



CLIMATE LANDSCAPE ANALYSIS FOR CHILDREN



**An Assessment of the Impact of
Climate, Energy and Environment
on Children in Guyana
2018**



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ACRONYMS

AIDS	Acquired Immune Deficiency Syndrome
CBD	Caribbean Development Bank
CCCCC	Caribbean Community Climate Change Centre
CDC	Civil Defence Commission
CEE	Climate, Environment and Energy
CLAC	Climate Landscape Analysis for Children
CCORAL	Climate Change Online Risk and Adaptation Tool
CO	Country Office
CO ₂	Carbon Dioxide
CRSAP	Climate Resilience Strategy and Action Plan
CYEN	Caribbean Youth Environment Network
ECLAC	Economic Commission for Latin America and the Caribbean
ENSO	El Nino Southern Oscillation
EPA	Environmental Protection Agency
FAO	Food and Agriculture Organization of the United Nations
GDP	Gross Domestic Product
GEA	Guyana Energy Agency
GFC	Guyana Forestry Commission
GGMC	Guyana Geology and Mines Commission
GIZ	German Corporation for International Cooperation
GoG	Government of Guyana
GPL	Guyana Power and Light
Gt	Giga-tonnes
HDI	Human Development Index
HECI	Hinterland Electrification Company Inc.
HFLD	High Forest Cover Low Deforestation Rate
ICT	Information and Communication Technology
ITCZ	Inter-tropical Convergence Zone
LCDS	Low Carbon Development Strategy
MOE	Ministry of Education
NAMA	National Appropriate Mitigation Actions
NAPs	National Adaptation Plans
NCERD	National Centre for Resource Development
NDIA	National Drainage and Irrigation Authority
NORAD	North American Aerospace Defense Command
ROLAC	Regional Office for Latin America and the Caribbean
SIDS	Small Island Developing States

OCC	Office of Climate Change
OP	Office of the President
PAHO/WHO	Pan American Health Organization/World Health Organization
SDGs	Sustainable Development Goals
SNC	Second National Communication
STEM	Science, Technology, Engineering and Mathematics
TNA	Technology Needs Assessment
ToR	Terms of Reference
UN	United Nations
UNDP	United Nations Development Programme
UNFAO UNICEF	United Nations Food and Agricultural Organization United Nation's Children Fund
UNISDR	United Nations International Strategy for Disaster Reduction
WASH	Water, Sanitation and Hygiene
WRI	World Resources Institute
WWF	World Wildlife Fund



MESSAGE FROM THE HON. LT. COL. (RET') JOSEPH HARMON, MINISTER OF STATE



Hon. Joseph F. Harmon, MSM, MP
Minister of State
Ministry of the Presidency

“Guyana is in transition to becoming a ‘green’ state. The ‘green’ state is a comprehensive developmental model which places emphasis on the protection of our environment, the preservation of our biodiversity, the promotion of the use of renewable energy and the adoption of practical measures to ensure climate adaptation,” H.E. President Granger 18th August 2018.

The Green State Development Strategy (GSDS) is the framework being used for Guyana’s quest to establish a ‘green’ economy and a ‘green’ state as well as the country’s resolve to be meaningfully involved as a significant contributor to the 2030 Agenda for sustainable development including the SDGs. The Climate Landscape Analysis for Children (CLAC), undertaken by UNICEF in coordination with the Office for Climate Change, is another important step in the process to ensure that the GSDS is truly reflective of all stakeholders in the Guyanese society.

Guyana’s Green State Development Strategy is meant to be a national development plan, providing long-term vision and guidance for Guyana’s economic, social and environmental development. In addition, it aims to provide a foundation for an inclusive green economy, resulting in improved human well-being and social equity. Therefore, the information provided through the CLAC is critical for ensuring that the voices of children are heard and recognized.

“Our national interest is tied to international cooperation and collaboration to address the adverse effects of climate change,” H.E. President Granger 18th August 2018

Hon. Joseph F. Harmon, MSM, MP
Minister of State, Ministry of Presidency.



MESSAGE FROM THE UNITED NATIONS CHILDREN'S FUND (UNICEF)



Ms. Sylvie Fouet

Children face more acute risks from climate-related disasters and slow onset events than adults. They have less developed physiology or immune systems, psychological vulnerabilities and specific needs. They account for the greatest share of the population in main disaster-affected countries. Shifts in child demographics will further accentuate this.

Climate change, environmental degradation and energy access are equity issues. Addressing them when knowing the impact on children is therefore vital for building a more sustainable future in line with the Sustainable Development Goals (SDGs). Globally, UNICEF Strategic Plan 2018-2021 has climate and environment issues as one of the five outcome areas.

Partnering with the Office for Climate Change in Guyana, UNICEF has conducted a **Climate Landscape Analysis for Children (CLAC)**, using a desk review of key documents and 'face to face' semi-structured interviews with twenty-one stakeholder agencies. The study gives an evidence based implementation guide and an action plan to further strengthen work on climate, environment and energy (CEE)-related issues by addressing the impact on children and young people.

In Latin America and the Caribbean region, this is a unique piece of knowledge generation. With strategic alliances, I look forward to reducing the CEE effects on children and young people's life journey to ensure the youngest are developing their full potential and needed skills in a growing green economy – as well as for the future generations in Guyana!

A handwritten signature in black ink, appearing to read "Sylvie Fouet".

Ms. Sylvie Fouet
Country Representative of UNICEF Guyana & Suriname

ACKNOWLEDGEMENT

The Guyana Climate Landscape Analysis for Children (CLAC) process was led by the Office of Climate Change, Ministry of the Presidency in collaboration with the United Nations Children Fund (UNICEF). This important piece comes at a time when the Government of the Cooperative Republic of Guyana intensifies its efforts to establish a 'green' economy and a 'green' state through the Green State Development Strategy (GSDS) framework.

It is important to acknowledge the leadership and guidance of Dr. Paulette Bynoe and the technical support provided by Mrs. Janelle Christian, Head, Office of Climate Change, Ministry of the Presidency who facilitated the CLAC process in coordination with the UNICEF Global Climate Change Team and the Country Office for Guyana and Suriname. The collaboration of Government Ministries, Commissions and Departments, the National Toshias Council and key civil society and other stakeholders on this seminal piece, is duly acknowledged and applauded.

The CLAC will provide a strong foundation for the conceptualisation and design of national, regional and community-level projects and programmes. It is expected that this CLAC will be updated periodically and will benefit all Guyanese including women and children, especially the most vulnerable, for many years to come

EXECUTIVE SUMMARY

This Report is a result of UNICEF Guyana’s decision to conduct a Climate Landscape Analysis for Children (CLAC) to examine the baseline situation of climate, energy and environment (CEE) -related issues affecting children and how they relate to UNICEF’s priorities. The aim of the CLAC is to aid in identifying:

- i. Knowledge and data gaps and issues for further research;
- ii. Strategic entry points for the CO (mainstreaming and stand-alone);
- iii. Strategic partnerships;
- iv. Opportunities for leveraging climate finance for improved results for children;
- v. What UNICEF can bring to the table in potential joint proposals and partnerships; and
- vi. Recommendations for building the office’s capacity on climate, energy and environment issues

A mixed methods approach was adopted in order to give consideration to the methodological guidelines of the CLAC and the principal data collection methods employed included a desk review and analysis of available documentation; in-depth, face to face interviews and focus group meetings; professional experience, knowledge and judgement; and a validation workshop.

The Report presents the climate, environment and energy situation in Guyana, Government responses to/priorities on CEE, the impact of CEE-related issues on children, child-inclusive CEE policies, strategies and programming, CEE funding landscape in Guyana, linkages of the UNICEF Country Programme to CEE and recommendations.

A number of policies, strategies, and action plans to guide national responses to issues related to climate, energy and environment including the Draft Climate Resilient Strategy and Action Plan (CRSAP, 2015), Guyana’s Nationally Determined Contributions (NDCs, 2015) and National Biodiversity Strategy and Action Plan (NBSAP, 2012 -2020).

The Impact of CEE on Children living in areas exposed to climate and environmental impacts

In Guyana, children suffer from the negative impact of climate change, especially flooding in areas that prevent them from going to school. Stagnant pools of water cause mosquitoes to breed larvae which results in malaria and filaria- both of which are prevalent in the interior communities. This has an impact on children not attending school. On the other hand, during drought conditions, especially in the interior regions, the water level is extremely low; as a result schools remain closed. Even when children are allowed to attend school the heat is so intense that they become very restless and lack concentration. Heat waves will be of significant risk for children, particularly those living in urban

settings where heat island effects may become more frequent due to increasing temperatures. It is noteworthy that infants are especially at risk because they cannot yet regulate their body temperature (Loxley, 2017).

During the periods of droughts, rural and hinterland areas children are forced to walk for miles in search of water for basic domestic use and are also required to provide assistance on their family farms to ensure food security. Their involvement in these livelihood activities has negative impact on their school attendance, which affects their education. These children have to walk miles through tracks or trails to attend school and most times the girls become victims of both violent and sexual assaults.

During periods of dry spells and intense rainfall, water resources in hinterland areas are at risk of contamination due to poor sanitation services and existing shallow wells this situation leads to diarrhoeal disease, which is the second largest killer of children under 5 worldwide. When these conditions become extreme, families in Guyana's hinterland are forced to relocate which in turn impacts children.

The Impact of CEE on water, nutrition and health

Major problems with quality, continuity and reliability of service persist both along the coastal strip and in severely under-served hinterland regions (WHO 2009: 29). Water quality in some locations has been degraded due to contamination through indiscriminate gold mining, unhygienic practices, and other anthropogenic activities. Pressures on inland rivers are mainly due to mining and related activities. In particular, dredging and other types of mining operation, such as hydraulicking using surface water, cause hydrocarbons to be released and increase sediment loads in rivers and streams, thereby causing increased surface water turbidity. The levels of pollution in these water bodies that are accessed by families, including children, for their domestic purposes, pose severe risks to their health and wealth being, due to their susceptibility to water borne diseases.

Moreover, the projected decrease in rainfall is expected to impact coastal populations that are dependent largely on ground water resources to meet their domestic, commercial and industrial needs. Guyana is also faced with contamination of surface water in areas such as Georgetown and areas along the coastal lowlands that are very populated due to inadequate and indiscriminate waste disposal practices. Concerns of the Environmental Protection Agency relate to biological and chemical contamination that is mostly prevalent along the coast because of open-ditch sewers and septic tanks that are impacted by floods during the intense rainy seasons, as well as changes in turbidity, pH, conductivity and low levels of dissolved oxygen in surface water. In addition, iron rich soils and runoff from agricultural practices change water chemistry along the coast (Parsram, 2010). Inadequate waste management also represents a health risk, mainly in urban areas. During the 2005 floods, canals were not adequately draining, partly due to waste accumulation in them. This contributed to outbreaks of leptospirosis (WHO, 2009).

In the absence of adequate groundwater supplies inland, hinterland residents may resorted to using creeks and rivers nearby that may require treatment before consumption and was not easily accessible given the topography of the region. As a result, residents may consume contaminated water and were exposed to various water borne diseases (cholera, dysentery, gastroenteritis and typhoid).

Another health related issue is malaria that affects every region in Guyana, though prevalent, it is higher in rural and hinterland regions (especially Regions 1, 7 and 8), where there is less access to appropriate health infrastructure.

With regards to nutrition, climate change has also threatened the food security in both coastal and hinterland areas (for example, in the North and South Rupununi in Region 9), although not to a great magnitude to cause chronic malnutrition in Guyanese children. Undoubtedly, there exists the problem of inadequate nutrition with respect to food quality and quantity, as a result of floods and droughts, since food crops, particularly cassava which is an Amerindian staple diet, are destroyed and many families, particularly in hinterland areas can ill-afford the transportation costs to access food from the coast.

The Impact of CEE on access to basic services and infrastructure

The situation regarding children with respect to water, nutrition and health has several root causes, chief of which is the lack of/or limited social infrastructure to deliver these services. UNICEF (2016) reports that maternal and child mortalities are associated with the following underlying causes: inadequate health care, lack of full immunization, the unhealthy situation of household environment in relation to water and sanitation, and by household food insecurity, as well as poverty, social norms, regional disparities and gender norms that have been identified as the structural causes. Additionally, the afore-mentioned causes are worsened for children (under the age of 5) who reside in the Guyana's hinterland, in the rural areas, living in poor families and from Amerindian families, since they, more often than not, lack access to good quality health services. For example, open defecation is practiced for less than 1% of the population in Guyana, but its practice is higher among those living in Regions 7 and 8 (11% of the population) (UNICEF, 2016).

Further, increasing frequency and intensity of droughts, mostly in hinterland areas will negatively affect the WASH programme, with increasing frequency of use of unsafe water sources in these conditions where water security is low. On Guyana's coastlands, increasing occurrences of flooding from heavy rainfall events and possible salt water intrusions from rising sea levels and storm surges could compromise many safe fresh-water sources; thus leading to water insecurity and the use of unsafe water sources, which in turn, can increase the prevalence of water-borne diseases such as diarrhoea and cholera, and can have devastating impacts on the health of children, sometimes leading to death. In fact, children living in the interior of Guyana have three times more chance of having diarrhoea than those living in urban areas. Similarly, 21% of the children living in Amerindian communities; Region 7,8 and 9 had more cases of diarrhea reported. (UNICEF, 2016).

Importantly, the lack of energy services in hinterland areas disrupts the provision of health care, emergency services, water and other critical infrastructure. Children, particularly those in hinterland and rural communities, lack sufficient access to energy services: for instance, reliable electricity supply to study at nights or use ICT. In other cases, children may be required to search and collect firewood as part of their household chores which can be burdensome and time consuming. Also, the homes that use firewood for cooking are exposed to particulate matter (soot or smoke) and high concentrations can lead to respiratory problems, allergies, and asthma.

As a result, there are two major effects on our children; carbon monoxide poisoning/exposure and

interrupting of social services that require power (for example, schools). Further, energy costs also prevent poor families from accessing the service due to the issue of affordability and, at specific hours of the day, some families have no power for use; Wi-Fi for research, power to iron clothes necessary for school clothes washing machines, all factors affecting children.

Lack of a reliable power supply also affects school children's ability to study and engage in other important extra-curricular activities. Although street lights can be found along the main access roads, they are not usually available along the streets leading to them. This can be dangerous for children and young adults returning home from lessons and other extracurricular activities; especially around year end since it gets darker as the sun sets earlier. Even though some children may want to attend extra lessons to fully grasp the concepts taught at school in their academic pursuit, they are told by parent to return to their homes that are perceived as being safer. Consequently, many children do not attain education beyond the primary level and are hardly involved in extra-curricular activities which would have helped to develop their psycho-motor skills, memory and, ultimately their improved social development.

It is noteworthy that poverty is an underlying factor that affects the ability of children in Guyana to adapt to climate change and to access energy services in Guyana. Indigenous children are disproportionately affected in this case, given that poverty is particularly marked among Amerindian and rural interior populations. Specifically, the socio-economic deprivations of poor households limit their adaptive capacity.

The Impact of CEE on Education

Rural and interior parts of Guyana have lower attendance, and the poorer a family, the smaller are the chances that the child will attend programmes that are available. The situation in Guyana is worsened by the lack of effective early warning systems in mostly rural and hinterland communities. Additionally, the physical burden, coupled with the psychological anxiety and stress during periods of climate variability (particularly during dry spells) impacts the mental state of children, whose attention span and capacity to concentrate are often below expectation. It should be noted that many school in the hinterland are without regular supply of electricity and are built with materials (such as zinc sheets) that trap heat; therefore increasing the discomfort of children at school.

