, programmes and projects is essential for broad basing of institutional action for successful deployment of CRSAP

4. Lack of appreciation of Guyana's long term vision for a green and climate resilient economy by some organizations and the wider public.
5. Lack of an overarching national M&E framework for tracking adaptation actions and assessing adaptation achievements is yet to be formulated though a common guidance is available for all Caribbean Nations in the form of "One Monitoring and Evaluation Framework" developed under the aegis of CARICOM Liliendaal Declaration (2009) to which Guyana is a signatory.

Further a detailed review of the elements listed in Table 6 will be carried out.

Table 6: Elements of Stocktaking and method of evaluation

	Element of stock taking	Method
1	Adequacy of Current climate and climate scenarios	Undertake literature review to assess o The spatial coverage of climate observation in Guyana. o Actual data used for deciphering the observed climate trends o Latest IPCC climate scenarios and their applicability in the Guyanese context o Type of climate information needed to assess the vulnerability of each sector and what is available o Adequacy of Institutional mechanisms to generate and disseminate climate information
2	National capacities and resources	For each of the resilience actions suggested within the CRASP, a review of the following will be undertaken - the various initiatives of the government as outlined in the earlier sections - the different programmes and their guidelines - the relevant policy documents

	Element of stock taking	Method

		- the mandates and publications of various departments of the government and their agencies - The mandates and publications and human capacities of international institutions within Guyana and the Caribbean region that can support Guyana in enhancing its adaptive capacities and building resilience - J-CCCP review if available The elements of review would include - Institutional mechanisms to generate, archive and disseminate as per users need information on climate and on vulnerability and risks of all sectors and - human resources
3	Barriers towards planning, designing and implementing adaptation activities	Barriers are defined as obstacles that can be overcome with concerted effort, creative management, change of thinking, prioritization, and related shifts in resources, institutions, policies, programs etc. (Moser and Ekstorm, 2010). It is proposed to review all the available literature and extract information on the barriers reported for implementation of the CRSAP and any other initiatives/programs such as the REDD+, coastal defence, agriculture adaptation, upping the adaptive capacities of various ethnic communities, that of industry including mining etc. The barrier analysis will be in line with the barrier analysis framework created by Moser and Ekstorm (2010). The framework identifies barriers such as: - In understanding phase of the problem related to CC - Common barriers in the planning phase - Common barriers in the implementation phase that includes o Institutional and coordination mechanism o Legal and procedural feasibility o Accountability o Monitoring plans to track achievement of Goals, Objectives and outputs o Availability of resources and their sustainability- economic, human etc. o Availability of information management systems o Evaluation mechanisms to enable learning, mainstreaming and best practices etc.

4.	Sustainable development efforts most at risk due to climate change	Run through the 17 sustainable development goals that are towards ending poverty, inequality and injustice and hence aspiring to be socially inclusive by 2030 in the
	Element of stock taking	Method
		Guyanese context (SDG, 2016) and assess how these will be impacted by climate change. Analyse the extent (High, Low, Medium) to which each of the goals are vulnerable to climate change in the Guyanese context. This will be done by comparing the risk perception of the 15 sectors documented in the CRSAP vis a vis the SDG goals. Further, all the programmes, projects and budgets within the government that are aligned with these developmental goals will be mapped.
5	Outline the gaps to be addressed	The gaps will be identified by comparing the elements of the NAP as outlined in the NAP-Tech guidelines (Table 3, page 25 of NAP guidelines prepared by the Least Developed Country Expert Group (UNFCCC, 2012)) of the UNFCCC developed by the least developed country experts. The analysis will be based on information collected, review of policies and international commitments of Guyana.
6	Assess the impact of climate change on Social development	Key programs related to social development of community and regions and for the indigenous people will be reviewed in the context of climate change. The OCC may please guide the consultant in identifying the key programs that are towards social development in Guyana.
7	Any other	-

Output:

A report identifying gaps and barriers in key programmes and policies of the government becoming climate resilient across all sectors, regions and for communities.

5.3 Review of CRSAP Five-year Roadmap

The five year road map in the CRSAP aims to develop climate resilience through 4 projects in 4 sectors, develop capacities for national adaptation planning and secure climate finance thus enabling mainstreaming of climate resilience into national budget process. An overview of these 4 projects is reproduced in Table 6.

Table 7: Overview of PCNs to be implemented in the next 5 years

Objective	Potential Location	Proposed Lead implementer	Indicative Project Duration and timeframe	Indicative Project costs USD million (adj.)
To make the agriculture sector resilient to exacerbated impacts of droughts and flood due to climate change	Interior zone (regions 8 and 9) and coastal zone (regions 5 and 6)	MoA	5 years	13.48-14.18
Objective	Potential Location	Proposed Lead implementer	Indicative Project Duration and timeframe	Indicative Project costs USD million (adj.)
through integration of sustainable practices in agriculture in Guyana				
Guyana's defence enhancement and maintenance	East Bank Berbice from Logsdale, Brothers, Sisters and upto Mara region-6	WSG, MPI	5 years	41.96-46.29
Public health adaptation to climate change	Interior zone (regions 1,7 and 9) and coastal zone (Region 6)	MoPH	3 years	17.35-18.60
Strengthening Drainage and Irrigation Systems	George Town and the immediate surrounding parts of the Demerara Coast	NDIA, MoA	5 years	31.5-33.23
Total Investment needed				104.34-112.30

It is proposed to look at the detailed project concept notes prepared for the four early start projects that are to be launched as part of the 1st 5 year road map of the CRSAP. OCC is requested to share the detailed project concept note with the consultant, the departmental training calendar of each of the institutions to be involved in the project. The review components of the 5 year road map will be done as follows.

Table 8: Review elements of 5 year road map and its financial strategy

	Project Objective	Road map elements to be reviewed	Review elements of Financial strategy

1	To make the agriculture sector resilient to exacerbated impacts of droughts and floods due to climate change through integration of sustainable practices in agriculture in Guyana	i. Assess extent of alignment with priorities of the National Agriculture Strategy 2013-2020 (MoA, 2013), Disaster risk management plan (MoA, 2013) and the National Strategy to address climate change in Agriculture (CCCCC, 2009). ii. Review the flow actions in the project and appropriateness of suggested adaptation actions to ensure expected outputs and outcomes. If any additional	The feasibility of accessing various sources of funding as listed in the CRSAP will be reviewed. Possibility of aligning some of the activities in the projects with ongoing programmes will be explored. For some activities, the provisions of the international funding's will be explored and if found suitable, full scale project design documents

	Project Objective	Road map elements to be reviewed	Review elements of Financial strategy
		requirement is identified, it will be suggested. iii. Assess institutional and human capacity building requirements. Capacity gaps of the institutions will be identified vis a vis their existing mandates .	will have to be prepared by the GoG. Training needs for preparing these documents as per the guidelines will be assessed.