During periods of inclement weather characterised by heavy rains and strong winds the roofs of school building are 'blown away', thereby leaving students exposed to the storm due to inappropriate designs of buildings and failure to use more resilience materials for construction of building. Moreover, stakeholders have observed that in emergency situations, schools are used as temporary shelters; thereby increasing the length of time children are away from classes. Such a situation can cause families to be so frustrated that they prevent their children from attending school.

The Impact of CEE on Child Protection and Social Inclusion

The impacts of CEE can have indirect effects on child protection: for example, forced migration in search of alternative livelihoods during climatic events can affect the family as a social unit, as well as lead to violence and abuse in the home as a result of psychological stress, as noted during the 2005 flood event in Guyana.

Moreover, three critical issues regarding child right in Guyana are poverty, child labour and truancy in the school system. Each of these issues will be exacerbated by climate change given that: (i) children lack access to potable water supply, food and energy during natural hazards and disasters in would often leave their homes to enhance their chances of survival during these grave situation; as such, they are exposed to abuse by adults and also reducing their time for schooling; (iii) displacement or relocation due to environmental factors often disrupt their schooling (iii) children seek employment (child labour) due to deprivation of income and basic needs in their homes; (iv) during floods children are forced to occupy shelters that are not 'child friendly; hence they may be exposed to different forms of abuse; and (v) children are exposed to diseases due to poorly constructed sanitary facilities in rural and hinterland areas.

The Impact of CEE on Indigenous people

Indigenous children and families inhabit mostly the forest and savannah areas and depend on natural resources and other ecosystem services of their environment for their sustenance. This makes them very vulnerable to climate change, due to a number of factors that increase sensitivity and exposure, including dependence on ecosystem services and agriculture, and isolation from main infrastructure and transportation networks. Thus, any slight alteration in the eco-system affects the residents of these villages inclusive of the many young lives that are dependent on the same factors.

Undoubtedly, the unpredictability and effects of climate change disrupt the livelihood of these persons, particularly during periods of heavy rainfall as household face issues of inundation, food and water insecurity and health risks. In many cases, children in the hinterland, who are been very dependent on surrounding ecosystems where animals, fruit trees are abundant, are denied access due to such hazards as flood, drought and wildfires. There are also issues of soil fertility change, flora and fauna life depreciation, and disturbance of wildlife population- all of which directly affect the well-being of the children living in these areas, given their subsistence lifestyle. According to the MOIPA, the most severely affected areas are Region 1 (north-west) and Region 9 (south-west), home to approximately 23,000 indigenous Amerindians, where, in addition to drought, fires have been raging. Crops and livestock have suffered, significantly reducing food supplies. People employed in agriculture (especially subsistence farming), forestry and fishing are seriously affected by the low water levels in rivers, creeks and ponds. Unsafe drinking water and the risk of waterborne or water-related diseases pose serious health threats: an increased number of malaria and dengue fever outbreaks have been reported; even as depleted river levels hinder the use of waterways for transportation purposes; thereby affecting children's attendance at school.

Programmes and projects related to Climate, Energy and Environment are supported financially by multilateral and financial donor institutions such the UN Development Framework Guyana: 2012-2016, the FAO Country Programming Framework: 2016-2019 and the IADB Country Strategy: 2017-2021.

The impacts of climate variability (ENSO) and longer term climate change, coupled with environmental degradation pose grave consequences for the sustainable human development of society, particularly children, given that structural issues limit the extent to which their rights can be fully guaranteed. Given the role of UNICEF in helping to ensure that children rights are honoured and fulfilled, there is need for the integration of several measures into the next Country Programme. In addition to an

Implementation Plan in Annex III, the following recommendations are made:

- a) Strengthen UNICEF CO Engagement in CEE;
- b) Strengthen the mainstreaming of CEE in the 2018 Country Programme;
- c) Support Child Sensitive CEE Policy and Planning;
- d) Promote greater collaboration with the CDC;
- e) Engage the MOE to support Education for Sustainability;
- f) Support the creation of child friendly information;
- g) Promote and support greater equity in accessing potable water supply, schools and health centres in rural and hinterland areas;
- h) Support the design of Child Friendly Infrastructure; and
- i) Further research on barriers to children engagement in CEE.

1. INTRODUCTION ¹

1.1 The Context of the Study

For approximately seven decades, the United Nation’s Children Fund (UNICEF) has been working on the ground in 190 nations to encourage and support children’s survival, protection and development, and in particular, in areas such as child health and nutrition, good water and sanitation, quality basic education, as well as the protection of children from violence, exploitation, and Acquired Immune Deficiency Syndrome (AIDS). In addition, UNICEF has recognised the importance of addressing the issues of global climate change², energy access and environmental degradation that disproportionately affect children and young people; thereby hindering their capacity to benefit from a more secured and sustainable future. According to the UNICEF 2015 Annual Report: *The effects of climate change –diseases, droughts and floods that destroy food sources and livelihoods– further exacerbated risks to children and deepened deprivation for millions. Crushing poverty and widening disparities in health, education and protection undermined the lives and futures of millions more.....Children who are given a fair start in life – nurturing care, access to nutrition and basic health services, an education, protection from violence and exploitation – are more likely to fulfill their potential as adults and make their societies richer in every sense.*

To this end, UNICEF has been proactive in its institutional response, for example, by integrating climate and environment issues in one of the five Goal Areas of the new Strategic Plan (2018-2021) that was approved in September 2017.

It is within this afore-mentioned context that UNICEF Guyana has taken a decision to conduct a Climate Landscape Analysis for Children (CLAC)³, examining the baseline situation of climate, energy and environment (CEE) -related issues affecting children and how they relate to UNICEF’s priorities. Specifically, the ultimate aim of the CLAC is to help to identify: (i) Knowledge and data gaps and issues for further research; (ii) Strategic entry points for the CO (mainstreaming and stand-alone); (iii) Strategic partnerships; (iv) Opportunities for leveraging climate finance for improved results for children; (v) What UNICEF can bring to the table in potential joint proposals and partnerships; and (vi) Recommendations for building the office’s capacity on climate, energy and environment issues.

1 Information obtained from the Terms of Reference for the Consultancy and slightly modified.

2 Climate change refers to a change in the state of the climate that can be identified (e.g., by using statistical tests) by changes in the mean and/or the variability of its properties, and that persists for an extended period, typically decades or longer. Climate change may be due to natural internal processes or external forcings such as modulations of the solar cycles, volcanic eruptions, and persistent anthropogenic changes in the composition of the atmosphere or in land use.

3 The CLAC is a scoping exercise of what CEE issues are in a country and how they affect child rights in the country. It helps in identifying and prioritizing entry points for CEE action.

1.2 Methodological Approach

This Report has been prepared in collaboration with the UNICEF Headquarters Office and the UNICEF Country Office. A mixed methods approach was adopted in order to give consideration to the methodological guidelines of the CLAC and particularly in respect of the following themes:

- The climate, environment and energy situation in the country;
- Institutional mapping: Government responses to/priorities on CEE;
- The impact of climate, environment and energy issues on children;
- Child-Inclusive CEE policies, strategies and programming;
- The UNICEF Country Programme and linkages to CEE; and
- Recommendations.

The following were the principal data collection methods that were employed for the study.

- i. Desk review and analysis of available documentation specified in the list of references which includes documented research, consultants' reports, case studies review of case studies around the world that have similar socio-economic, environmental and cultural context, and any other publications deemed necessary to help facilitate an institutional mapping of key actors, and more importantly, a descriptive analysis of the climate, energy and environment situation and how these impact children in Guyana.
- ii. In-depth, face to face interviews and focus group meetings (as deemed necessary), with stakeholders, using a semi-structured interview schedule that benefited from a peer review process, involving UNICEF officials. Notably, the questions were only used as a guide since stakeholders had different areas of interest, expertise and mandates. Thus, this data collection method aimed to fill any data gaps observed during the desk review and analysis of available documentation, as well as to provide data on planned projects of stakeholders with particular reference to energy, climate, and environment.
- iii. Professional experience, knowledge and judgment were used to a lesser extent by the Consultant; given her role in research and policy formulation on environmental and climate change issues in Guyana.
- iv. In an effort to validate the findings of the report, the Consultant in collaboration with the UNICEF Guyana Office facilitated a stakeholder validation workshop with the Project Steering Committee and any other key stakeholders deemed critical to the review process to provide an opportunity for feedback.

2. GUYANA: A BRIEF SUMMARY

Guyana is a relatively small developing country that is located within the equatorial trough zone at 5° 00' N and 59° 00' W. It has a total territory of 214,970 square kilometres (km²) and is bounded by the Atlantic Ocean on the north, Suriname in the east, Venezuela in the west, and Brazil in the west and south (Figure 1).

Figure 1: Location of Guyana



(Source: <http://botany.si.edu/bdg/vegmap.html>)

The country, which has less than one million inhabitants with children⁴ representing approximately 36 % of the total population, is particularly known for its forests (see Figure 2) that cover more than 80% of the land, rich biodiversity, productive coastal soils, minerals including gold and diamond, as well as its numerous rivers, streams, creeks and waterfalls.

4 According to the Convention on the Rights of the Child, a "child" is a person below the age of 18.

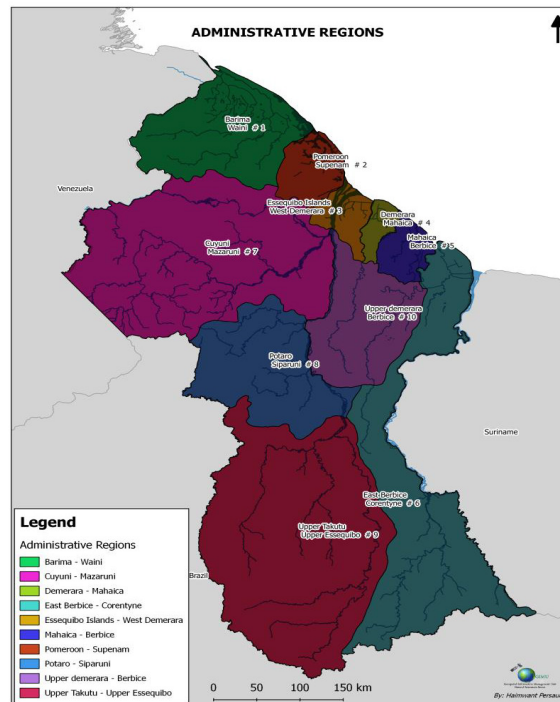
Figure 2: Vegetation Map of Guyana



Source: <http://botany.si.edu/bdg/vegmap.html>

According to the Guyana Bureau of Statistics (2014) the Coastal Regions of Guyana (Regions 2,3, 4,5,6, and 10) account for 88.1 % of the total population, while the Hinterland Regions (Regions 1,7,8 and 9) account for the remaining 10.9% (see Figure 3).

Figure 3 : Map showing location of Administrative Regions in Guyana



Source: *State of the Environment Report: Guyana, 2016*

Unarguably, one of Guyana's most valued natural assets is its rainforests, which cover approximately 76 percent of the country, contain over 5GtCO₂ in above ground biomass, and are estimated by the World Resources Institute (WRI) and United Nations Food and Agricultural Organization (UNFAO) to cover an area of approximately 16.3 million hectares (World Wildlife Fund (WWF), 2009). Guyana has a historically low deforestation rate of approximately 0.1% to 0.3% per annum, and as such, is classified as a High Forest Cover Low Deforestation Rate (HFLD) country (NORAD, 2011).

The 2016 State of the Environment Report notes that the proportion of people living in extreme poverty in Guyana fell from 28.7 per cent to 18.6 per cent between 1993 and 2006, and that during the same period, the percentage of people living in moderate poverty fell from 43.2 percent to 36.1 percent. Further, poverty in the rural interior is significantly higher than in the rest of the country.

Younger aged cohorts also have higher poverty rates. In 2006, 33.7 % of people aged 16-25 were under the poverty line, almost 10 points more than people older than 41 (24 % under the poverty line) (Ministry of Finance, 2011). While the incidence of poverty has declined since 1999, it remains particularly marked among Amerindian and rural interior populations, children and young people below 25 years old (National Health Strategy for Guyana 2013-2020, 2013).

Moreover, according to the UNICEF Situation Analysis of Women and Children in Guyana (2016), *Guyana is considered to be a medium human development country. In UNDP's Human Development Report of 2014 (UNDP, 2014), the country's value for HDI was 0.638, ranking Guyana in position 121 among 187 countries. Despite the fact that the latest value shows and improvement of 0.87% when compared to the value in 2000, the country has been stagnated in the same ranking position since 2008.....* Poverty in Guyana has a child's face. Similar to previous measurements, the poverty number from 2006 shows that younger age cohorts have a significantly higher poverty headcount than older ones. 33.7% of young people aged 16-25 lived in poverty in 2006. Almost half of all children aged 16 and below were poor (47.5%) in 2006 (UNICEF, 2016, p.10).

As a member of the Small Island Development States (SIDS)⁵, Guyana is faced with similar constraints in her sustainable development efforts: high costs for energy, infrastructure, transportation, communication and servicing; little resilience to natural disasters; growing populations; high volatility of economic growth; a proportionately large reliance of their economies on their public sector; and fragile ecosystems, particularly in the narrow coastal zone. From the standpoint of climate change, SIDS must address such issues as the vulnerability of highly coastal-concentrated agricultural land and infrastructure development due to a projected rise in sea-level, and increased frequency and intensity of storm events-both of which have profound effects on both the economies and environments of SIDS.

5 Small Island Developing States (SIDS) were recognized as a distinct group of developing countries facing specific social, economic and environmental vulnerabilities at the United Nations Conference on Environment and Development (UNCED), also known as the Earth Summit, held in Rio de Janeiro, Brazil (3-14 June 1992). Three geographical regions have been identified for the location of SIDS, namely, the Caribbean, the Pacific and the Atlantic, Indian Ocean, Mediterranean and South China Sea (AIMS). Source: <http://unohrls.org/about-sids/>

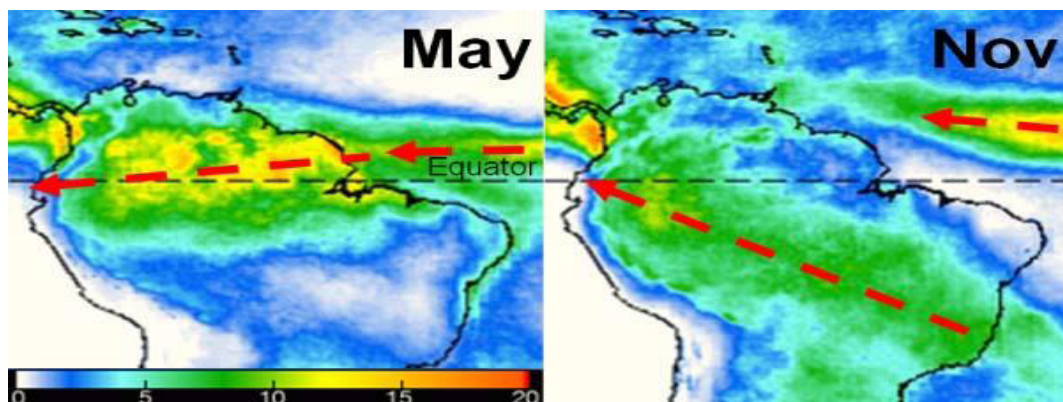
3. THE CLIMATE, ENVIRONMENT AND ENERGY SITUATION IN THE COUNTRY

The country has a wet tropical climate characterized by a high level of rainfall variability which determines seasons. Overall, there are two wet seasons (April to July and November to January) and two dry seasons (February to April and July to November). The major weather system is the Inter-tropical Convergence Zone (ITCZ) and the major climate system is the El Niño Southern Oscillation (ENSO).

3.1 The current climate, including variability, climate related disasters and other environmental factors

Guyana's weather and climate are influenced by the seasonal shifts of the Inter-Tropical Convergence Zone (ITCZ), a cloud and rain-bearing belt of rising air where south-easterly and north-easterly trade winds converge, in turn affecting trade wind direction and rainfall patterns. When the ITCZ is in the north, south-easterly winds prevail south of the equator and rainfall levels are high. On the other hand, most of the country receives less rainfall, with the exception of the coastal areas which benefit from north-easterly winds onshore, when the ITCZ is to the south (Draft Climate Resilience Strategy and Action Plan, 2016).

Figure 4: Seasonal movements of the ITCZ. The ITCZ moves north during May–July and southwards during November–January

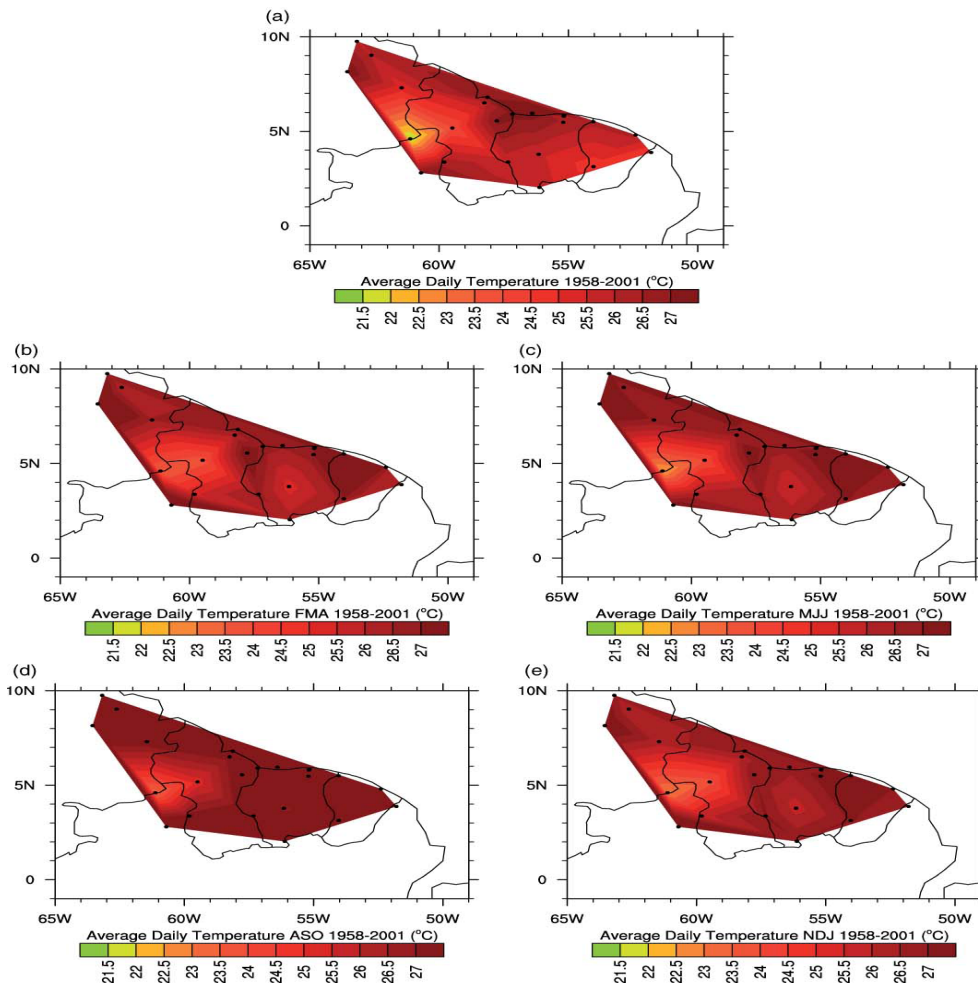


(Source: Bovolo et al., 2011).

Temperatures in Guyana vary geographically with high altitude regions experiencing cooler temperatures than the coastal and lowland zones (see Figure 5). As noted by Bovolo et al. (2011) temperatures in the upland regions and the interior (west) side of the country range between 20°C to 23°C¹. Due to the stabilizing effect of the sea and the north-easterly trade winds, temperatures on the coast range between 22°C and 31°C (See Figure 5). Observed climate data shows mean annual temperatures have increased by 0.3°C since the 1960s, corresponding to an average rate of temperature increase of approximately 0.07°C per decade, with the highest changes occurring in the August-September months (~ 0.10°C per decade). This rate of increase is below the global average

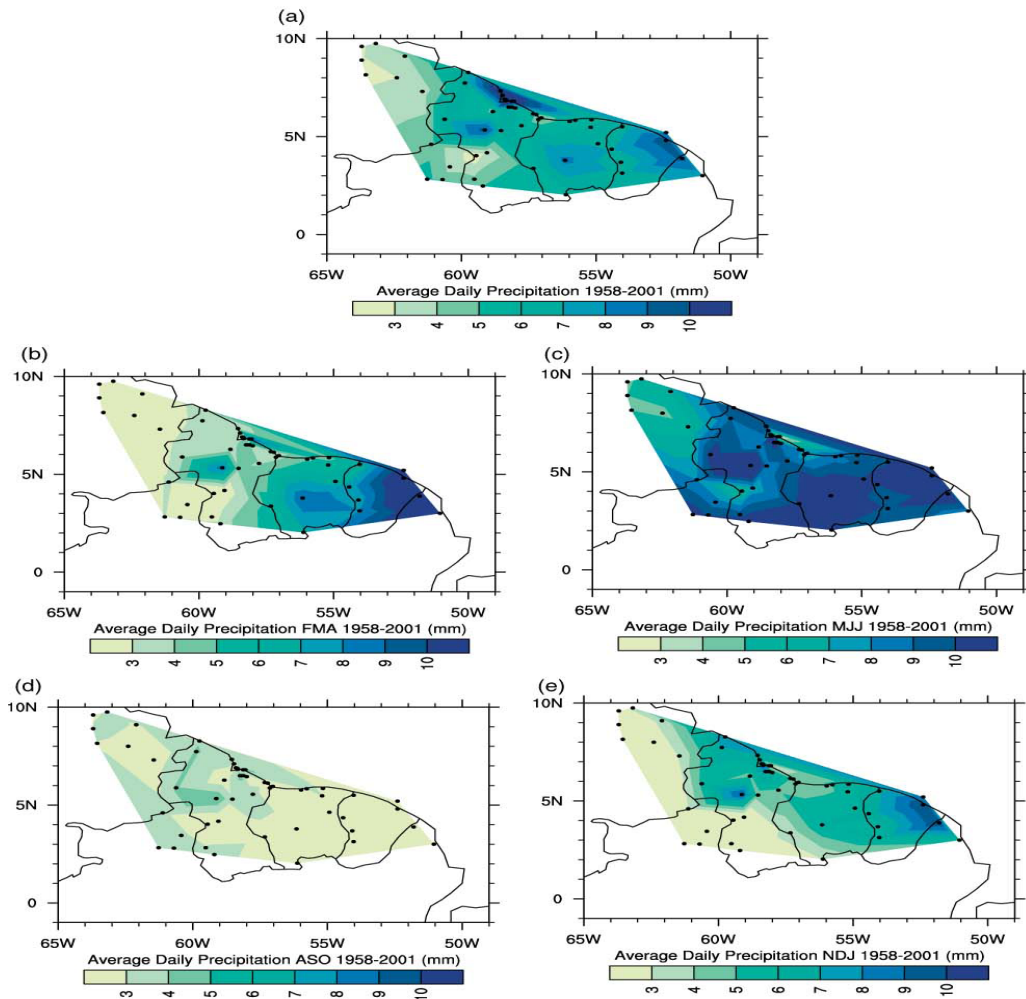
warming of $\sim 0.08^{\circ}\text{C}$ per decade since the 1960s². The average number of cold days per year has decreased by 37 (10% of days) and the frequency of cold nights has decreased at a similar rate (Draft Climate Resilience Strategy and Action Plan, 2016).

Figure 5: Average Daily Temperature



With respect to precipitation, Guyana has two wet seasons (from April to July and from November to January) and two dry seasons (from February to April and from July to November). During the second wet season northern, coastal regions receive between 150 mm and 300 mm of rain per month.

Figure 6: Average Daily Precipitation



Source: (Source: Bovolo et al., 2011).

Annual (a) and seasonal (b–e) average daily precipitation based on available observations for 1958–2001. Seasons are: February to April (b) secondary dry season; May to July (c) primary wet season; August to October (d) primary dry season; and November to January (e) secondary wet season. (Source: Bovolo et al., 2011).

3.2 Observed and projected changes in the climate

Even though Guyana is referred to as a net sink or net CO₂ removal country, vulnerability assessments conducted in Guyana (for example as part of the CRSAP process in 2015) at the territorial level indicated that climate change will impact Guyana in a number of ways. Generally, climate models project that temperatures will increase; annual average precipitation will decline; the proportion of total rainfall that falls in heavy events will increase; and that sea level and the height of storm surges will rise (Initial National Communication, 2002). This in turn will lead to further negative impacts, unless decisions already taken are urgently implemented.

Over the last century, Guyana has experienced significant changes in its climate: while annual average rainfall range is usually between 1,600 mm to 3,000 mm, geographical influences, such as mountains and oceans, have resulted in three major climate types, namely, tropical savannahs (very dry regions), very wet tropical rainforest climate (very wet regions), and wet/dry tropical rainforests (wet/dry regions). Moreover, coastal locations have a mean temperature of 26.8 °C, while interior locations experience 27 °C. The Second National Communication (SNC) to the UNFCCC, (2012) suggests that there has been an increase by 1.0°C of the mean annual temperature within the last century.

While observed climate data reveal increases in mean annual rainfall, with an average rate of increase of 4.8mm per month, equal to 2.7% increase per decade since the 1960s, this trend is not statistically significant. It is noteworthy that the country, as a low lying developing State, is particularly vulnerable to climate change: for instance, floods and drought have had significant impacts on Guyana⁶; flooding in 2005 caused economic damage estimated at US \$465 million (60% of GDP); drought is causing wells in the Rupununi to dry up, with the government trucking water into Region 1 (Barima-Waini) and Region 9 (Upper Takatu-Upper Essequibo) for those communities more severely affected.

A summary of the projected climate change impacts on Guyana are presented in Table 1 below.

Climate variable	2030s	2040s – 2070s	2070s – 2100
Average annual temperature ⁱ	↑ 0.4°C to 2.0°C	↑ 0.9°C to 3.3°C	↑ 1.4°C to 5.0°C
Average annual precipitation ⁱⁱ	+0% to -4%	-4% to -8%	-4% to -5%
Proportion of total rainfall that falls in heavy events ⁱⁱⁱ		↑ 1-2%	↑ 2-3%
Sea level rise ^{iv}	↑0.14 m to 0.26 m	↑ 0.21 m to 0.43 m	↑ 0.25 m to 0.51 m
Sea level rise + storm surge ^v	↑ 2.94 m to 5.94 m		↑ 2.93 m to 6.19 m

Table 1 : Summary of climate change scenarios for Guyana

(Source: McSweeney et al., 2008, Government of Guyana, 2012, cited in CRSAP, 2016.)

6 Guyana has been classified as a high flood risk country by the UNISDR, with the greatest vulnerability experienced within the coastal zone.

i Results are minimum to maximum values across a range of scenarios and General Circulation Models (GCMs). Source: McSweeney et al., 2008.

ii Results are median values across a range of scenarios and General Circulation Models (GCMs). Source: McSweeney et al., 2008.

iii A 'heavy' event is defined as a daily rainfall total which exceeds the threshold that is exceeded on 5% of rainy days in current climate of that region and season. This table refers to median annual change in %. Source: McSweeney et al., 2008

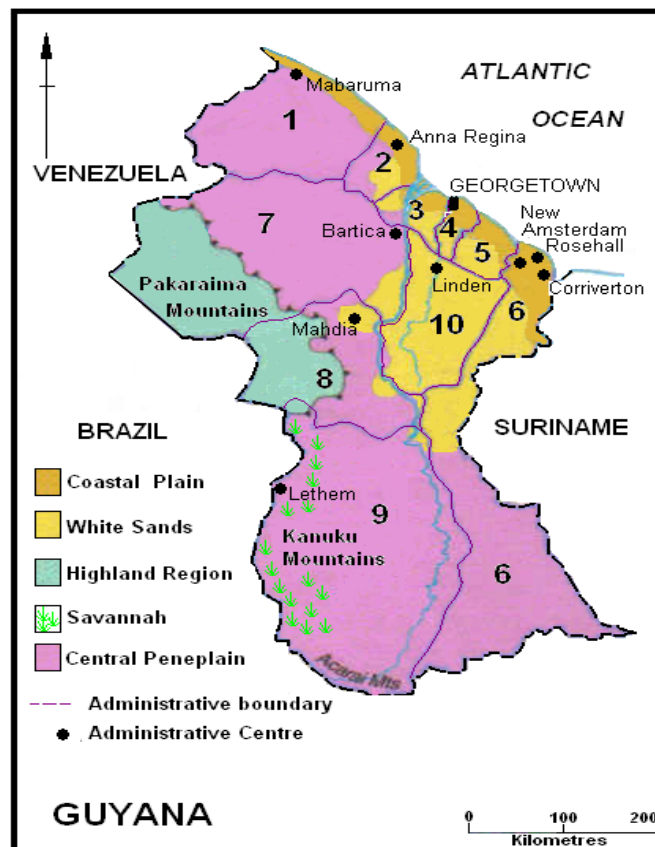
iv Source: Government of Guyana, 2012

v Source: Government of Guyana, 2012

3.3 High Exposure Areas

Guyana is vulnerable to different natural hazards and potential disasters including flooding, landslides, drought, fires, and severe weather systems, among others. According to UNICEF (2016), between 1990 and 2014, floods were the main natural disaster that occurred in the country. In fact, the IDB Disaster Exposure Index (DEI)³ ranks Guyana as the fourth most exposed country in the Latin American and Caribbean region to natural disasters. This high level of exposure (0.60 on a scale of 1.00) is mainly due to the country's high exposure to and experience of flooding and drought (CRSAP, 2015). Notably, in 2005, one of the most intense flood events caused significant damage to property, infrastructure and the economy, in particular, the agricultural industry, one of the main income earners for Guyana. Damage was estimated at US \$54.5 million (17.56% of the total GDP) (ECLAC, 2005). The total damages caused by the 2005 flood were estimated at US \$465 million (Government of Guyana & United Nations, 2012). Records also indicate that approximately 34 persons died, apart from the fact that essential services (schooling, transportation and safe water distribution) and basic economic activity (primarily agricultural production) were disrupted, while thousands were displaced from their homes for several months.

Figure 7: Map of Guyana showing Geomorphologic and Administrative Regions



Source: Guyana Forestry Commission, 2014

In 2006, the country experienced another major flood event costing US \$30.1 million in damages which severely hampered the recovery of the agriculture industry (State of the Environment Report, 2016). Most recently, flooding occurred in 2015, after receiving more than 100 mm of rain in 24 hours (Hydrometeorological Service, 2015), resulting in significant inundation of areas along the East Berbice-Corentyne (Region 6), Demerara-Mahaica (Region 4), including Georgetown, and some areas of Mahaica-Berbice (Region 5). Further, the State of the Environment Report (2015) notes that in June 2011, continuous heavy rainfall in Region 9, resulted in the worst flooding event since 1973. The two of the most populous areas were the most significantly affected as critical infrastructure, such as roads, bridges and electricity plants, were damaged. Flooding can therefore be described as a county wide problem affecting both coastal and hinterland areas. The UNICEF 2016 Situation Analysis Report records that in the coastal area, flooding results from heavy rainfall, overtopping of the river networks, and breaches in the conservancies or seawall, whereas in interior areas, heavy rains and the abundance of rivers create the conditions to constant increases in the water levels.