2	To enhance the resilience of Guyana's sea defence systems to a variable and changing climate. Specific Objectives: - Minimize risks of coastal flooding and erosion, by supporting the rehabilitation and reconstruction of sections of the sea wall, and restoration of mangrove ecosystems where appropriate. - Raise public awareness, amongst the fishing communities possible impacts of CC on their livelihoods, ways to adapt and the importance of the mangroves eco-system.	i. Assess extent of alignment with Low Carbon Development Strategy (LCDSU, 2013), Guyana's Sea and River Defence Policy (GoG, 2015), National Mangrove Management Action Plan (NMMAP, 2010), Code of Practice for Mangrove Harvesting (2007), and Guyana's National Development Strategy. ii. The success of this project depends on 3 factors – (a) Reliable projections of maximum height and recurrence frequency of storm surges to assess how much area can be inundates, enabling adequate design of sea defence, (b) access to alternate livelihoods of population dependent on ecosystem services of the mangroves that will be restored; (c) appropriate institutional arrangement for implementation and monitoring and evaluation mechanisms to assess progress and success. Therefore capacity of each of these elements within the Guyanese system will be reviewed, gap areas highlighted and mechanisms for plugging the same will be suggested, including capacity building training needs.	The feasibility of accessing various sources of funding as listed in the CRSAP will be reviewed. Possibility of aligning some of the activities in the projects with ongoing programmes will be explored. For some activities, the provisions of the international funding's will be explored and if found suitable, full scale project design documents will have to be prepared by the GoG. It is possible to also explore the inception of a national adaptation fund that is partially or fully funded by the private sector through their CSR funds. Training needs for preparing these documents as per the guidelines will be assessed.

	Project Objective	Road map elements to be reviewed	Review elements of Financial strategy

3	Public health adaptation to climate change	i. identify synergies with Guyana's health vision 2020 (MoH, 2013), health sector disaster plan (MoH, 2009), Guyana's water safety plan, neglected tropical diseases plan (NTD), Diarrheal disease, and malaria control plan, WASH-2013, Caribbean neglected tropical disease initiative, Guyana's initiative towards improving waters sector infrastructure amongst others. WHO programs operational in the country also need to explored such as vector disease control programme if any. ii. The elements of the project proposal need to be more specific as they now look open ended. iii. Review adequacy of steps designed towards strengthening disaster risk management and early warning response systems with regards to the health sector at all levels (community, regional and national) in view of expectations of the 2009 Health Disaster Management Plan and Ministry's disease surveillance programme iv. Review the adequacy of the steps towards integrating the lessons learnt from the Oxfam, Red Cross and Guyana Citizens Initiative for ensuring post flood sanitation strategy, and information exchange program v. Review the strategy for enhanced public awareness on disease prevention	The feasibility of accessing various sources of funding as listed in the CRSAP will be reviewed. Possibility of aligning some of the activities in the projects with ongoing programmes will be explored. For some activities, the provisions of the international funding's will be explored and if found suitable, full scale project design documents will have to be prepared by the GoG. It is possible to also explore the inception of a national adaptation fund that is partially or fully funded by the private sector through their CSR funds. Training needs for preparing these documents as per the guidelines will be assessed.

	Project Objective	Road map elements to be reviewed	Review elements of Financial strategy
		vi. Review preparedness vis a vis water, air and vector borne disease forecast capacities, dissemination strategy, and enabling access to preventive measures listed in the PCN vii.Review the institutional arrangements, and financial capacities to establish additional institutional capacities required	

4	Strengthening Drainage and Irrigation Systems	i. Assess the processes suggested by way of which integration of new set of projections of sea level rise, storm surge, tidal activity and extreme rainfall will be integrated in design of drainage and irrigation systems and hence in various components of the project ii. Assess synergies with programs such as Mahaica, Mahaicony, Abary Agricultural Development Authority (MMA/ADA) Phase II, Agriculture Support Services Programme (ASSP); Project Restore Guyana; and Conservancy Adaptation Project (CAP) especially focus on iii. Review the process through which communication with farmers on irrigation management strategy is to be shared for floods and drought conditions iv. Review the adequacy of measures being suggested to get outcome of the project vis a vis the expected technical capacities	The feasibility of accessing various sources of funding as listed in the CRSAP will be reviewed. Possibility of aligning some of the activities in the projects with ongoing programmes will be explored. For some activities, the provisions of the international funding's will be explored and if found suitable, full scale project design documents will have to be prepared by the GoG. It is possible to also explore the inception of a national adaptation fund that is partially or fully funded by the private sector through their CSR funds. Training needs for preparing these documents as per the guidelines will be assessed.

Output: A review of the CRSAP five year road map

5.4 Training Need and Capacity Development Plan

Capacity development needs essentially will be based on the review of the CRSAP and 5 year road map and other documents that throw a light on the capacities existing within the country or in the region.

Preliminary review indicates that the capacity gaps towards implementation of the CRSAP and finally the NAP for successful implementation of NAP in Guyana are as follows:

- *Capacity for generating climate information*: is clearly one of the basic pillars that needs to be strengthened in Guyana. Human capacities and institutional capacities are some of the issues that need to be identified and addressed here.

- *Human and institutional capacities towards implementation of the NAP*: Again this area clearly needs strengthening. Specific technical trainings and capacity development plans need to be made here.

- *Mainstreaming adaptation in development planning*: This is key to a successful adaptation implementation in any country and would require exclusive attention from the government. Training officials in the various departments and agencies and those working in private and non-governmental sectors may be required to address climate change concerns in their respective domains.

- *Inclusive and extent of participation in adaptation planning*: Mapping the stakeholders for each of the adaptation actions is an essential exercise in itself to understand who needs what kind of support towards adaptation.

- *M&E frameworks and implementation pathways*: Without such frameworks it will be difficult to assess the progress made vis a vis the adaptation targets of each sector under consideration in the CRSAP/NAP. Therefore training towards preparing M&E frameworks to monitor the sectoral goals, the objectives and expected outcomes of the actions there in and to monitor the progress of the NAP itself can be one of the training elements of the NAP as well.

- *The NAP process:* The NAP process itself has to be disseminated amongst stakeholders, as it's a continuous process that has to be collectively undertaken on a regular basis. By all stakeholders.

The review of the CRSAP and other documents may throw up some more training and capacity building needs. Based on the recommendation of the OCC (telephonic/skype/email), the training needs assessment and capacity development plans for the one's that are considered priority by the government for now will be developed.

Output: A training needs assessment and capacity development plan

5.5 Update Current Climate Information, Associated Risks, and Adaptation Actions

The tasks and methodology followed for updating climate information, associated risks and adaptation actions is detailed in Table 9 below.