Several areas in Guyana have been exposed to drought conditions. In 2015 and 2016, hinterland communities (particularly in Regions 8 and 9) have been faced with drought conditions that impacts climate dependent sectors such as agriculture and water. A Caricom Community Climate Change Centre funded Study that was conducted in Lethem and its nine adjacent Amerindian communities by a team of researchers (led by the author of this report) records that impacts shared by the stakeholders included: reduction in water availability (with most of the hand dug wells in the community becoming dry and the composition of the water being altered as noted by the Neighbourhood Democratic Council (NDC) and other stakeholders. Other impacts were associated with food insecurity are: reduction of crop yield (for example, cashew and Amerindian main staple: cassava) and reduced availability of fish. Stakeholders also raised concerns about the dust pollution since all the roads in Lethem are lateritic. The study highlighted the principal human health as skin rashes.

Table 2 below summarises the major hazards of administrative regions in Guyana, as described in the 2017 Risk-informed, Child Friendly Regional Profiles.

Administrative Region	Summary of Risk Profile
1-Barima-Waini	<p>In Barima Waini, the most hazard exposed areas are located in the Port Kaituma area extending to Arakaka and Eclipse Falls. Additional areas of significant exposure are centred on Baramita in the upper Waini River basin. These areas are vulnerable to water pollution, issues related to solid waste management, mining related hazards, and flooding. All of these hazards have the potential to expose residents to epidemics, which can amplify the hazard risk.</p> <p>These hazards have the ability to affect children’s ability to access health, social services, and education. The amplified exposure to epidemics, together with restricted access to health and social services in disaster scenarios, increases the risks posed to children.</p>

2-Pomeroon-Supernaam	The hazard exposure risk of this area is due to a combination of crop pests and diseases, and precipitation and river defence related flooding, as well as salt water intrusion. Such a combination of exposures renders the region very vulnerable to food insecurity.
3- Essequibo Islands West Demerara	<p>Being a coastal region, floods are deemed the major hazard, with the 100-year event flood of 2005 being particularly severe in impact. Fires of human (domestic fires) and natural (bush fires) origin are said to occur seasonally within the region. Outbreaks of diseases have on occasion been reported, the most recent being the Chikungunya epidemic of 2014.</p> <p>Improper garbage disposal has also been identified as a chronic issue, while water contamination, air pollution, drought and dust pollution (from cane and rice harvesting) are reported as seasonal events.</p> <p>In the estuarine areas of both the Demerara and Essequibo Rivers, and particularly on the islands of the Essequibo River, erosion is of major concern as is overtopping of sea/river defences during spring tides. Salt water intrusion has also been reported in these areas.</p>
4- Demerara-Mahaica	Not available
5- Mahaica-Berbice	<p>Region 5 is exposed to several hazards of both natural and anthropogenic origin. Being a coastal region, floods were deemed the major hazard, with the 100-year flood event of 2005 being particularly severe in impact. Fires of human (domestic fires) and natural fires) origin (referred to as bush fires) have been observed seasonally.</p> <p>Outbreaks of disease have been reported- the most recent being the Chikungunya epidemic of 2014. Water contamination, air pollution, drought and dust pollution (from cane and rice harvesting) are noted as seasonal events.</p> <p>Garbage disposal has been reported as a chronic issue.</p>
6- EastBerbice Corentyne	<p>The region is subject to natural and anthropogenic hazards. Their effects are concentrated on the coastal subset of the Region where the majority of the population and infrastructure exist. Floods are the major hazard with notable events in 2005 which affected the majority of the coast, and 2013 in the Black Bush Polder area. To a lesser extent, domestic fires occur throughout the year while bush fires occur in the dry season.</p> <p>Outbreaks of disease have been reported for this Region- the most recent being the Chikungunya epidemic of 2014.</p> <p>Improper garbage disposal has been reported as a chronic.</p>

7-Cuyuni-Mazaruni	Although Cuyuni Mazaruni is a mountainous and hilly region, there has been localised flash flooding in lowland areas. Additionally, this region is at risk by a limited landslide risk, tempered by the intact nature of the forest cover on most slopes and low population densities.
8-Potaro-Siparuni	<p>Malaria is endemic in the region and waterborne illnesses are also relatively widespread, though of low intensity.</p> <p>The major hazards appear to be those of anthropogenic origin, linked to extractive industries. Pit collapses, retention dam failures and accidents in the logging industry are the most often reported hazards. Of these, retention dam failures are of greatest concern due to their potential for contaminating land and water bodies far from their source.</p>
9-Upper Takatu-Upper Essequibo	Not available
10-Upper Demerara-Berbice	Not available

Table 2: Summary of Risk Informed, Child Friendly Regional Profiles

Source: Ministry of Communities & UNICEF, 2017.

3.4 Other relevant environmental issues

Guyana has faced other major environmental issues which remain the same in nature, but of a lower intensity compared to research findings that were communicated by Bynoe (2008). These issues are briefly described below reflect the findings of Bynoe (2008), the State of the Environment Report on Guyana (2016), and the National Appropriate Mitigation Actions (NAMA), 2017.

- I. **Land and water pollution:** Guyana is still faced with the challenge of waste water collection and treatment. Currently, there exist only two sewerage systems that are located in the capital city of Georgetown and therefore receive its domestic wastewater. The first system is the Central Georgetown Sewerage System, a gravity fed system comprising 24 interlinked sewerage basins that drain into a single pumping station. This system serves almost 31 percent of the town's population. The second system is the Tucville Sewerage which serves residents of the Tucville community, thereby receiving sludge from septic tanks in the Greater Georgetown area and from private waste disposal tankers. The wastewater from both sewage stations is pumped and discharged into the Atlantic Ocean via the Demerara River. All other towns in the country lack sewage system or waste water treatment facilities; as such, waste water and liquid wastes are generally drained in septic tanks. This process remains un-regulated and therefore poses a health risk to urban dwellers, particularly children.

It is noted, however, that the GoG has recently piloted a project aimed to reduce the installation cost of septic tanks for low income families by providing financing for the construction of the septic tanks at a value of USD 1,200. The selected applicant has to prequalify and is required to contribute equity in the form of plumbing and equipment to connect and activate the system. This project is funded by the European Union (EU) and the Inter-American Development Bank (IDB) and is executed through the Central Housing and Planning Authority and in collaboration (State of the Environment Report on Guyana, 2016).

- II. **Hazardous Waste Disposal:** Currently, there is no facility to dispose or treat hazardous waste. This problem is the consequence of several factors: inadequate infrastructure, limited monitoring and irregular enforcement of legislation, insufficient financial resources, poor governance and the absence of organised solutions; unacceptable social behaviour and industry⁷; lack of strong enforcement of the Environmental Protection (Hazardous Waste) Regulations (2000), and the absence of regulations to address the import, export and in-transit shipments of hazardous waste. In fact, the state of the Environment Report (2016, p.129) unequivocally states that: *The generation of hazardous waste has been steadily increasing and is likely to continue to increase. The improper management, treatment and disposal of hazardous waste is a significant environmental problem in Guyana since there are no hazardous waste disposal facilities, and the treatment facilities that exist in Guyana are currently inadequate. there has been an increase in the number of persons becoming authorized for the export of used lead acid batteries for recovery. As such, over the years, the amount of hazardous waste has accumulated due to the lack of disposal options in Guyana.* Notably, the National Strategy and Management Plan for the Sound Management of Hazardous Waste for Improved Public

⁷ Industries have not acquired updated technology because of impact on production costs, unwillingness by some industries to invest in technology, lack of appropriate policy and to some extent enforcement of policy relating to standards for importation of cars/technology etc.

and Environmental Health in Guyana, (an output of the Hazardous Waste Inventory Study for Guyana) has not been officially endorsed and implemented.

- III. **Surface Water Pollution:** In the interior of Guyana, degradation of rivers and streams and pollution of surface and ground waters result from unsustainable mining practices. Two examples that heighten concern are: the release of mercury during the amalgamation process in small scale gold operations by itinerant miners (some of whom are operating illegally) and thereby threaten the livelihoods and health of communities; and high turbidity of rivers and creeks as a result of land and river dredging operations. According to the State of Environment Report (2016, p.217): *Dredging and other types of mining operation, such as hydraulicking using surface water, cause hydrocarbons to be released and increase sediment loads in rivers and streams. Although improvements were made, effluent generated by mining activities still gets into waterways resulting in high levels of suspended solids usually above the critical level of 30 NTU from small and medium-scale mining activities and in some cases tailings are either discharged directly or seep into waterways.*

Further, studies in the gold mining areas of Region 1 in 2006 showed that all water samples contained mercury above the WHO drinking water quality guideline of 1 mg/l, and sediment samples showed levels of mercury that exceeded the Canadian Environmental Quality Guidelines of 0.486 ppm. About one-third of all fish caught had mercury levels higher than those recommended by the United States Environmental Protection Agency of 0.5 ppm, and results from a survey of the human environment showed a significant level of mercury contamination in the northwest area of the country (PAHO, 2012, cited in UNICEF, 2016).

Other activities such as bauxite mining, improper disposal of sawmill wastes; tourism related recreational activities, and to a lesser extent agriculture, also have polluted these freshwater sources reducing the quality of surface water (Parsram, 2010).

- IV. **Ground Water Contamination:** According to the State of the Environment Report (2016), the Boa Vista-Serra do Tucano-North Savannah is faced with the risk of pollution, given its shallow water table and the increase in agricultural activities within Region 9. The aquifer is exposed to pollution, as well as, from municipal wastes, particularly in the absence of a regulated sanitary landfill where most wastes are released directly into the environment. The Report advises that pollutants may also be transported via hand-dug wells which are used as a source of water for communities within Region 9, and if (they are) not closely monitored, citizens could consume contaminated water from groundwater sources.
- V. **Air Quality in Georgetown⁸:** Recent studies on air quality is a cause for concern due to burning of sugar cane fields (to the south of Georgetown); uncontrolled burning of domestic and other sources of wastes; increase in waste generation; improper waste disposal at the landfill site at Haag Bosch; increase in the number of vehicles and traffic congestion in central Georgetown; and unauthorized small-scale industrial activities (for example, paint shops). Another source is the combustion of fuels (and subsequent emission of air pollutants such as carbon monoxide and nitrous oxide) by Guyana Power Light for electricity generation. It is noteworthy that the majority of energy in Guyana is derived from imported petroleum: in fact, Guyana's petroleum dependence grew at an average rate of 7% in the last five (5) years.

⁸ For more information see GEO Georgetown Report. Chapter II. 2008.

It is estimated that petroleum imports from 90% of the country's current energy mix with the remaining 10% being shared among fuelwood, charcoal, solar and bioenergy⁹.

Each of the issues listed above will undoubtedly impact children: for example, the direct impacts of climate change, such as flooding of coastal areas, overtopping of sea defences, and impacts on water resources will affect mostly women and children, particularly children living in poverty, indigenous children and children who are faced with disabilities.

3.5 Energy Access

Currently, Guyana's energy supply comprise imported petroleum products,¹⁰ (80% of primary energy), two electric grids that generate power from fossil fuels to supply the principal population areas (predominantly coastal), a number of isolated mini-grids, and biomass in the form of sugar cane bagasse and fire wood (collectively 19% of primary energy) that are used for heat and electricity (Guyana Energy Policy, 2017).

In 2010, Guyana imported and consumed more than 4 million barrels of petroleum products, suggesting that there were increases of 4.28% and 1.68% respectively in both imports and consumption. Moreover, petroleum product imports indicate increases at an average rate of 7% annually. According to a recently concluded rapid assessment conducted by the Guyana Energy Agency, assuming that this trend continues, petroleum product imports would increase by 40%¹¹ of its 2011 value in the next five (5) years. (Guyana Energy Agency, 2014).

The Guyana Energy Agency (2014) also noted that there was an estimated 9,155 GWh of total primary energy was supplied in 2011, and that petroleum products accounted for 74%, while renewable and alternative sources supplied the remaining 26%. It is noteworthy that the distribution of energy consumption supplied by petroleum products was described as follows:

- Electricity: 33%
- Transportation: 28%
- Residential and Commercial: 16%
- Agriculture and Mining: 12%
- Industry and Manufacturing: 6%.

Additionally, the breakdown of electricity consumption in 2011 was as follows¹²:

- Residential: 45.3% (195 GWh)
- Industrial: 37.4% (161 GWh)
- Commercial: 17.3% (74 GWh)

⁹ Guyana Energy Agency. (2011). *2011 Annual Report*. Georgetown, Guyana: Guyana Energy Agency.

¹⁰ In 2012, total imports of petroleum-based products were 4.9 million barrels, representing 24 percent of the country's GDP (Guyana Energy Agency, 2014).

¹¹ This growth estimate is based on annually compounding. Imports data indicate an average annual growth rate of 7% for the period 2006 to 2011.

¹² Guyana Power and Light Incorporated. (2012, May 2012). *GPL In Perspective*. Georgetown: Guyana Power and Light Incorporated.

There are stark differences with regard to energy supply in coastal regions and interior regions of Guyana:

The current energy situation in the interior communities is characterized by the fact that public infrastructure is weak and in most cases referring to small, stand-alone energy generations systems, mainly for power generation. In small, often remote communities, there is usually no power grid existing to distribute electricity among public services, households or businesses. In larger communities or in vicinity to villages or towns, electricity supply and distribution grids are more common. However, supply is in most cases ensured for a maximum of several hours a day (for example, 3-4 hours in the evening). Additionally, households do very often have their own private gasoline or diesel operated generators, sometimes in addition to the installed solar home systems (GoG, 2012, p.6)

Given that Guyana forested area represents about 70 to 80 % of the country and the current volume of timber being processed in the country, biomass resources including wood wastes¹³ such as sawdust, wood chips, bark, and other timber products constitute readily available energy resources. In 2002, fuel wood was the primary source of energy for cooking in Regions 1, 2, 8 and 9 which accounted for 67% of fuel wood consumption. In 2011, by means of the UNDP funded “Energy Access at Community Level for MDG Achievement in Hinterland Areas” programme, efficient and cleaner burning stoves (using indigenous materials) were introduced to some hinterland residents, and solar cookers were distributed in five hinterland communities.

The GOG 2014 Assessment of Fiscal and Regulatory Barriers to Deployment of Energy Efficiency and Renewable Energy Technologies in Guyana (2014) states that an increasing demand for reliable, cost effective, accurately priced energy supplies is a major challenge to sustainable economic development in Guyana; also that the country experiences difficulties in accessing capital, especially for smaller firms and lower to middle income households. Moreover, the limited knowledge of the technical risks associated with renewable energy and energy efficiency projects limits local investments and opportunities for foreign capital and are affected by high transaction costs, as well as current energy subsidies are some of the chief obstacles to energy efficiency and increased renewable energy use in Guyana.

13 In the case of firewood the efficient use of biomass sources must be emphasized in order to minimize any risks associated human and ecosystems health.

4. GOVERNMENT RESPONSES TO/PRIORITIES ON CEE

4.1 CEE policies, strategies and action plans

The GoG, in partnership with key stakeholders of the Guyanese populace, have developed a number of policies, strategies, and action plans to guide national responses to issues related to climate, energy and environment. Table 3, Table 4 and Table 5 below provide summaries.

I Climate Change

National Strategies/ Action Plan	Year	Decision -Making Function
Guyana Climate Change Action Plan	2001	Provides a reference point for national programmes to help mitigate climate change by addressing anthropogenic emissions by sources and removals by sinks of all greenhouse gases not controlled by the Montreal Protocol, and measures to facilitate adequate adaptation to climate change.
National Climate Change and Adaption Policy and Implementation Plan	2001	Provides a very useful point of reference in the process of identifying key issues of Guyana's Coastal Plains with regards to potential climate change impacts, capacity building, and the institutional and legislative framework. Further, it informs the types of interventions that are necessary at the sectoral level to ensure that Guyana's response to the threat of climate change is planned.
National Poverty Reduction Strategy	2001-2005	Provides the most strategic planning framework at the highest level of national planning with the principal objectives being: (i) to attain the highest rates of economic growth that are possible; (ii) to eliminate poverty in Guyana; (iii) to achieve geographical unity; (iv) to attain an equitable geographical distribution of economic activity; and (v) to diversify the economy.
National Environmental Action Plan	2001-2005	Provides the framework for integrating cross-sectoral environmental concerns into the wider context of Guyana's economic and social programme.
National Protected Area Strategy	2003	Provides the framework for establishing an integrated national system of protected areas.
National Land Use Plan (Draft)	2005	Provides the framework for coordination among the land uses, as well as, facilitates integration of land use and the preparation of a National Land Use Plan.

National Biodiversity Action Plan (NBAP) II	2007-2011	Provides general planning process for biodiversity use and conservation and within the same framework of NBAP I, plus emphasises more stakeholder involvement.
Guyana’s National Policy on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilisation	2008	Articulates a national policy on Access and Benefit-Sharing that is consistent with other national policies and regulations, and with international treaties to which Guyana is a contracting Party.
National Agriculture Sector Climate Change Adaptation Strategy	2009-2018	Promotes more effectively reduce the risks posed by climate change and position the agricultural sector to adapt through technical innovation and diversification to increase its competitiveness and sustainability by 2018.
National Forest Policy Statement	1997; 2011	<p>Places emphasis on forest management and its importance to national development. The specific objectives are as follows:</p> <p>Promote sustainable and efficient forest activities, which utilize the broad range of forest resources and contribute to national development while allowing fair returns to local and foreign entrepreneurs and investors.</p> <p>Achieve improved sustainable forest resources yield while ensuring the conservation of ecosystems, biodiversity, and the environment.</p> <p>Ensure water protection and rehabilitation: prevent and arrest the erosion of soils and the degradation of forests, grazing lands, soil, and water; promote natural regeneration and reforestation and protect the forest against fire, pest, and other hazards.</p>
Low Carbon Development Strategy	2009	Provides overarching national framework for the transformation of Guyana’s current economy to that of a “low carbon economy” while addressing issues related to climate change through a compensatory scheme by marketing Guyana’s standing forest. The strategy is built on Guyana’s vision to encourage investments/economic development while protecting and maintaining its forest cover. The strategy has three pillars: (i) investment in low carbon economic infrastructure; (ii) investment and employment in low carbon economic sectors; and (iii) investment in communities and human capital. This document integrates environmental, social and economic aspects of sustainable development.

Second National Communication (SNC) to the UNFCCC	2011	Provides a reference point for developing programmes aimed to build capacity and strengthen national institutions with regards to climate change mitigation and adaptation in response to the UNFCCC.
Draft Climate Resilient Strategy and Action Plan (CRSAP)	2015	The CRSAP Roadmap summarises the key strategic actions that need to be taken to deliver the CRSAP and increase Guyana’s resilience to a variable and changing climate. It also articulates a timeframe for action focused on the next five years (2016-2020) as well as a proposal for a review and iteration process in 2020. This approach is largely synchronised with the newly commenced government term and national planning cycle (2015-2019). The roadmap recognises that building climate resilience is a journey that requires cycles of action, reflection and iteration as lessons are learnt about effective implementation and resource allocation. Specifically, the CRSAP provides: a roadmap for the next five years; Project Concept Notes for four priority climate resilience programmes which can now be developed into full proposals and submitted for funding; a summary of the most significant climate risks and required resilience actions across 15 key sectors.
National Appropriate Mitigation Actions (NAMA) (Draft)	2017	The NAMA outlines a comprehensive approach for the greening of towns in Guyana, with specific reference to various economic activities in the energy, waste, water and transport sectors. To this end, the NAMA explores possibilities of applying the principle of circular economy and emphasizes the complementarities of the various sectors in the process of the greening the towns. However, it is important to note that the intervening actions listed in the document are address issues of climate, energy and environment.
Technology Action Plan for Adaptation	2017	The TAP provides action plans for the prioritised adaptation technologies, including proposed project ideas which may be developed into detailed proposals for funding and implementation. This strategic document identifies technologies for three sectors, namely agriculture, water, and coastal zone & low lying communities based on their potential, climate resilience and national development priority. Actions include the development of a National early warning system for flood and drought and the use of energy efficient mobile pumps.

Technology Action Plan for Mitigation	2017	<p>The Technology Action Plan for Mitigation identifies the Forests and Energy Sectors as the priority sectors for mitigation and describes a set of technology applications, which include the following:</p> <ul style="list-style-type: none"> a) Energy Sector: Solar farms to service urban centers and supply the national grid; large hydropower plants (over 5MW) to support national energy demands; and Standalone wind farms to service urban centers and supply the national grid. b) Forest Sector: Introduction of geological surveys and mineral mapping to improve exploration; reforestation of mined out areas utilizing fast growing species such as <i>Acacia spp.</i>; and deployment of efficient recovery systems in small and medium scale gold mining operations.
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Table 3: National Strategies and Action Plans to Combat Climate Change and its Impacts

II Energy

National Strategies/ Action Plan	Year	Decision -Making Function
Nationally Determined Contributions (NDCs)	2015	<p>The NDCs outlines Guyana’s conditional and unconditional contributions to the UNFCCC’s Paris Climate Agreement. It also provides the basis for climate change mitigation actions under the UNFCCC related to the Energy Sector.</p> <p>The goals most related to energy transformation are:</p> <ul style="list-style-type: none"> • Reducing dependence on fossil fuels for energy generation by achieving close to 100% renewables by 2025 through a diversified renewable energy infrastructure including biomass, solar, wind and hydropower. • The conduct of energy audits and replacement of inefficient lighting • Public education and awareness programmes

<p>National Energy Policy (draft)</p>	<p>2016</p>	<p>The policy document is an update of the 1994 Energy Policy. It aims to transition away from imported fossil fuels with the deployment of indigenous renewable energy resources, improve energy efficiency, attain universal access to modern energy services and curtail greenhouse gas emissions from the energy sector and minimise the foreign exchange cost of energy to the national economy.</p> <p>The policy expresses Government’s direction for the Energy sector which essentially will provide the basis for planning and implementation of renewable energy and energy efficiency programmes and projects. According to the Draft National Energy Policy (2016) the immediate goal are to increase access to reliable, clean, least cost and affordable energy services that serve the basic needs and demands of the population, and to achieve universal access to green energy services to meet the demand for energy services such as light, process heat, thermal comfort/cooling, static and motive power as a means to enhance social and economic activity and quality of life at the least economic and environmental cost.</p> <p>It is therefore the intention of the GoG to: (i) Support and facilitate the Hinterland Electrification Co. Inc. (HECI), and the Ministry of Public Infrastructure to expand and improve its programmes in rural electrification with an emphasis on the following: (i) micro-grids, solar photovoltaic systems with batteries, run-of-river and river dam hydro, and hybrid renewable energy systems using photovoltaic or wind with biodiesel and other biofuels; (ii) Explore new and proven methodologies for financing of rural electrification. The aim is to examine methodologies for both public sector and private sector financing; (iii) Support the development of independent micro grids by hinterland communities. Programme support will prioritize electrification for productive uses and key social services, particularly health, education, water supply and agriculture; (iv) Identify and carry out feasibility studies on micro/mini hydro sites and other sources to provide power to mini-grids in remote areas. The management of these schemes will be done by local rural communities or local entrepreneurs; and (v) Introduce fixed price feed-in tariff mechanisms for rural mini and micro grids. These mechanisms are aimed at cost effective renewable energy resources. The cost effectiveness criterion will ensure that only least cost renewable technologies are employed, while providing a reasonable return to householders and investors.</p> <p>Additionally, there are two critical initiatives that will influence the objectives and goals of the energy policy: namely: (i) The Guyana Generation Expansion Study and Annexes (2016) which indicates shows that Guyana Power and Light least cost pathway is dominated by (a)renewable energy, including a medium scale hydroelectric power plant which would do the bulk of the generation, plus wind energy,</p>
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		including a medium scale hydroelectric power plant which would do the bulk of the generation, plus wind energy, grid scale solar photovoltaic and biomass, as well as some amount of thermal generation, using diesel or natural gas; and (b). The Brazilian led Arco Norte project that connects the State of Roraima in northern Brazil to the three Guianas and the Caribbean Sea. This proposed project brings to the fore the possibility of Guyana’s participation in cross border electric grids and the development of large scale hydro- power resources.
Green State Developing Strategy (GSDS)	2017	<p>The GSDS articulate Guyana’s long-term development agenda towards a green economy that ensures the sustainable management of natural resources, human development and well-being, and economic growth balanced with preservation of the country’s environmental treasures for future generations. This strategy identifies seven themes considered critical to Guyana’s transition to a Green State:</p> <ul style="list-style-type: none"> • Green and Inclusive Structural Transformation: Diversifying the economic base, accessing new markets and creating decent jobs for all • Sustainable Management of Natural Resources and Expansion of Environmental Services: stewardship of natural patrimony • Energy – Transition to Renewable Energy and Greater Energy Independence • Resilient Infrastructure and Spatial Development • Human Development and Well-being • Governance and Institutional Pillars • International Cooperation, Trade and Investment <p>This Strategy also provides the overarching framework in which the National Energy Policy will be integrated. The strategy also places significant emphasis on ensuring the full delivery of a modernised energy sector, with an increased mix of clean and renewable energy resources. The four core strategic areas on energy are:</p> <ul style="list-style-type: none"> • Achieving a transition close to 100% renewable energy in the power sector; • Achieving affordable, reliable and clean energy services for all; • Ensuring security and quality of energy for business growth; and • Increasing energy efficiency.

Table 4: National Strategies and Action Plans related to Energy

III Environment

National Strategies/Action Plan	Year	Decision -Making Function
National Biodiversity Strategy and Action Plan (NBSAP)	2012-2020	The revised and updated NBSAP recognizes the need for better quality of information to assess status, threats and trends in biodiversity and emphasizes the need for communication, resource and capacity building strategies to ensure effective natural resources planning and management. The revised/updated NBSAP (2012-2020) places emphasis on monitoring and evaluation and better implementation of the conventions and protocols and including the vision for biodiversity. By 2030, biodiversity will be sustainably utilized, managed and mainstreamed into all sectors contributing to the advancement of Guyana’s bio-security, and socio-economic and low carbon development”. Nine strategic objectives have been identified with 47 actions to be implemented by 2020, contributing to the five goals of the Strategic Plan and 12 of the 20 AICHI targets.
National Forest Policy (NFP)	2011	The NFP aims to ensure the “conservation, protection, management and utilization of the nation’s forest resources while ensuring that the productive capacity of the forests for both goods and services is maintained or enhanced 91”. The revised NFP addresses the country’s national and global responsibility for the sustainable management of the forest and recognizes the critical role of forests in maintaining the ecosystems and life supporting services.
The Draft National Land Use Policy	2004	The Draft National Land Use Policy aims to streamline land for planning and to create conditions necessary to achieve types of land uses which are sustainable, socially desirable and environmentally compatible on state lands, and provides the framework for coordination among land uses. It will also facilitate integration of land use and the preparation of a NLUP. The revision of the policy in 2012 incorporated the principles of sustainable land management.
National Land Use Plan	2013	The National Land Use Plan provides support for decision making by looking at development options and constraints throughout the country. It was compiled by assessing current land use, potential, constraints and stakeholders’ concerns. It provides a strategic framework to guide land development in Guyana. As such, the NLUP is built upon a number of national policies and strategies that have a direct relevance for land use and land management. The NLUP seeks to enable financial resources to be targeted at optimal land uses at the regional level and to provide a spatial element for developmental planning.

National Forest Plan	2011	The National Forest Action Plan provides a framework, and identify programmes and activities that must be accomplished, to ensure implementation of the policy and compliance with the law. Recognizing the broad purview of modern forestry, it stated clear objectives, with associated activities, for national planning, forest resource management, forest industry, research and information, education and training and social development.
Draft National Integrated Water Resources Management Policy and Roadmap	2013	The Draft National Integrated Water Resources Management Policy and Roadmap aims to ensure water resources are managed in a manner to safeguard the health, safety and welfare of Guyana's citizens and ecosystems and to ensure effective, efficient, and equitable use of water resources consistent with the sustainable development goals of the nation. This policy sets out the framework for the management of Guyana's water resources and presents a road map for the planning for integrated water resources management, which includes maintaining the integrity of the aquatic ecosystems.
National Policy on Inland Fisheries and Aquaculture	2012	The National Policy on Inland Fisheries and Aquaculture aims to promote the sustainable development of inland fisheries and aquaculture to ensure food security and social and economic benefits while protecting, maintaining and rehabilitating the ecosystem. The policy also focuses on institutional strengthening, capacity building and research and development.
National Development Strategy 2001-2010	2001	Provides a framework for national planning and captures a number of cross-sectoral issues such as environment, forestry, agriculture, mining, tourism and fisheries, among others.

Table 5: National Strategies and Action Plans related to Environment

4.2 Institutional arrangements and Key Stakeholders for CEE

What follows below is a summary of the major stakeholders of CEE in Guyana in respect of their individual institutional mandate. The information was obtained from the Department of Public Information as well as the websites of international organisations.

National Stakeholders

Civil Defence Commission- The Civil Defence Commission (CDC) was established in the year 1982 to make plans and conduct operations to deal with all types of disasters in Guyana. The CDC therefore functions in various areas including (i) Service provision – Promoting its role of providing services to local authorities/communities and for that purpose, to develop programmes designed to enhance those services; (ii) Planning and Implementation – Ensuring the promotion and development at national level of disaster planning and management and, in co-operation with local authorities, facilitating the implementation of disaster management measures for the purpose of emergency relief and support; (iii) Loss reduction and Mitigation – Promoting the adoption of disaster loss reduction and mitigation policies and practices at the national and local authority level; (iv) Training and Education – To establish and promote the development, maintenance and improvement of the tenants of disaster management training and education; and (v) Coordination of the national system to support the disaster management process throughout Guyana¹⁴.

Department of Environment- The Department of Environment, which was established in 2016, is responsible for the development of a plan of action to ensure the achievement of the green agenda. This Unit of the Ministry of the Presidency will also ensure that all the agencies concerned with the environment and sustainable energy generation play their part in Guyana’s transition towards a ‘green’ state.

Environmental Protection Agency- The mission of the Environmental Protection Agency (EPA) is to ensure management, conservation, protection and improvement of the environment, the prevention or control of pollution, the assessment of the impact of economic development on the environment and the sustainable use of natural resources. Environment protection encompasses mitigation of atmospheric pollution; however, climate change adaptation and mitigation is not a specific responsibility. However, in the other home carbon emissions reduction and flood proofing of facilities e.g. storage is addressed on conditions that permits are granted to developers.

Guyana Energy Agency- The Guyana Energy Agency has a legal mandate to monitor the performance of the energy sector in Guyana, including the production, importation, distribution and utilization of petroleum and petroleum products. While the GEA has no desire or intention to halt, or purposely delay, any business operation by licensed public operators; The Agency is obligated by law to ensure that all regulations and procedures, including those outlined and enforced by other entities are followed.