Table 9: Various tasks to be undertaken to update climate information

Sr no.	Task	Methodology
1	Analyse current climate information to identify trends to support the planning process	For a historical evaluation of climate trends in Guyana, climate data will be sought from the Hydromet. Additionally, observational gridded temperature datasets processed by Climate Research Unit (CRU) of University of East Anglia and precipitation data sets from NOAA's Global Precipitation Climatology Centre (GPCC) will be accessed and analyzed for the priod 1901-2010. The parameters that will be evaluated will include -temperature -Precipitation -Extreme events
2	Analyzing storm surge and extreme sea level trends	Data from Hydromet will be sought. If not available review of literature on the same will be undertaken.
3	Generate future climate projections	In light of new advancements made in climate modeling, availability of newer climate scenarios in the Coupled Model Intercomparison Project Phase 5 (CMIP5) datasets, and several downscaling approaches with statistical and dynamical approaches, higher resolution datasets, amongst other, we would evaluate the future climate of Guyana in the present study. We will evaluate the historical/control period (1970-2000) against mid-century (2050s) and end-century (2100s) projections from climate models. Definitive changes in

Sr no.	Task	Methodology

		key climate variables such as precipitation and temperature and their related consequences would be calculated and accessed ranging from extremes to normalization. Ensembles of 10 Regional Climate Models (RCMs) (from CORDEX-Coordinated Regional Climate Downscaling Experiment for South America domain) and gridded observations for the study area would evaluate the models in historical/control period (1970-2000) and changes in future period. Future changes will be calculated for 2 Representative Concentration Pathways (RCPs), the middle emission (RCP4.5) and high emission (RCP8.5) and for climatic variables, precipitation and temperature. Evaluation of Extremes will be performed based on precipitation and temperature based indices for entire Guyana in future dataset. Averages, biases and extremes of the variables and therefor indices will be calculated and evaluated for the spatial and temporal scales defined. Information on uncertainty associated with the projections will also be provided. RCPs were used for making climate change projections for the 1st time in IPCC AR5 (2013)[2] as against the SRES scenarios (Special Report on Emission Scenarios) used for climate projections in the AR4 (2007)[3]. There are four different RCP pathways of GHG emissions and atmospheric concentrations, air pollutant emissions and land use. The RCPs include a stringent mitigation scenario (RCP2.6), two intermediate scenarios (RCP4.5 and RCP6.0) and one scenario with very high GHG emissions (RCP8.5). Consequently, RCP 2.6, 4.5, 6.0, and 8.5 represent heating of the atmosphere by 2.6 W/m2, 4.5W/m2, 6.0 W/m2 and 8.5W/m2 respectively. The increase in global surface temperature by 2081- 2100, relative to 1850–1900, is likely to be limited within 1.5°C for RCP 2.6, and within 1.5 - 2°C for RCP 4.5 based climate projections. Whereas for RCP6.0 based projections, the temperature is likely to exceed

[2] IPCC, 2013: Summary for Policymakers. In: Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Stocker, T.F., D. Qin, G.-K. Plattner, M. Tignor, S.K. Allen, J. Boschung, A. Nauels, Y. Xia, V. Bex and P.M. Midgley (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

[3] Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M. Tignor and H.L. Miller (eds.). 2007. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

Sr no.	Task	Methodology
		2oC and for RCP 8.5 it is likely to exceed 4oC by the end of the century. The Paris Agreement speaks of holding the Global temperature within 1.5-2oC (Article 2.1(a)), which corresponds to climate projections made using RCP 4.5. Hence adaptation actions addressing risks associated with RCP4.5 climate projection have to be addressed as Guyana is a signatory to the Paris Agreement. Additionally, the risks associated with RCP 8.5 projections will enable Guyana to evaluate the maximum extent of adaptation efforts that might be required.
4	Storm surge and extreme sea level projections	Literature review will be carried out to ascertain extreme sea level projections. One of the latest publication on risk from storm surges and extreme sea levels is published by Sanne Muis et al, 2016[4]. Other literature will also be reviewed to get a range of projections. Uncertainties associated with the projections will also be documented.

[4] Sanne Muis, Martin Verlaan, Hessel C. Winsemius, Jeroen C. J. H. Aerts and Philip J. Ward1; 2016. A global reanalysis of storm surges and extreme sea levels. Nat Commun. 2016; 7: 11969. Published online 2016 Jun 27. doi: 10.1038/ncomms11969. Available at: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4931224/#S1

Sr no.	Task	Methodology
5.	Assess vulnerabilities/risks to climate change at sectoral, regional and national level. Rank identified climate risks and align them with appropriate adaptation actions	Vulnerability is a function of exposure, sensitivity and adaptive capacity. Ideally different approaches are applied to assess vulnerability for different sectors and systems. They can be hazard based, ecosystem based, vulnerability based, resilience based and risk based. The most common is the risk based approach. Besides assessing the hazard, the risk based approach includes concepts of uncertainty and perceptions of the risks. Risk is defined in quantitative terms and, subject to availability of data. Measures to reduce risk are developed in response to these quantified estimates. The CRSAP has already created risk registers for all 15 sectors that range from Serious, High, Medium and Low. It has also identified adaptation actions to ameliorate these risks under 5 adaptation pillars (See section 2.6) as defined in the 2nd National Communication of Guyana to UNFCCC. Also sectoral briefing notes have been prepared through extensive consultation process containing these aspects (see section 2.2 of CRSAP document). In view of the new high resolution climate projections that will be developed in this assignment, it is proposed to re-visit the sectoral briefing notes containing the risk registry of each sector and the actions proposed to ascertain the changes in risk levels if any and adjustments required. For this the following steps are proposed. Step1: Request OCC to share the detailed list of stakeholders who have been engaged in consultations for developing the CRSAP. Step2: Share the new climate projections including changes vis a vis the previous climate assessment for validation, with the OCC and other relevant agencies such as the Hydromet, Maritime Administration (MARAD) for tidal information, Water Resources Department, Agriculture Department and any other agency identified by the OCC who are involved in climate research and are responsible for managing climate sensitive resources. Step3: A 5 layered approach will now be under taken to assess the shift in the level of risks associated with various

		sectors and hence assess the changes required in the adaptation action portfolio of each sector.
Sr no.	Task	Methodology

		(i) Share the new climate analysis and review of impact on sectors through email with the identified stakeholders at national and sub national level. (ii) Request stakeholders to review the level of risks identified for their relevant sectors and appropriateness of the actions suggested for adaptation in light of the new climate scenarios. A set of questions will be prepared to guide them through the process. The questionnaire will be validated by the OCC before it is circulated. (iii) It is possible that responses from all stakeholders may not come in through email. Therefore Incountry one to one or focused group meetings will be set up to run through the questionnaire for such stakeholders (iv) Collate all the responses and present it in a larger workshop where all the stakeholders are invited to validate the risk registry and climate action portfolio. (v) Undertake stakeholder workshops at national level and one at regional level to get the vulnerability, risk and adaptation lists validated

Outputs:

i. An updated climate information report
ii. Minutes of the one to one consultations and workshop
iii. An updated report on climate change risks and vulnerabilities across 15 sectors

5.6 Update CRSAP to NAP

As indicated earlier in the document the CRSAP will be updated to NAP by following the NAP technical guidance as summarized in Table 3 of the same (UNFCCC, 2012). It should be noted that processes undertaken in the CRSAP can directly feed into the NAP. It also should be clear at the outset that NAP is a dynamic process. It will be built iteratively as plans for implementing adaptation actions get concretized and new adaptation strategies get identified.