Guyana Forestry Commission- The Guyana Forestry Commission (GFC) is entrusted with the mandate to ensure that Guyana’s forest resources are sustainably managed and conserved. Specifically, the Commission is responsible for advising the subject Minister on issues in respect of forest policy,

¹⁴ For details see http://cdc.gy/?page_id=14350

forestry laws and regulations, as well as the administration and management of all State Forest land, in accordance with a National Forest Plan. The latter function includes development and monitoring of standards for forest sector operations, formulation of forest protection and conservation strategies, and provision of guidance to forest education and training.

Guyana Geology and Mines Commission - The Guyana Geology and Mines Commission (GGMC) was created in 1979 to carry out the following functions: promotion of mineral development; provision of technical assistance and advice in mining, mineral processing, mineral utilisation and marketing of mineral resources; mineral exploration; research in exploration, mining, and utilisation of minerals and mineral products; enforcement of the conditions of Mining Licences, Mining Permits, Mining Concessions, Prospecting Licences (for Large Scale Operations), Prospecting Permits (for Medium and Small Scale operations) and Quarry Licences; collection of Rentals, fees, charges, levies etc. payable under the Mining Act; and hall marking.

Hydrometeorological Service (Hydromet)-The Hydrometeorological Service is responsible for the establishment, management, and operationalization of national systems to monitor the availability, quality, and use of surface water and ground water. This unit is also mandated to observe, archive and understand *Guyana's* weather and climate patterns providing meteorological and hydrological services in support of *Guyana's* national needs and international obligations.

Ministry of Agriculture- The Ministry of Agriculture has the mandate to ensure the formulation and implementation of policies and programmes which facilitate the development of agriculture and fisheries in Guyana, thereby contributing to the enhancement of rural life; the sustained improvement of incomes of producers and other participants in the agricultural production and marketing chain; and the maintenance of a sound physical and institutional environment for present and future productive activities.

Ministry of Indigenous Peoples' Affairs- The mandate of the Ministry of Indigenous Peoples Affairs is to enhance the social, economic and environmental well-being of Indigenous Peoples and their lands through collaboration, sustainable development and appropriate legislation, while at the same time ensuring the preservation of Indigenous culture and traditional knowledge.

Ministry of Public Health- The mandate of the Ministry of Public Health is to improve the physical, social and mental health status of all Guyanese by ensuring that health services are accessible, acceptable, affordable, timely and appropriate given available resources.

Ministry of Natural Resources-The Ministry of Natural Resources is mandated to develop, implement and oversee policies for the responsible exploration, development and utilization of natural resources at the same time ensuring the protection and conservation of the environment and advancement of the green economy.

Ministry of Social Protection- The Ministry of Social Protection has the mandate to provide quality service to ensure the safety and well-being of residents of senior citizen homes and other vulnerable citizens that fall within the purview of that Ministry. This includes service to the country's vulnerable groups – women, children, the elderly, homeless and youths.

National Toshias Council - The National Toshias Council was established in 2006 as a body corporate comprising all Toshias (leaders of Amerindian communities to carry out the specific functions, including promoting good governance in Villages including investigating matters as requested by a Village and making recommendations, provided that the NTC may not investigate any matter which has been referred to the Minister and must ensure that any person involved in the investigation is given a reasonable opportunity to be heard; preparing strategies and plans for reducing poverty and improving access to health and education in Villages; and prepare strategies and plans for the protection, conservation and sustainable management of Village lands and natural resources.

National Centre for Educational Resource Development of the Ministry of the Education (NCERD) – The National Centre for Educational Resource Development (NCERD) is mandated to plan and implement all in-service teacher education programmes, in order to improve the quality of education at all levels in the system so that education may serve as an effective instrument of social and economic development.

National Drainage and Irrigation Authority (NDIA)- The National Drainage and Irrigation Authority (NDIA) functions as Guyana’s apex organization dealing with all public matters pertaining to management, improvement, extension and provision of drainage, irrigation and flood control infrastructure and services in declared areas of the country. Established in 2006 by an Act of Parliament, No.10 of 2004, the Drainage and Irrigation Act, the Authority has developed an institutional structure in terms of water resources management strategy and water use planning for the primary purpose of locating, evaluating, conserving and distributing water resources of the country for agricultural purposes.

Office of Climate Change- The Office of Climate Change (OCC) was established in June 2009 within the then Office of the President (OP), now Ministry of the Presidency, to work across Government to support work on climate adaptation, mitigation and forest conservation. It serves to bring together and align efforts of various government agencies that are already underway and to co-ordinate efforts by multilateral and nongovernmental organizations assisting Guyana’s climate change agenda. The OCC also has the overall coordinating responsibility for the national consultation on the Low Carbon Development Strategy (LCDS), developing policies, programmes and plans in relation to climate change response, and for coordinating and monitoring implementation and providing support to negotiations at appropriate global and regional forums.

4.3 Ongoing initiatives on CEE

Ongoing initiatives of major players/stakeholders with respect to CEE are outlined briefly in Table 6 below.

Stakeholder Institution	Ongoing Initiatives with Implications for Children
NATIONAL	
Environmental Protection Agency	Initiatives have been taken to raise awareness on climate change as part of EPA’s mandate for environmental awareness. There is an ongoing campaign for climate change awareness in primary schools. The Agency has also facilitated teacher training and environmental club camps focused on climate change awareness and has prepared educational material such as climate change booklets that target children and youth.
Amerindian Peoples Association	The Amerindian Peoples Association (APA) has been very engaged in REDD+ initiatives under the Norway initiative. There is currently a Volunteer Partners Agreement that allows this NGO to work along with communities and to educate them on how to save the forest by sustainable utilisation of its resources. The APA also uses media (including videos) to get messages to young people including school children) to increase their understanding of climate change, energy and Environment.
Civil Defence Commission	The Civil Defence Commission has been working partners to develop Community Based Disaster Risk Management Plans to enhance the adaptation capacity at the local level. Much focus has been given to vulnerable groups, including women and children. The Civil Defence Commission Volunteer Corps (CDC VC) ⁶ , an arm of the CDC was launched in 2012 to promote Comprehensive Disaster Management in Guyana through volunteerism. The main function of CDV is to support the functioning and initiatives of the CDC, the country’s national disaster organisation, particularly at a community level, thereby fostering a sense of community. To date, there are approximately 120 volunteers from Regions: 3, 4, 5, 6, 7, 9 and 10 in Guyana. The volunteers range from military personnel, students, nurses, teachers to doctors who have been trained in areas such as Search and Rescue, Disaster Risk Management, Community Mobilization, First Aid, Damage Assessment and Conflict Resolution.

Guyana Energy Agency

The Guyana energy Agency has implemented several projects to date. For instance, there was the Hinterland/Rural Electrification Programme for which approximately 20,000 solar PV systems were installed in households without grid access during 2012-2015. Additionally, GEA, in collaboration with the Ministry of Education and the Ministry of Indigenous People Affairs managed the installation of 9 grid-connected solar photovoltaic (PV) systems at 8 secondary schools and the Scholarship Hostel with a combined capacity of 88.5 kW in early 2017.

Moreover, to support the transition towards greater renewable energy use in public buildings, GEA is also managing the Georgetown Public Hospital and Agatash in Bartica, Region 7. GEA is also managing Government's energy efficiency programme which primarily entails lighting change-outs and the installation of occupancy sensors. There is also the Rural Energy Project, funded by the Latin American Energy Organization (OLADE) and the Canadian International Development Agency (CIDA). This project aims to demonstrate the application of solar energy technology (solar powered freezers, solar PV panels, solar dryers, solar water heaters) to enhance and accelerate the productivity of livelihood activities in Powaikuru, Moraikabai and Shulinab located in Regions 1, 5 and 9 respectively.

In 2017, GEA provided technical support to the Office of Climate Change in the implementation of renewable energy and efficiency projects under the Japan Caribbean Climate Change Partnership (JCCCP) project in Bartica. Solar CCCP) project in Bartica. Solar PV for the 3-Mile Secondary School and energy efficient street lights will be installed in 2018.

It is noteworthy that the Agency will provide leadership for Guyana's energy development plan to harness resources such as hydropower, solar, wind, and biomass encompasses various scales of projects, including micro and hydroelectric plants for hinterland electrification, medium-sized renewable energy projects for the national grid, and larger scale projects for the export of electricity. Currently, the development of solar and wind farms is being considered as viable options for the reduction of Guyana's dependence on fossil fuels for electricity supply and the integration of renewable energy in the short to medium term.

It is also the Government's intention to attain universal access and equitable geographical distribution of green energy services at the least cost to consumers. Greater interest is being directed to the Hinterland Region; particularly for the utilities in the recently designated towns of Bartica, Lethem, Mahdia, Mabaruma and the principal community of Port Kaituma. Emphasis will also be placed on delivering electricity to remote riverine villages. The Guyana Power and Light (GPL) Inc. also plans to install three 3-MW solar PV farms in the near future.

	<p>Moreover, the Government intends to advance measures necessary to secure the efficient management of energy and the source of energy in the public interest. These include conducting energy assessments/audits, implementing technology and regulations for energy efficient buildings (schools, health centres, community centres, government buildings) encouraging energy-conscious procurement within the public sector, research, development and promotion of energy efficiency management standards. Also, energy efficient street lighting as well as education and awareness on energy related matters will be promoted, as outlined in its Annual Reports (2014-2016) and Draft Energy Policy.</p> <p>All of the above-mentioned initiatives consider needs for energy access, education and health, e.g. solar PV system for remote a medical facility allows for vaccine refrigeration and additional services, or reduces the distance children have to travel to receive medical attention. , as well as having a home solar PV system that will allow for children to complete homework and study at nights, using better lighting. In 2017, 37 schools are among several public buildings that have benefitted or will be benefitting from renewable energy and energy efficiency initiatives; namely, solar PV systems, energy efficient lights and occupancy sensors.</p> <p>In an effort to complement these interventions school presentations are done annually as part of an on-going component of GEA’s strategic plan and in keeping with part of its mandate relating to information dissemination. The presentations provide information on climate change and sustainable energy development and students have an opportunity to interact with Officials of the Guyana Energy Agency. During these visits, students are encouraged to form ‘Energy Champion’ clubs and meet regularly to discuss the implementation of energy conservation measures in school and at home.</p>
<p>Hydro-meteorological Service</p>	<p>This Unit of the MOA provides weather forecast to various parts of Guyana and hold exhibitions and other events that target schools with the aim to enlighten and sensitive children and even adults on the weather patterns related to climate change. Currently, the Unit encounter difficulties in providing forecasts for hinterland areas.</p>
<p>Ministry of Health</p>	<p>The Ministry of Health at present has no specific plans for addressing climate change, but will continue to monitor diseases, given the potential health risks associated with this global phenomenon. Importantly, the Ministry’s “Health Vision 2020” A National Health Strategy for Guyana 2013-2020 is to provide opportunities in this respect.</p>

<p>Ministry of Indigenous Peoples Affair</p>	<p>Projects implemented by the Ministry of Indigenous People Affair focus more on economical and sustainability considerations, with the aim of teaching and placing these villages in a position to assist themselves and minimize, if not remove, the effects of the CEE. Further, the ministry is often seen as the familiar face to the villages and thus plays the important role of facilitator to other projects funded by varying organizations such as the UNDP. In this regard, the ministry’s capital projects relate more to a direct response to the needs of the communities. Projects include the provision of wells and solar panels, which the Ministry helped to facilitate and collaborated with other organizations to make an impact. Other projects that have been supported include: women’s small businesses, documentation centers, multi-purpose buildings, village offices, guest house/eco Lodges, community centers, cassava mills, pavilions, upgrading of trails and construction of bridges. Villages also benefit from tractors and trailers, ATVs, Mini Buses, 4×4 Pickups, boat and engines, chain saws, Generators and agricultural tools. With the provision of these projects, hinterland and other rural communities can plan for sustainable human social and economic development of residents, including children.</p> <p>Additionally, during climatic events (floods and droughts) that pose serious threats to women and children in particular, the Ministry provides assistance (for example by helping to re-cultivate farms, and provision of food and water) to the communities. The MOIPA has also been working with communities to develop Village Resource Development Plans (VRDPs), which provide opportunities for incorporating climate change impacts in decision making.</p> <p>Due to the wide scope that has been adopted by the Ministry the projects undertaken have some (direct and indirect) impact on the lives of the children of the villages/communities.</p>
<p>National Drainage and Irrigation Authority</p>	<p>All NDIA activities address issues of climate change mitigation and adaptation as well as water. This may be directly (infrastructure building, operation and maintenance) as well as indirectly (maintenance of machines that undertake cleaning). None of these initiatives account for the needs of children specifically. They are targeted at the wellbeing of all citizens through:</p> <ul style="list-style-type: none"> ❖ Protection from some natural hazards; ❖ Provision of drinking water supplies (minimal); ❖ Support for the agriculture sector; and ❖ Management of the environment (cleaning of major drainage & irrigation infrastructure). <p>One notable project is the World Bank funded the Cunha Canal Rehabilitation Project which aims to increase the drainage capacity of the East Demerara Water Conservancy (EDWC) and local agricultural areas in this territory, reducing vulnerability to climate change.</p>

The Ministry of Education National Centre for Educational Materials Development

The Ministry of Education National Centre for Educational Materials Development, with international support, is engaged in piloting the infusion of climate change and biodiversity education in all levels within the school system. Conservation International – Guyana (CI-Guyana) has collaborated in the recent past with the Ministry of Education through the National Centre for Educational Resource Development (NCERD) to complete a number of strategic initiatives. These include the development of a video series on climate change and biodiversity for secondary school students (Grades 9-12); drafting a climate change and biodiversity resource book; and completion of a study for inclusion of climate change and biodiversity education at the primary level (Climate Change Education Progress Report, 2012).

In addition, UNICEF supported the development of a video on climate change titled ‘Our Earth is Heating Up? Let’s Take Action Now’ for the Nursery Level (age 3 years to 5 years nine months). Reviews by primary school teachers indicate this is also useful for the primary level (age 5 years nine months to age 11 years nine months). At the primary level, teacher training workshops targeted the use of the Inquiry Based Science Education (IBSE) approach in teaching climate change. Several IBSE lessons were developed for Grades One to Six for Science and Social Studies. These lessons are presently being piloted in sixteen primary schools throughout the country. They were developed in collaboration with technical expertise sourced through UNICEF. A recent review of the pilot has revealed the need for additional school-based training and the provision of resources to support effective lesson delivery.

The Guyana Mangrove Restoration Project (GMRP), which led to the recent formation of the Mangrove Restoration and Management Department at the National Agricultural Research and Extension Institute (NAREI), has collaborated with NCERD to implement the public awareness and education component of the National Mangrove Management Action Plan. This plan aims to mitigate climate change (carbon sequestration through mangrove reforestation and forest preservation) and adapt to its effects (sea defence, biodiversity). Several resources for schools on the sustainable coastal zone protection through mangroves were developed. These included a video titled “Holding Back the Sea” and a teacher’s resource manual for secondary schools in Guyana – “Mangroves: Our Natural Sea Defence”. Notably, the establishment of the Mangrove Visitors’ Centre, Victoria, East Coast Demerara has led to numerous field trips by primary and secondary school teachers and students. This is a good example of learning from the environment which bridges formal, non-formal and informal learning.