As regards the content of the 1st NAP of GoG, it will be developed in consultation with the OCC.

Table 10: Steps and indicative activities for aligning CRSA with NAP technical guidelines.

Step	Activity to be pursued	Status/Methodology
Element A. Lay the groundwork and address gaps		
Initiating and launching of the NAP	Briefing the policy makers about CC and adaptation challenges	The CRSAP process has just been concluded through an extensive stakeholder engagement. Therefore policy makers and other stake-holders in Guyana are aware about climate change adaptation challenges in Guyana. In fact Guyana has been addressing adaptation concerns as early as in 2001 when climate change action plan and the national adaptation policy were launched. Subsequently it has developed action plans for adaption in agriculture sector, sea defence, and disaster risk reduction amongst others.
	Designating a spearheading agency for the NAP	The OCC has already spearheaded the work on CRSAP which will do the same as the CRSAP gets converted into NAP
	Create and enhance a National Vision and Mandate	This is being reviewed in section 5.1 of this document and concrete vision and mandate will come through the subsequent consultations that the consultant will undertake with relevant identified stakeholders (email/ skype)
	Operationalise the NAP process through access to support	The Japan Caribbean Climate Change Programme (JPCCCP) is committed to support the process
	Sequence the various NAP processes and monitoring and evaluation plan	With the CRSAP, the Nap process has already started. Considering the steps already carried out and building forward, the steps needed to implement the NAP will be laid out. This again will be done in consultation with OCC and the sectoral pathways will be defined in consultation with the lead agencies and other participants identified as the ones who will be implementing NAP in Guyana.
Stocktaking and identifying available information on	Conduct stock taking of past and ongoing activities	Is to be carried out by the consultant hired. A report is being prepared and will be submitted shortly. The stock taking methodology is given in sections 5.2 and 5.3.

climate change, impacts, vulnerability and adaptation and assessing gaps and needs of the enabling	Synthesize available analysis of current and future climate at the broad national /regional level	Already this activity has been done as a part of the CRSAP process, but a new generation climate scenarios are being generated based on RCP driven CORDEX outputs. This will be provided by the consultant. The methodology is explained in section 5.4 of this document

Step	Activity to be pursued	Status/Methodology
environment of the NAP	Conduct gap analysis to assess strengths and weaknesses regarding the capacities, data and information, and resources required to effectively to engage with NAP	The gap analysis in the CRSAP is being carried out by the consultant. The review elements and methodology are elaborated in 5.2.2
	Assess potential barriers to the planning, design and implementation of adaptation actions	Being carried out by the consultant using the methodology described in section 5.2.3 and 5.3
Address capacity gaps and weaknesses in undertaking the NAP process	Develop and enhance enabling institutional and technical capacity for undertaking the NAP process	A review is being undertaken of the capacity gaps. A methodology for this assessment is outlined in section 5.2.2. Based on this review, process will be suggested for developing the institutional capacities. Development of the capacities per se is the responsibility of the Guyanese government.
	Identify and enhance awareness of potential opportunities for integrating climate change adaptation into development planning at different levels	The CRSAP has identified climate risks for 15 sectors (that includes regions and communities as well) and relevant strategies for adaption. Also 4 early start adaptation project concept notes have been designed. In all these, the alignment/synergy of proposed actions with ongoing programmes have been identified. Further all these have been done through an extensive stakeholder engagement. The need for mainstreaming CC in planning has been identified in the CRSAP and enhanced stakeholder consultations through improved institutional and governance structures has been suggested as the means to go forward.

	Design and implement climate change communication programmes, public awareness-raising and education	Climate change communication is part of all the project concept notes. Additionally, It is proposed that a communication strategy will be provided by the consultant for raising awareness about the NA process amongst stakeholders and general public.
Comprehensively and iteratively assess development needs and climate vulnerabilities	Compile information on main development objectives, policies, plans and programmes	This is being assessed as per the methodology described in section 5.2.4
	Identify synergies between development and adaptation objectives, policies, plans and Programmes	This is being done as per the methodology provided in section 5.2.4
Element B. Preparatory elements		

Step	Activity to be pursued	Status/Methodology
Analyse current climate and future climate change scenarios	Analyse the current climate to identify trends in variables and indices that could be used to support planning and decision-making	Methodology for analyzing this described in section 5.4
	Characterize broad future climate risks and levels of uncertainty using scenario analysis at the national level or as part of a regional analysis including through climate and socioeconomic scenarios	Methodology described in section 5.4
	Communicate projected climate change information to all stakeholders and the public	Methodology described in section 5.4 for communicating to stakeholders. For public communication a separate outreach strategy needs to be developed.
Assess climate vulnerabilities and identify adaptation options at sector, subnational, national and other appropriate levels	Assess vulnerability to climate change at sector, subnational, national or appropriate levels (by applying applicable frameworks)	Carried out in CRASP. However, this exercise will be repeated through a consultative process as described in section 5.4
	Rank climate change risks and vulnerabilities	Carried out in CRASP. However, this exercise will be repeated through a consultative process as described in section 5.4

	Identify and categorize adaptation options at multiple scales to address priority vulnerabilities	Carried out in CRASP. However, this exercise will be repeated through a consultative process as described in section 5.4
Review and appraise adaptation options	Appraise individual adaptation options, including economic, ecosystem and social costs and benefits, and possibilities for unintended (positive and negative) impacts of adaptation measures	An analysis along these lines has been carried out at least for the adaptation actions suggested in the 4 Project concept notes. The assessment includes - Economic justification - Social impacts - Environmental impacts - Project sustainability - Project risks and mitigation measures -Summary budget and investment plan - Total estimated project costs - Possible sources of funding The same needs to be carried out for all the actions in the 15 sectors. It is proposed that a session will be devoted towards training on identifying the above mentioned elements when new climate scenarios are presented,

Step	Activity to be pursued	Status/Methodology
		and any changes in intensity or extent of adaptation actions are suggested.
Compile and communicate National Adaptation Plans	Aggregate sectoral and subnational adaptation priorities into national adaptation plans	Develop detailed adaptation plan for prioritized actions. Extent of this work to be discussed with OCC before any commitment is made.
	Integrate review comments into the national adaptation plans and process endorsement at the national level as defined in the mandate for the NAP process	The adaptation plans developed will be sent out for review to relevant stakeholders in consultation with the OCC and review comments incorporated
	Communicate and disseminate the national adaptation plans widely to all stakeholders in the country	Communication and dissemination strategy will be outlined
Element C. Implementation strategies		