It should be noted that although the Ministry of Education has taken a proactive role in the infusion of climate change education with international support, one of the institutional constraints identified in the Climate Change Education for Sustainable Development Case Study of Guyana is the limited horizontal and vertical integration among and within public and private sector agencies. It is envisaged that children of all ages will benefit for the approval of the Education

	for Sustainable Development (ESD) policy which seeks to mainstream climate change education.
Office of Climate Change (OCC)	<p>The Office of Climate Change has been promoting, facilitating, as well as implementing a number of initiatives that range from policy related to environmental awareness and action in respect of CEE. Chief among those initiatives are:</p> <ul style="list-style-type: none"> • the development for a National Climate Change Policy, a Five Year Strategic Plan for the OCC and a Communications Plan, with financial support from the Caribbean Development Bank (CBD). • The development a National Adaptation Plan that is supported by the United States of America International Development Agency (USAID) • Training of officials within key agencies in the application of the Caribbean Climate Online Risk and Adaptation Tool (CCORAL) • The development of a proposal for the institutional arrangement to implement a MRVS in energy efficiency in public buildings; <p>In an effort to build public awareness and understanding of climate change and its associated impacts, as well as the need for adaptation and mitigation actions, the OCC has produced posters and videos produced for education and public awareness, and has continued to work collaboratively with the Caribbean Environment Youth Network (CYEN) –Guyana Chapter to implement a climate change sensitization programme in secondary schools. Additionally, The OCC also facilitated the attendance of sixth form students to a Regional Youth Climate Change Conference that as held in Jamaica in 2017.</p> <p>The Office has played a key role in the development of major policy documents, including the National Determined Contributions, National Appropriate Mitigation Actions, the Technology Needs Assessment and corresponding adaptation and mitigation plans.</p> <p>It is noteworthy that the OCC is very actively involved in the ‘greening’ initiatives at the community level: Bartica under the “Transitioning to National Energy Security: Bartica a Model Green Town project that is being financed through the Italian Government in collaboration with the Caribbean Community Centre for Climate Change. The OCC engaged the schools, councillors, regional representatives and the Mayor’s team in January 2018 to introduce the Science, Technology, Engineering and Math (STEM) programme in Bartica. Subsequently, several teachers and two community members benefited from training in an effort to build local capacity in the delivery of the programme.</p>

Table 6: Ongoing Initiatives of major players/stakeholders with respect to CEE

Source: Face to Face Interviews and Focus Group Meeting

5. THE IMPACT OF CLIMATE, ENVIRONMENT AND ENERGY ISSUES ON CHILDREN

5.1 The Impact of CEE on Children living in areas exposed to climate and environmental impacts

Climate and the environment are crucial determinants of child survival and development (Global Water Partnership & UNICEF, 2017). Moreover, the World Health Organization states that mitigating environmental risks could save the lives of 4 million children every year, and that climate change, disasters and environmental degradation expose families (especially, boys, girls and women) to risks that make them vulnerable to disease, malnutrition and violence.

In Guyana, children suffer from the negative impact of climate change, especially flooding in areas that prevent them going to school. Stagnant pools of water cause mosquitoes to breed causing malaria, filarial- both of which are prevalent in the interior communities. This impacts on the attendance of children going to school: for example, children may only have one pair of shoes or uniform and if either becomes wet, they (the children) must remain at home. On the other hand, because of drought conditions, especially in the interior regions, the water level is usually extremely low; as such, schools remain closed during such periods, thereby affecting children. Even when children are allowed to attend school the heat is so intense that they become very restless and lack concentration. In fact, stakeholders note that *the boys would often take off their shirts in an effort to feel cool*. Additionally, heat waves will be of significant risk for children, particularly those living in urban settings where heat island effects may become more frequent due to increasing temperatures, and. It is noteworthy that infants are especially at risk because they cannot yet regulate their body temperature (Loxley, 2017).

5.2 The Impact of CEE on water, nutrition and health

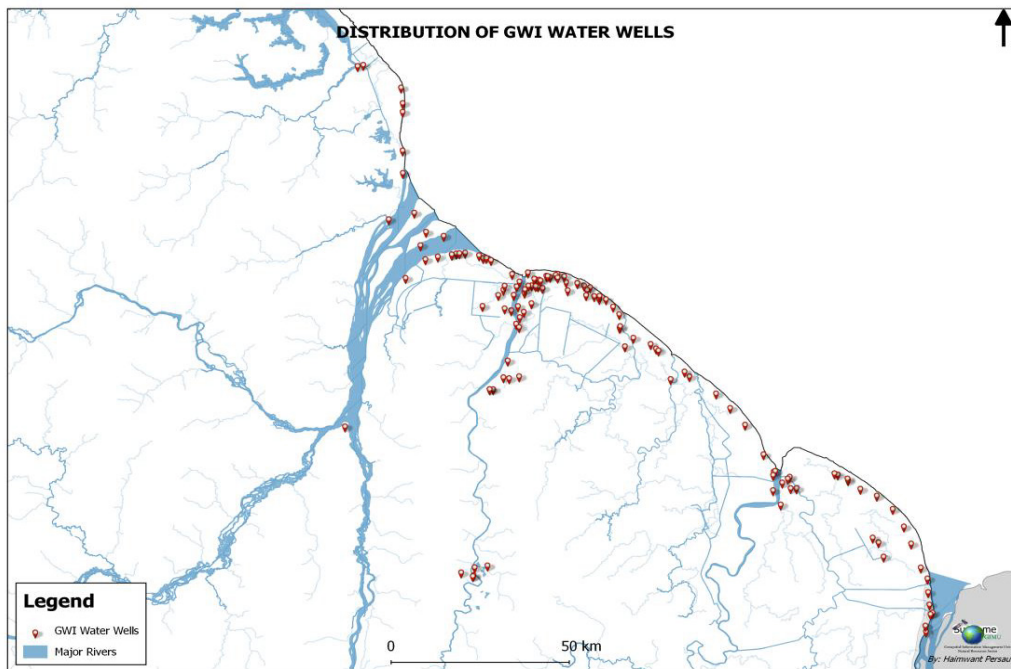
The 2016 State of the Environment Report draws attention to various environmentally related health risks due to ground and surface water pollution from illegal mining practices, poor industrial waste disposal practices, among others. While there has been significant progress in relation to access to piped water, from seventy-nine percent (79%) in 2005, to ninety-two percent (92%) in 2009 (Ministry of Finance, 2011), *major problems with quality, continuity and reliability of service persist both along the coastal strip and in severely under-served hinterland regions* (WHO 2009: 29).

Water quality in some locations has been degraded due to contamination through indiscriminate gold mining, unhygienic practices, and other anthropogenic activities. Pressures on inland rivers are mainly due to mining and related activities. In particular, dredging and other types of mining operation, such as hydraulicking using surface water, cause hydrocarbons to be released and increase sediment loads in rivers and streams, thereby causing increased surface water turbidity. Despite improvements, effluent generated by mining activities seep into waterways resulting in high levels

of suspended solids usually above the critical level of 30 NTU from small and medium-scale mining activities; additionally, in some cases tailings are either discharged directly or seep into waterways (State of the Environment Report, 2016). The levels of pollution in these water bodies that are accessed by families, including children, for their domestic purposes, pose severe risks to their health and well-being, due to their susceptibility to water borne diseases.

Moreover, the projected decrease in rainfall is expected impact coastal populations that are dependent largely on ground water resources to meet their domestic, commercial and industrial needs. Based on data available from GWI (2016), the ground water sources for the coastal areas total one hundred and twenty-five (125) wells distributed across Administrative Regions 2, 3, 4, 5 & 6 (see Figure 8).

Figure 8: Location of Guyana Water Inc. (GWI) managed wells along the coast of Guyana



Source: State of the Environment Report, 2016

Guyana is also faced with contamination of surface water in areas such as Georgetown and areas along the coastal lowlands that are very populated due to inadequate and indiscriminate waste disposal practices. Concerns of the Environmental Protection Agency relate to biological and chemical contamination most prevalent along the coast, open-ditch sewers and septic tanks that are impacted by floods during the intense rainy seasons, as well as changes in turbidity, pH, conductivity and low levels of dissolved oxygen in surface water. In addition, iron rich soils and runoff from agricultural practices change water chemistry along the coast (Parsram, 2010). Inadequate waste management also represents a health risk, mainly in urban areas. During the 2005 floods, canals were not adequately draining, partly due to waste accumulation in them. This contributed to outbreaks of leptospirosis (WHO, 2009).

In the absence of adequate groundwater supplies inland, hinterland residents may resort to using creeks and rivers nearby that may require treatment before consumption that would not be easily accessible given the topography of the region. As a result, residents may consume contaminated water and may be exposed to various water borne diseases (cholera, dysentery, gastroenteritis and typhoid). Such a situation is not common in all hinterland areas: for example, Region 7 Improved Water for Drinking: It is observed that less than half of the region's population (22.2%) undertake some form of water treatment, whether through household treatment or through the provision of water purification guidelines as well as potable water by the Guyana Water Incorporated (GWI) through the commissioning of recent ground wells in the area.

Another health related issue is malaria that affects every region in Guyana, though prevalence is higher in rural and hinterland regions (especially Regions 1, 7 and 8), where there is less access to appropriate health infrastructure.

In the Climate Impacts and Adaptation Report (2017), Loxley notes that nutrition for children may be adversely affected by climate change in Latin America and the Caribbean (LAC), both through direct and indirect impacts. In particular, slow on-set temperature and precipitation change and variability will affect crops in numerous ways, impacting yields and family income, and therefore food security as growing seasons and conditions are altered. Severe droughts or floods will also impact agriculture on a large scale.

The Report summarises the main direct impacts as: changes in crop growing conditions and yields; increased loss of income and food insecurity; changes in the abundance and type of crop pests; loss of arable land from flooding and sea level rise; and loss of ecosystem services; and indirect impacts on family income. These observations are very relevant to Guyana, as climate change has also threatened the food security in both coastal and hinterland areas (for example, in the North and South Rupununi in Region 9), although not to a great magnitude to cause chronic malnutrition in Guyanese children. Undoubtedly, there exists the problem of inadequate nutrition with respect to food quality and quantity, as a result of floods and droughts, since food crops, particularly cassava which is an Amerindian staple diet, are destroyed and many families, particularly in hinterland areas can ill-afford the transportation costs to access food from the coast.

5.3 The Impact of CEE on access to basic services and infrastructure

The situation regarding children with respect to water, nutrition and health has several root causes, chief of which is the lack of/or limited social infrastructure to deliver the services. UNICEF (2016) reported that maternal and child mortalities are associated with the following underlying causes: inadequate health care, lack of full immunization, the unhealthy situation of household environment in relation to water and sanitation, and by household food insecurity, as well as poverty, social norms, regional disparities and gender norms that have been identified as the structural causes. Additionally, the afore-mentioned causes are worsened for children (under the age of 5) who reside in the Guyana's hinterland, in the rural areas, living in poor families and from Amerindian families, since they, more often than note, lack access to good quality health services. For example, open defecation is practiced for less than 1% of the population in Guyana, but its practice is higher among those living in Regions 7 and 8 (11% of the population) (UNICEF, 2016).

Further, increasing frequency and intensity of droughts, mostly in hinterland areas will negatively affect the WASH programme, with increasing frequency of use of unsafe water sources in these conditions where water security is low. UNICEF (2016) notes that the WASH sector is already affected in many different ways by weather and climate events (such as variability, seasonality and extreme events) and that this translates into negative impacts on drinking water availability and quality, and also in negative performance of sanitation and hygiene services. The Report warns that future climate change will put an additional stress on delivering and sustaining health and well-being related outcomes

Similarly, on Guyana's coastlands, increasing occurrences of flooding from heavy rainfall events and possible salt water intrusions from rising sea levels and storm surges could compromise many safe fresh-water sources; thus leading to water insecurity and the use of unsafe water sources, which in turn, can increase the prevalence of water-borne diseases such as diarrhoea and cholera, and can have devastating impacts on the health of children, sometimes leading to death. In fact, children living in the interior of the country have three times more chance of having diarrhoea than those living in urban areas. Similarly, 21% of the children living in Amerindian communities specifically Regions 7, 8 and 9 had frequent occurrence of diarrhoea. (UNICEF, 2016).

Energy is an important input for health, education, food production, transportation, job creation, community development and poverty alleviation. Importantly, the lack of energy services in hinterland areas disrupts the provision of health care, emergency services, water and other critical infrastructure. Children, particularly those in hinterland and rural communities, lack sufficient access to energy services: for instance, reliable electricity supply to study at nights or use ICT. In other cases, children may be required to search and collect firewood as part of their household chores which can be burdensome and time consuming. Also, the homes that use firewood for cooking are exposed to particulate matter (soot or smoke) and high concentrations can lead to respiratory problems, allergies, and asthma.

These have two major effects on children; carbon monoxide poisoning/exposure and interrupting of social services that require power (for example, schools). Further, energy costs also prevent poor families from accessing the service due to the issue of affordability: *The monthly expenses for electricity amount on average to about 6,000 GYD and for cooking to approximately 5,000 GYD per household and month in the communities which are close to larger towns and between 5,000 and 9,000 GYD per household and month in remote communities* (ConPlusUltra, 2012). This implies that at specific hours of the day, some families have no power for the use of; Wi-Fi for research, power to iron clothes and the use of washing machines; these are all factors affecting children.

Lack of a reliable power supply also affects school children's ability to study and engage in other important extra-curricular activities. Although street lights can be found along the main access roads, they are not usually available along the streets leading to them. This can be dangerous for children and young adults returning home from lessons and other extracurricular activities; especially around year end since it gets darker as the sun sets earlier. Even though some children may want to attend extra lessons to fully grasp the concepts taught at school in their academic pursuit, they are told by parent to return to their homes that are perceived as being safer. Consequently, many children do not attain education beyond the primary level and are hardly involved in extra-curricular activities which would have helped to develop their psycho-motor skills, memory and, ultimately their improved social development.

It is noteworthy that poverty is an underlying factor that affects the ability of children in Guyana to adapt to climate change and to access energy services in Guyana: indigenous children are disproportionately affected in this case, given that poverty is particularly marked among Amerindian and rural interior populations as discussed in earlier sections of this Report. Specifically, the socio-economic deprivations of poor households limit their adaptive capacity in the following areas with respect to CEE:

- Actions such as raising and retrofitting of homes;
- Use of alternative roofing materials since the use of Ite-palm leaves by growing populations will endanger the plant species;
- Relocating from their traditional lands (titled and untitled) to ‘safer’ areas¹⁵;
- Focusing on sustainable alternative livelihood activities due to low level of formal education and limited job opportunities;
- Limited access to rural electrification (mostly solar energy service) and inability to maintain systems;
- Upgrading of shallow wells that are either dry during droughts or contamination during flood¹⁶s and the lack of financial resources to install deep wells;
- Greater diversification of crops and food resources;
- Changes in agriculture techniques such as rain fed agriculture to drip irrigation to ensure food security;
- Community based disaster response systems; and
- Limited knowledge of the science of climate change that can complement their traditional knowledge.

5.4 The Impact of CEE on Education

Education is the cornerstone of sustainable development since it empowers people, including children, with the awareness, knowledge, skills, and attitudes to make decisions and take actions to help them prepare for, adapt to, and help mitigate the impacts of a changing climate. To date, the MOE has benefited from projects financed by UNICEF, CI and UNESCO; thus, environmental education has been introduced at various level of the formal curriculum: for example, at the primary level, integrated Science and Social Studies. Lessons on biodiversity conservation and climate change have been developed and teachers have benefited from training workshop to deliver the curriculum.

At the secondary level, issues in respect of climate change, disaster management and environmental protection have been infused in the syllabi of many of the subjects (such as Biology, Chemistry, Environmental Science, Agriculture Science, Geography, etc.) offered at the Caribbean Proficiency Examination. The extent to which such initiatives can be successful is contingent upon access to basic education by all children in the Guyanese society.