Prioritize climate change adaptation in national planning	Define national criteria for prioritizing implementation based on, inter alia, development needs, climate vulnerability and risk and existing plans	This criteria has been defined in the CRSAP and also in the Low Carbon Development Strategy (LCDS). As a result 4 project concept notes have been floated on national priority areas. Also adaptation actions have been prioritized for all 15 sectors in the CRSAP
	Identify opportunities for building on and complementing existing adaptation activities	This has been done in the CRSAP as other adaption programmes have been reviewed and their alignment with existing programmes identified
Develop a (long term) national adaptation implementation strategy	Define a strategy for the implementation of adaptation actions including target areas or beneficiaries, responsible authorities, timing, sequencing of activities and mobilization of Resources	Target areas or beneficiaries, responsible authorities- available under CRSAP. timing, sequencing of activities and mobilization of resources- to be carried out through the consultative process suggested in section 5.4
	Implement concrete adaptation measures based on the national adaptation plans through policies, projects and programmes	This is subject to availability of funding. However, certain actions can be budgeted within the national budget and can be implemented without looking for external funding. Opportunities of doing the same will be explored for prioritized actions listed in the CRSAP sectoral action plans.
Enhance capacity for planning and implementing adaptation	Strengthen institutional and regulatory frameworks for addressing adaptation in the long-term at national and sectoral levels	A framework will be developed for strengthening institutional and regulatory frameworks for addressing adaptation in the long-term at national and sectoral levels
	Design and implement training on the NAP process on an ongoing basis at sectoral and subnational levels to	Capacity development requirements and hence capacity development plans will be laid out as per the section 5.4. Further a framework will be suggested

Step	Activity to be pursued	Status/Methodology
	facilitate adaptation planning at subnational levels	that enables the NAP system to evaluate and assess the training needs at sectoral/subnational levels on an ongoing basis.
	Implement outreach on NAP process outputs at the national level and promote international Cooperation	An outreach plan will be suggested on the NAP process. Implementation is of course the responsibility of the GoG.

Promote coordination and synergy at the regional level and with other multilateral environmental agreements	Promote coordination of adaptation planning across sectors	Will develop a framework that ensures coordination of adaptation planning across sectors and regions and opportunities of synergies with other multilateral environmental agreements in the formulation of - respective plans, - in capacity-building and - during implementation
	Identify and promote synergy in assessment, planning and implementation of adaptation at the regional level as appropriate	
	Identify and promote opportunities for synergy with other multilateral environmental agreements in the formulation of respective plans, in capacity-building and during implementation	
Element D: Reporting, Monitoring and Review of the NAP process		
Monitor the Nap process	Identify (few) areas of the NAP process that will be evaluated through qualitative and quantitative performance measures as part of an assessment of effectiveness of, and progress and gaps in, the NAP process	Will be identified in consultation with OCC
	For the areas identified for evaluation, define metrics for documenting progress, measuring and communicating levels of effectiveness and assessing gaps	Metrics will be defined as per standard literature but will be finalized in consultation with OCC
	Collect information on the metrics, throughout the NAP process	A framework will be designed that enables collection of information on the metrics on a continuous basis
Review of the NAP process to assess progress, effectiveness and gaps	Compile and synthesize information from new assessments and emerging science, as well as the results and outcomes from adaptation activities being implemented, to support the review and update of the NAPs and related outputs	Will devise a process of activities in consultation with Hydromet, Agriculture department, and other relevant departments that enables smooth uptake of new information on science, technology and best practices of adaptation (institutional arrangements, policies, institutional capacity development or any other). An additional session will be organized in the workshop on dissemination of new set of climate projections were a participatory consultative approach will be taken to develop sector specific frameworks that enables synthesis of
Step	Activity to be pursued	Status/Methodology

		information from new assessments and emerging science, as well as the results and outcomes from adaptation activities that are and will be implemented in the future.
	Review, on a regular basis, activities undertaken as part of the NAP process by evaluating the information and metrics collected as part of the monitoring of the process	A review mechanism will be suggested that will allow review and uptake of lessons learnt on a regular basis
Iteratively update the national adaptation plans	Update the national adaptation plans, and related documentation, at a frequency specified in the national mandate, framework or strategy for the NAP process, by repeating selected steps as appropriate	Define the national mandate on frequency of update
	Work towards aligning the production of updates to the NAPs with relevant national development plans	Develop a framework for aligning the updates with either the national development plans (if they are every 5 years then the information in the Nap can also be updated every 5 years), or with the frequency of reporting the updated NAP to the UNFCCC, which is more earlier.
Outreach on the NAP process and reporting on progress and effectiveness	Disseminate the NAP documents and related outputs to the UNFCCC secretariat and to other relevant stakeholders, as these become available	A content of the NAP will be evolved in consultation with the OCC and reviewed by members of the former MSSC of the CRSAP as identified by OCC. Based on the content that is approved, all the elements of the content will be documented for it to be communicate d to the UNFCCC secretariat and other relevant stakeholders.
	Provide information in national communications on progress in and effectiveness of the NAP Process	This will be the prerogative of the OCC as to what and how it will report the information generated in the NAP to the National Communication.

6. Work Plan

6.1 Key Stakeholders that will be involved

Consultations with relevant stakeholders adds value to the process of developing the National Adaptation Plan. The stakeholder consultations ensure that the final document responds to stakeholder needs and can be owned, supported by those implementing and affected by it. Through One on One emails and telephonic conversations, focused group

meetings, and a workshop will be carried out to gather stakeholders 'views will be captured, assimilated, shared and integrated to align the CRSAP with UNFCCC's National Adaptation Plan Guidelines for LDCs. A tentative list of potential stakeholders who will be engaged with during the process of preparation of the NAP is listed below.

Table 11: Potential list of stakeholders who will be engaged with during preparation of the National Adaptation Plan*

Agency	Will be engaged for
Office of Climate Change, Office of the Presidency	The OCC will be the agency which will coordinate implementation of the CRSAP/NAP and monitor its delivery against the roadmap. GoG will establish a Committee or Advisory Unit with members drawn from to oversee and facilitate the delivery of the CRSAP. OCC will be engaged with to understand the Guyanese Government's overall view, goals and objectives on climate change adaptation, its role in coordination between agencies including the role it plays as UNFFCCC focal point.
Guyana Forestry Commission and REDD+ secretariat	The GFC oversees the national implementation of all actions and projects related to REDD+, readiness activities under the Forest Carbon Partnership Facility, and. the development of a monitoring, reporting and verification system (MRVS)
Former members of the now defunct Multi-Stakeholder Steering Committee for CRSAP	The MSSC supported the implementation of Guyana's LCDS and provided guidance and strategic direction for stakeholder engagement. The Committee constituted of representatives from the government, indigenous NGOs, the private sector, labour, forestry, mining, youth, women, academia, NGOs and civil society. The representatives will be engaged with during the consultation process.
Hydro-meteorological service (Hydromet)	Hydromet is responsible for observing, archiving and understanding Guyana's weather and climate. It provides meteorological, hydrological, and oceanographic services in support of Guyana's national needs and international obligations
Maritime Administration Department (MARAD)	MARAD is responsible for producing tide tables which give tidal predictions for the entire country. Historic and current tidal trends will be sought from this agency
Environmental Protection Agency – EPA	The EPA is the GoG agency responsible for overseeing the effective management, conservation, protection and improvement of the environment.

Civil Defence Commission	The CDC has the responsibility for coordinating and monitoring disaster risk management and comprehensive disaster management in Guyana. It effectively responded to the impacts of climate change events including the major floods of 2005 and 2013, and droughts of 2010 and 2015 among others

Agency	Will be engaged for
Ministry of Indigenous Peoples Affairs	The Ministry works towards enhancing the social, economic and environmental well-being of Indigenous Peoples (9 tribes) and their lands through collaboration, sustainable development and appropriate legislation, while preserving Indigenous culture and traditional knowledge. The economy of the tribes and the habitats living in the hinterland are tied to natural resources such as forests, agriculture, mining which have all been identified as seriously at risk due to climate change. Therefore, the programmes being implemented for them need to be climate resilient. CC investments such as LCDs, REDD+ investments etc. are being directed for the indigenous people. However, special Acts and legislations also need to be sensitive to climate change imperatives.
Ministry of Communities -Housing - Water resource management -Regional development -Local Governance	Ministry of communities is responsible for Housing, urban development, water resource management, regional development and local governance. A large and diverse portfolio. Its focus on drainage for George town is a timely measure that needs to ensure climate resilience. Engaging with the related Ministry is important to understand the future development plans and how climate change actions as sited in the CRSAP can best be integrated in its developmental planning. Additionally the Consultant would meet Members of the National Water Council (Being formulated), and the Guyana Water Inc.

Ministry of Business and Tourism	Ministry of Business is focusing on business strategies enabling startups, facilitate development of industrial bases for large and small enterprise, provide opportunities for increase in competitiveness, garner trade and investments through private sector engagement, and develop sustainable nature based tourism. Business and Tourism both are key areas for generating revenue for Guyana. Tourism infrastructure is identified as one which is at risk especially in the coastal zone due to sea level rise and higher and stronger storm surges. Therefore plans of Tourism Ministry vis a vis climate change needs to be explored.
Ministry of Public Health	The Health Ministry is responsible for providing accessible, acceptable and affordable services for physical, social and mental health status of all Guyanese and enhance the effectiveness of health personnel through continuing education, training and management systems. Malaria, water borne and respiratory diseases in the CRSAP have been identified that will exacerbate in the projected climate.

Agency	Will be engaged for
	Considering the impacts on DALYs without any interventions planned will lead to loss in productivity of the working population engaged in mining industry or in agriculture, engaging with the Ministry of Public health and its agencies is imperative.
Guyana's Geology and Mines Commission	The mining sector contributes
Guyana's Ministry of Agriculture and its Agencies -	Agencies under the MoA include Fisheries Department, Guyana Livestock and Dairy Development Agency, Guyana Rice Development Board, Guyana School of Agriculture, Guyana Sugar Corporation, National Agricultural Research & Extension Institute, MMA Agriculture Development Authority and National Drainage and Irrigation. MoA has been assigned as the nodal agency for CRSAP actions related to agriculture. Sugar, fisheries, rice, livestock, irrigation infrastructure, agriculture by indigenous communities, all have been designated as seriously or highly vulnerable. Therefore the relevant agencies need to be engaged with to ensure integration of climate change in their programs and policies.

Guyana Energy Agency	The Agency is committed to sustenance and development energy resources in the country. The Agency is involved in ushering in renewable energy in the form of hydro, biomass, solar photovoltaics, solar thermal, and wind. It is also focusing on energy efficiency in household cooking using wood, in electrical gadgets amongst others. Hydropower and biomass are susceptible to climate change and the adaptive capacities need to be in place to ensure energy security of Guyana.
Chamber of Commerce and Industry in Guyana and any other Industry Forum	Engaging the private sector is important as the Private investment in agriculture is the new area where Guyana is seeking investments. Climate smart agriculture needs to be integrated in the private sector approach to agri-businesses. Also mining is a core business that is at risk to climate change as identified in the CRSAP. The companies need to have plans in place to ensure sustained mining production and thus safe mining, sustainability of livelihoods, access to water resources, miners health etc. in a changing climate context. Part of their profits need to flow back into these. Role of kitty earmarked for corporate social responsibility in building climate resilience of business value chains can also be explored.
All donors and lenders	Identified in section 5.5
Agency	Will be engaged for
Civil Society members	As identified by the OCC, Office of the Presidency

*This list is not exhaustive. The list of resource persons/stakeholders who will be approached will be drawn from the CRSAP report and finalized in consultation with the OCC.

6.2 Activities and Timelines

	Month/Weeks	January				February				March				April				May				June				July				August				Sept.		
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
	ACTIVITIES																																			
1	**Inception Report**																																			
1.1	Preparation and submission																																			
1.2	Reviewed and accepted																																			
2	**NAP assessment Report**																																			
2.1	Review of CRSAP																																			
2.2	General Stocktaking																																			
2.3	Review of CRASP 5 year plan																																			
2.4	Submission (all by March 5) Comments (all by March 10), Revised report (all by March 18)																																			
2.5	Training Needs and Capacity Development Plan, Review and Finalisation (TNCDP)																																			
2.6	TNCDP Submission (by April 23), Review (by April 28) and finalization (May 7)																																			
3	**Updated Climate report**																																			

3.1	Analysis of observed climate data (data to be sought from HydroMet also reanalysis data to be used such as Aphrodite, CRU)																																								
3.2	Future CC projections																																								

	Month/Weeks	January				February				March				April				May				June				July				August				Sept.		
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
	ACTIVITIES																																			
3.3	Undertake literature review for storm surge strengths and extent of coastal flooding																																			
3.4	Compile a report on observed climate trends (submit by April 8)																																			
3.5	Reviewed by April 16 and finalization by April 25)																																			
4	**Update Climate risks and vulnerability assessment**																																			
4.1	Communicate the new climate information to all stakeholders through email (by April 12)																																			

4.2	Questionnaire developed and submitted to OCC (By March 31st)																																				
4.3	Questionnaire approved by OCC (April 7th)																																				
4.4	Dispatch questionnaire to stakeholders by email (by April 10th)																																				
4.5	Get feed back by (April 30th)																																				
4.6	Set up one to one in country meetings with key stakeholders to validate the and collate																																				

	Month/Weeks	January				February				March				April				May				June				July				August				Sept.		
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
	ACTIVITIES																																			
	all responses (May 1st and 2nd week)																																			
4.7	Plan Stakeholder workshops- Note on workshop and draft agenda for a national and a regional workshop(18th April)																																			

4.8	Review by OCC (20th April) Finalized agenda (23rd April) List of participants from OCC (23rd April)																																			
4.9	Organization of workshops by OCC- (April 24-May 13)																																			
4.10	Stakeholder workshops (at national level and one at regional level) (dates to be finalised by OCC but will in the period between)																																			
4.11	Draft Climate risk and vulnerability assessment Report updated and submitted (by June 4)																																			
4.12	Review comments (by June 11)																																			
4.13	Revised Climate risk and vulnerability assessment report (June 18)																																			
5	**Draft NAP document -1 ver**																																			
	Month/Weeks	January				February				March				April				May				June				July				August				Sept.		
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
	ACTIVITIES																																			

5.1	Content of the NAP developed and submitted to OCC for review (June25th)																																			
5.2	Review of the content and feed back (June 30th)																																			
5.3	NAP draft and submission for review (July 31st)																																			
5.4	Review of draft NAP (15th August)																																			
5.5	Revised NAP																																			
5.6	Undertake in country validation of the NAP draft document through a presentation and discussion through a series of validation workshops (numbers and target audience to be discussed with OCC).																																			
7	**Final NAP Document**																															-			
7.1	Incorporate validation comments and submit NAP Draft (August 31st)																																			
7.2	Review of NAP Draft (by August 1st week)																																			
7.3	Incorporate comments and submit Final NAP Draft (by August 2nd week)																																			

7. Reporting period

The reporting period for this project is from January to 1st week of August 2017 for this project. Section 5 lists all deliverables which will be delivered through this period.

Two in-country visits are proposed and they are as follows.

	Purpose of visit	Period of visit	Number of days in Guyana/
1	Consultative meetings and workshop for updating vulnerability and risk assessments, setting the national agenda for adaptation	May 1st to 31st	Maximum upto 30 days
2	Validation workshop for NAP draft	August 3rd week	7 days

8. Roles and functions

Consultant:

Will undertake the entire work as outlined in the work plan with guidance/consultation and other stakeholders who will be implementing the various elements of the NAP.

OCC focal point:

The OCC focal point has the most important role in this process. The focal point will provide guidance to the consultant at every step in the process of converting the CRSAP to NAP. The focal point will have the following roles in this process

- Will vet the list of stakeholders to be consulted in the process including the members of the former steering committee of the CRSAP
- Will facilitate access to reports/documents as required that may not be available publicly on the net
- Will introduce the consultant to the stakeholders to facilitate one to one consultations (e.g. by email or telephonically when the consultant is in Guyana for consultations)
- Will be the one who will be the final authority for vetting all the frameworks that will be designed to facilitate actions on various elements of NAP process such as the training needs assessment and capacity building requirements, updating, disseminating, reviewing adaptation actions in view of the new climate information generated, and towards update of the CRSAP to NAP including the

M&E framework for NAP and defining the national mandate for adaptation (see section 5.4, 5.5, and 5.6)

- Will vet the agenda of the workshops developed by the consultant
- Will vet the list of stakeholders who will attend the suggested workshops
- Will send out the invitations to stakeholders for the workshops
- Will organize the workshops in Guyana as a part of this process

JCCCP focal point;

- Enable access to key policy or programme documents that may be required over and above the ones already provided
- Support in arranging meetings with identified stakeholders for the Consultant to meet while in Guyana
- Issue invitation letter to consultant for visiting Guyana.
- Support the consultant by providing latest reports of all activities being undertaken by the JCCCP including the base line assessment.
- Will review and provide comments for improvement on the reports produced by the consultant as per the work plan proposed
- Any other

9. Risk and Risk mitigation

Risks may be in the form of political, economic and financial, such as macroeconomic shocks. There may be a failure to maintain political support for climate change adaptation action. The political shock might be in terms of changes or stresses on national or subnational level government systems and processes, electoral changes, or other geopolitical development, and may include possible conflict or natural disaster risk. There are also institutional risks, such as a lack of continuity within the NDA/focal point and staff transitions; or turnover within key implementing entity partners and a lack of continuity.

Guyana is a politically stabilized democratic republic. Peaceful transitions have been taking place through systematic electoral process. Through these transitions, Guyana has not deterred from its commitment to the UNFCCC. NAP is a part of its commitment to UNFCCC. Given this background it is expected that Guyana will also fulfil the activities for formulating the NAP. Since the CRSAP and NAP process have been institutionalized, even with changes in person who is currently the focal point, the work will continue as the next person takes over. There might be a certain amount of delay due to the transitions as new incumbent will take some time to

understand the responsibilities, but the work on NAP will not be hampered as the consultant will continue to do the activities that can be done at consultant level while the disruption lasts.

10. References

1. CAF, 2010. Cancun Framework. Section II - Enhanced Adaptation Framework. FCCC/CP/2010/7/Add.1.
2. CARICAD, 2014. Strategic Plan for the civil defence commission –Guyana 2014-17. Submitted by the Carbbean Centre for Development Administration.
3. CCCCC, 2009. National Adaptation Strategy to Address Climate Change In The Agriculture Sector Of Guyana - Strategy and Action Plan. Prepared for Caribbean Community Climate Change Centre.
4. CDC, 2013. National Integrated Disaster Risk Management Plan and Implementation Strategy for Guyana, Civil defence Commission, Gov. of Gyana
5. CDCS, 2014. Costed analysis of Civil defence Commission Strategy and implementation Plan 2014-17. GoG.
6. CRSAP, 2016. The Climate Change Strategy and Action Plan (CRSAP). Government of Guyana
7. Dalrymple, O. 2006. Sea–level rise implications for the coast of Guyana. Fourth International Latin American and Caribbean Conference for Engineering and Technology (LACCET2006). "Breaking Frontiers and Barriers in Engineering: Education, Research and Practice", 21-23 June 2006, Mayagüez, Puerto.
8. Dixit A, McGray H, Gonzales J and Desmond M. 2012. Ready or Not: Assessing Institutional Aspects of National Capacity for Climate Change Adaptation. Washington, D.C.: World Resources Institute. Available at <http://www.wri.org/publication/ready-or-not>.
9. DoE, 2015. Development Agenda of a Green Economy Pathway. Department of Environment, Office of the Presidency, Gov. of Guyana
10. EPA, 2000. Guyana's Integrated Coastal Zone Management Plan.
11. EPA, 2001. Integrated coastal zone management action plan. Prepared by the Enviornment Protection Agency, Government of Guyana.
12. Erik Haites, Dennis Pantin, Marlene Attzs, James Bruce Jamie MacKinnon, James Bruce Jamie MacKinnon, 2002. Assessment of the Economic Impact of Climate Change on CARICOM Countries. A report for the Environment and Socially Sustainable Development – Latin America and Caribbean World Bank.
13. FCCC/CP/2010/7/Add.1. Cancun Framework. Section II - Enhanced Adaptation Framework. Pages 11-35.

14. GCF, 2016. Inception report- Guyana's Readiness to realise Guyana's INDCs, and related climate change policies.
15. GEA, 2014. Guyana Energy Agency Strategic Plan 2014-18.
16. GFC, 2001. National Mangrove management plan
17. GHDR, 2015. Guyana's Human Development Report. Published by UNDP.
18. GIZ, 2014. GIZ SNAP Tool- Stock taking for National Adaptation Planning (SNAP). Publised by GIZ. Available at: http://www.adaptationcommunity.net/?wpfb_dl=148
19. GoG, 2010. Guyana's National Mangrove Management Action Plan. Available at: http://www.mangrovesgy.org/home/images/stories/Documents/Project%20reports/NATIONAL%20MANGROVE%20MANAGEMENT%20ACTION%20PLAN%20%202010-2012.pdf
20. GoG, 2015. Guyana's Sea and River Defence Policy. Ministry of Public Infrastructure. Government of Guyana. Available at: http://www.mopi.gov.gy/%5Cfiles/Policy%20Documents/Policy_Final_GoG_Cover_Cabinet_December_8_2015.pdf
21. GSB, 2016. Guyana Statistical Bulletin, 2016. Annex V. Selected Socio-Economic Indicators
22. Guyana's 5th National report to CBD, 2015
23. Guyana's Biodiversity Strategy Action Plan, 2012-2020
24. Guyana's National Landuse plan
25. Guyana's Second National Communication to UNFCCC. Section 1.3.1, page 50. Available at: http://www4.unfccc.int/ndcregistry/PublishedDocuments/Guyana%20First/Guyana's%20revised%20NDC%20-%20Final.pdf
26. INDC, 2015. Guyana's revised INDC. Office of the Presidency, Government of Guyana. Available at: .....
27. JCCCP, 2016. Project document on Baseline Assessment related to Climate Change in the Caribbean.
28. Khan, M., 2001. National Climate Change Adaptation Policy and Implementation Plan for Guyana. National Ozone Action Unit of Guyana/Hydrometeorological Service, Georgetown.
29. LCDSU, 2013. Low Carbon Development Strategy Update. Transforming Guyana's economy while combating climate change. Office of the President, Government of Guyana. Available at: http://unfccc.int/resource/docs/natc/guync2.pdf
30. McSweeney, C. New & Lizcano, G., 2010. UNDP Climate Change Country Profile: Guyana. Available at:

http://www.geog.ox.ac.uk/research/climate/projects/undpcp/UNDP_reports/Guyana/Guyana.lowres.report.pdf
31. MoA, 2011. Food and nutrition Strategy. MoA, GoG.
32. MoA, 2013. A National Strategy for Agriculture in Guyana 2013-2020. Agriculture – our vehicle for sustained economic and social prosperity. Published by Ministry of Agriculture, Government of Guyana. Available at: http://cms2.caricom.org/documents/11264-moa_agriculture_strategy_20132020_-_cd.pdf
33. MoA, 2013. Disaster Management Plan for the Agriculture Sector 2013-18. Published by the Ministry of Agriculture, Government of Guyana. Available at: http://www.un.org.gy/index.php?option=com_k2&view=item&id=144:disasterrisk-management-plan-for-the-agriculture-sector-2013-2018&Itemid=740
34. MoA, 2013a. Agriculture-Our vehicle for sustained economic development- A National Strategy for Agriculture in Guyana 2013-2020
35. MoNRE, 2013. Costed Strategic Framework for the Ministry of Natural Resources and the Environment. GoG
36. Moser SC and Ekstrom J. 2010. A framework to diagnose barriers to climate change adaptation. Proceedings of the National Academy of Sciences. 107(51): pp.22026–22031.
37. NAPtech, 2012. National Adaptation Plan – technical guidelines for the National Adaptation Plan Process. ht2tps://unfccc.int/files/adaptation/cancun_adaptation_framework/application /pdf/naptechguideli3nes_eng_high__res.pdf
38. NAREI, 2010. Mangrove Restoration Project. National Agriculture Research and Extension Institute. Available at: http://www.mangrovesgy.org/
39. NATCOM1, 2002. Guyana's initial national communication to UNFCCC.
40. NATCOM2, 2012. Guyana's Second National Communication to UNFCCC. Government of Guyana.
41. NCC, National Climate Committee (2001). Guyana Climate Change Action Plan in Response to its Commitment to the UNFCCC.
42. NMMAP, 2010. National Mangrove Management Action Plan. National Agriculture Research Institute. Government of Guyana.
43. OPHDI, 2012. Oxford Poverty and Human Development Initiative -2013. "Guyana Country Briefing", Multidimensional Poverty Index Data Bank. OPHI, University of Oxford.
44. Roberts Aubrey K, Water management in Guyana – A presentation. Water management Inc.
45. Sanne Muis, Martin Verlaan, Hessel C. Winsemius, Jeroen C. J. H. Aerts and Philip

J. Ward1; 2016. A global reanalysis of storm surges and extreme sea levels. Nat Commun. 2016; 7: 11969. Published online 2016 Jun 27. doi: 10.1038/ncomms11969. Available at: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4931224/#S1

46. SDG, 2016. Sustainable Development Goals-2030. Available at: http://www.gy.undp.org/content/guyana/en/home/post-2015/sdgoverview.html
47. UNECLAC, 2011a. An Assessment of the Economic Impact of Climate Change on The Agriculture Sector In Guyana. Published by Economic Commission for Latin America and the Caribbean Head Quarters, Sub regional Headquarters for the Carribean.
48. UNECLAC, 2011b. UNECLAC, 2011. An Assessment of the Economic Impact of Climate Change on the Coastal and Human Settlements Sector in Guyana. Published by United Nations Economic Commission for Latin America and the Caribbean (UNECLAC).
49. UNFCCC, 2012. National Adaptation Plans- Technical Guidelines for the National Adaptation Plan Process of least developed countries. Prepared by the LDC Expert Group, December 2012. Available at: http://unfccc.int/files/adaptation/cancun_adaptation_framework/application/pdf/naptechguidelines_eng_high__res.pdf
50. UNFCCC, 2015. Strengthening gender considerations in adaptation planning and implementation in the least developed countries. Available at http://unfccc.int/files/adaptation/application/pdf/21673_unfccc_leg_gender_low_v5.pdf

11. Appendix

Terms of Reference