15 For example, the Makushi of Guyana would relocate their savannah homes to forest areas during droughts and plant cassava, their main staple crop, on moist floodplains normally too wet for the crop. See http://www.ecdgroup.com/docs/lib_004630823.pdf

16 These are mainly caused by the ENSO and are predicted to be more frequent and of greater intensity in the future, bringing extended droughts, crop failures and even larger forest fires than are presently experienced. See http://www.ecdgroup.com/docs/lib_004630823.pdf.

The UNICEF Situation Analysis Report on Women and Children in Guyana (2016) notes five groups of vulnerable children (not mutually exclusive) with regard to accessing education at early childhood, primary and secondary education; namely:

- The first group of vulnerable children and women are those who live in the hinterland.
- The second group is comprised of Amerindians.
- A third group are those children with disabilities and special needs.
- Children living in single-parents households, especially those headed by women were identified as a fourth group of vulnerable children.
- The fifth group represents a stand-alone group, but it was also identified as the major cause of all other vulnerabilities: poverty.

For example, the Report states that rural and interior parts of Guyana have lower attendance, and that the poorer a family, the smaller are the chances that the child will attend programmes that are available. The Honourable Minister of Education, Dr. Rupert Roopnarine in 2015 observed that *“In the city and on most parts of the coast,” ... “It is simply an issue of jumping in a bus or a car or walking part of the distance on paved roads, in some communities access to a simple canoe to get from home to school is a challenge for many children. In other communities, the journey to school and back is in fact a journey, often taken on foot through tough terrain over significant distances.”*¹⁷

The situation in Guyana is worsened by the lack of effective early warning systems in mostly rural and hinterland communities. Additionally, the physical burden, coupled with the psychological anxiety and stress during periods of climate variability (particularly during dry spells) impacts the mental state of children, whose attention span and capacity to concentrate are often below expectation. It should be noted that many school in the hinterland are without regular supply of electricity and are built with materials (such as zinc sheets) that trap heat; therefore, increasing the discomfort of children at school.

During periods of inclement weather characterised by heavy rains and strong winds the roofs of school building are ‘blown away’, thereby leaving students exposed to the storm due to inappropriate designs of buildings and failure to use more resilience materials for construction of building. Moreover, stakeholders have observed that in emergency situations, schools are used as temporary shelters; thereby increasing the length of time children are away from classes. Such a situation can cause families to be so frustrated that they prevent their children from attending school.

5.5 The Impact of CEE on Child Protection and Social Inclusion

The impacts of CEE can have indirect effects on child protection: for example, forced migration in search of alternative livelihoods during climatic events can affect the family as a social unit, as well as lead to violence and abuse in the home as a result of psychological stress, as noted during the 2005 flood event in Guyana. The lack of regulated shelters also exposes children to situations that can lead to physical and/or mental harm. Likewise, as parent migrate in search of livelihoods climatic stresses or environmental degradation children are forced to seek job opportunities; thereby increasing the risk of possible harm (for example, sexual assault).

17 See <http://education.gov.gy/web/index.php/mediacenter/item/1707-school-attendance-awards-georgetown>

Moreover, three critical issues regarding child right in Guyana are poverty, child labour and truancy¹⁸ in the school system. Each of these issues will be exacerbated by climate change given that: (i) children lack access to potable water supply, food and energy during natural hazards and disasters in would often leave their homes to enhance their chances of survival during these grave situation; as such, they are exposed to abuse by adults and also reducing their time for schooling; (iii) displacement or relocation due to environmental factors often disrupt their schooling (iii) children seek employment (child labour) due to deprivation of income and basic needs in their homes; (iv) during floods children are forced to occupy shelters that are not 'child friendly; hence they may be exposed to different forms of abuse; and (v) children are exposed to diseases due to poorly constructed sanitary facilities in rural and hinterland areas.

With specific reference to child labour a 2011 National Child Labour Rapid Assessment Survey, conducted by the Ministry of Social Protection found that: *Many of the youths canvassed were involved in selling and agriculture¹⁹ in all three categories, while hidden evidence of prostitution activities were found in all of the age ranges. Also troubling was the fact that a small percentage of the children and working youths sustained illness and injuries while working. These occurred while the children and young workers were involved mainly weeding, begging or carrying out sexual activities. Also found was many children and young workers involved in carrying heavy loads and operating machinery. Some were also exposed to all weather conditions, chemicals, pesticides, glues, dust, fumes and gases at their places of work," the survey revealed²⁰.*

Social inclusion concerns in respect of CEE, namely, provision of energy security, climate change education, particularly for children who live in rural and hinterland areas and do not have access to public awareness programmes via television, radio and newspapers, plus the inclusion of students with disabilities in general classrooms to promote a sense of belonging, greater self-esteem and motivation to act to build one's resilience to CEE negative impacts. This will require a change in pedagogical methods as well as the attitude of teachers. Failure to address these concerns will affect the sustainable human development of boys and girls who do not live on Guyana's coastland that benefit from the more improved social infrastructure.

5.6 The Impact of CEE on Indigenous people

The Population and Housing Census (2012) indicates that Amerindian groups (referred to as indigenous people in Guyana) at present comprise 10.5 percent (78, 492) of the population. Indigenous children and families inhabit mostly the forest and savannah areas and depend on natural resources and other ecosystem services of their environment for their sustenance. This makes them very vulnerable to climate change, due to a number of factors that increase sensitivity and exposure, including dependence on ecosystem services and agriculture, and isolation from main infrastructure and transportation networks. Thus, any slight alteration in the eco-system affects the residents of these villages inclusive of the many young lives that are dependent on the same factors.

¹⁸ Children in Guyana are required by law to attend school up to age 14 years.

¹⁹ According to Professor Ken Danns, *the majority of child labourers in Guyana either work with their families on farms or in other economic activities. Even when working children sell their labour to others, other family members such as siblings or other relatives may be working with them. A sizable percentage however, works alone.* See http://www.ilo.org/wcmsp5/groups/public/---americas/---ro-lima/---sro-port_of_spain/documents/publication/wcms_308223.pdf

²⁰ <http://www.inewsguyana.com/children-in-guyana-involved-in-worst-forms-of-child-labour-prostitution-2011-survey/>

Undoubtedly, the unpredictability and effects of climate change disrupt the livelihood of these persons, particularly during periods of heavy rainfall as households face issues of inundation, food and water insecurity and health risks. In many cases, children in the hinterland, who are very dependent on surrounding ecosystems where animals, fruit trees are abundant, are denied access due to such hazards as flood, drought and wildfires that destroy the ecosystems, as described under 5.1. There are also issues of soil fertility change, flora and fauna life depreciation, and disturbance of wildlife population- all of which directly affect the well-being of the children living in these areas, given their subsistence lifestyle. According to the MOIPA, the most severely affected areas are Region 1 (north-west) and Region 9 (south-west), home to approximately 23,000 indigenous Amerindians, where, in addition to drought, fires have been raging. Crops and livestock have suffered, significantly reducing food supplies. People employed in agriculture (especially subsistence farming), forestry and fishing are seriously affected by the low water levels in rivers, creeks and ponds. Unsafe drinking water and the risk of waterborne or water-related diseases pose serious health threats: an increased number of malaria and dengue fever outbreaks have been reported; even as depleted river levels hinder the use of waterways for transportation purposes; thereby affecting children's attendance at school.

6. CHILD-INCLUSIVE CEE POLICIES, STRATEGIES AND PROGRAMMING

Children are the future, therefore any inappropriate action or inaction with respect to the myriad of issues mentioned in the earlier sections of this report will dire consequences Guyana's children. Importantly, actions are based on 'vision' documents such as policies and strategies that inform the development of programmes and projects

Issue 1 Do existing CEE policies and strategies address children's needs?

Presently, CEE policies and strategies (outlined in Tables 2, 3 and 4 in Section 4.1) do address the needs of children (albeit in some instances, in an indirect manner) as the action/measures that target communities and/or households will invariably include children within those social units in Guyana: For example, the Guyana Climate Change Action Plan (2001) includes sections on Response Measures for Adaptation to Climate Change and Education, Training and Public Awareness that comprise specific actions aimed at building the resilience of vulnerable groups in Guyana. Similarly, in recognition of the many weaknesses in the country's environmental framework, Guyana's Parliament in 1994 established a National Environmental Action Plan (NEAP), which is rooted in the Constitution of Guyana, which states *inter alia* that *Every citizen has a duty to participate in activities to improve the environment and protect the health of the nation* (Article 2:25) and *In the interest of the present and future generations the State will protect rational use of its fauna and flora, and will take all appropriate measures to conserve and improve the environment* (Article 2:36). Thus, in order to conserve and improve the environment, the Government of Guyana will endeavour to, *inter alia*, assure all people living in the country the fundamental right to an environment adequate for their health and well-being; conserve and use the environment and natural resources of Guyana for the benefit of both present and future generations, based on the principle of the exercise of Sovereignty; raise consciousness of the population on the environmental implications of economic and social activities through comprehensive education and public awareness programmes; and involve the population, including indigenous peoples, women and youth, in the management of the environment and natural resources.

Two other examples are: (i) the "Health Vision 2020" A National Health Strategy for Guyana 2013-2020 that was developed through a wide-ranging consultative process with key stakeholders (government, civil society, private sector, local and international non-governmental organizations and development agencies including the Pan American Health Organization/World Health Organization). It consists of two pillars, namely Universal Health and Addressing the Social Determinants of Health and (ii) the Green State Development Strategy²¹ which will inform the country's inclusive green economic and social growth, and provide a roadmap for achieving sustainable development goals and related targets, and outline a long term vision for a prosperous and equitable future. The objective of the strategy is to reorient and diversify Guyana's economy, reducing reliance on traditional sectors and opening up new investment and income opportunities in higher sectors adding higher values. The GSDS Framework outlines seven 'central themes':

²¹ For more information see: <http://www.greengrowthknowledge.org/sites/default/files/Framework%20for%20Guyana%20Green%20State%20Development%20Strategy%2028-03-17.pdf>

- i. Green and Inclusive Structural Transformation: Diversifying the economic base, accessing new markets and creating decent jobs for all;
- ii. Sustainable Management of Natural Resources and Expansion of Environmental Services: stewardship of natural patrimony;
- iii. Energy – Transition to Renewable Energy and Greater Energy Independence;
- iv. Resilient Infrastructure and Spatial Development;
- v. Human Development and Well-being;
- vi. Governance and Institutional Pillars; and
- vii. International Cooperation, Trade and Investment.

Issue 2 Do child relevant sector policies and strategies incorporate CEE issues?

Based on information accessed from the desk review of national documents, including policies, strategies and reports, as well as stakeholder meetings, CEE issues are incorporated as previously outlined in Tables 3, 4 and 5.

Additionally, the Poverty Reduction Strategy Programme (2008-2012) has indirectly incorporated CEE issues by addressing poverty reduction, greater access and equity in access to services for the poor and vulnerable groups in society, as well produced expanded social safety opportunities. Interventions have yielded positive results in the areas of infant and child mortality, and malnutrition among others²². In fact, the UNICEF 2010 Report notes that: *Cognisant of the fact that children should be at the heart of policy and practice, the State Party has ensured that focused interventions to protect and provide for children form the basis of all programmes initiated in the country. Furthermore, these programmes are designed with a special focus on the poor and the most vulnerable. They include the Poverty Reduction Strategy Programme, the National Development Strategy (NDS), the National Policy on HIV/AIDS, and the sector plans for Health, Education, Housing and Water as well as the Social Safety net programmes.* (UNICEF, 2010, pp. 12)

Issue 3 Do children benefit from investments and programmes on CEE?

Children have been benefitting from a number of CEE related programmes in Guyana, as outlined below.

- In the area of education, Office of Climate Change, UNICEF, the Ministry of Education through NCERD, Ecotrust, Conservation International (Guyana), World Wildlife Fund Guyana, among other stakeholders have targeted children within and ‘outside’ of the formal education system

22 For more information see https://www.unicef.org/guyana/CRC_Final_Report_April_2010.pdf

in their environmental awareness and education programmes. Some of the interventions are highlighted in Section 4.3 that deals with initiatives.

- With regard to disaster preparedness, which is closely linked to climate variability and longer term climate change, schools have benefited from camps facilitated by the CDC and sponsored by UNICEF and Digicel (Guyana). In 2017, children were taught first aid, fire safety, water conservation, sanitation and hygiene, as well as solid waste management.
- Children in Guyana have benefitted from the Model Safe School Programme (MSSP)²³²⁴ which aims to create safer and greener educational institutions. Basically, the MSSP aims to establish an ideal, yet adaptable, approach to risk management at the school level which includes the articulation of school safety policies, the recognition of standards for school safety and the implementation of interventions to address risk. The MSSP establishes an ideal, yet adaptable, approach to risk management at the school level that encompasses: the articulation of school safety policies; the recognition of detailed and wide-ranging standards for school safety; the identification of risk through assessment against the recognised standards, and the implementation of interventions to address risk that are guided by the concrete knowledge generated through assessment. There has also been a training aspect of the programme which has benefitted District Education Officers (DEOs) for each region, along with other government officials benefitting from a four-day training session that aimed to familiarise trainees with the context of the MSSP and the assessment tools; impart skills in the utilization of the tool to assess risk in schools, and in the preparation of assessment reports. Trainees were able to conduct all stages of the assessment and reporting process, including the development of recommendation reports and action plans.
- With respect to Energy, children in rural and hinterland areas are beneficiaries of the Rural Hinterland Electrification Programme (that targets social services and communal buildings, health posts, school buildings where they are to be used in the evenings; and other community buildings, where there may be libraries, sewing and handicraft production centers. This programme that has a development and poverty alleviation objective aims extend electricity to unserved areas where extension of existing distribution networks is deemed to be economically feasible. Specific activities are described in Section 4.3 that includes initiatives taken by GEA.

7. CEE FUNDING LANDSCAPE IN GUYANA

Programmes and projects related to Climate, Energy and Environment are supported financially by multilateral and financial donor institutions. Table 7 below provides details on specific initiatives that relate to CEE and are also children/youth related.

²³ <http://gina.gov.gy/education-ministry-launches-model-safe-school-programme-creating-safer-greener-institutions/>

²⁴ <https://www.unisdr.org/we/inform/events/55557>

Project Title	Funding Source	Implementing Entity	Government counterparts	Duration	Amount (USD)	Children/youth reflected
UN Development Framework Guyana: 2012-2016	United Nations	United Nations Country Team (UNCT)	Government of Guyana	4 years	Not available	Strategic plan for Rights of the Child Commission. Capacity development training for youths on local governance. A web-based platform to increase interaction between youth and policymakers on youth related issues. Improve institutional capacity of government and civil society organisations to enable access by vulnerable groups (youth, women and indigenous people) to financial and business development services. Enhanced capacities of key policy and service delivery institutions to provide business development, employment, and credit services to vulnerable and disadvantaged groups.
FAO Country Programming Framework: 2016-2019	Food and Agriculture Organization of the United Nations (FAO)	FAO	Ministries of Agriculture, Education, Public Health, Social Protection, Indigenous People's Affairs and Social Cohesion	4 years	3,000,000	Supporting government programmes aimed at the vulnerable towards accelerating the reduction of food insecurity, malnutrition and poverty. Expansion of the National school feeding programme with emphasis on nutrition, changes in lifelong food choices, food safety and linking public purchase to local farmers. Institutional and technical capacities of national agencies, hinterland and rural organizations including women and youth strengthened for sustainable agriculture, forestry, fisheries, hinterland and rural development
Improved Health and Increased Protection from Communicable Diseases for Women, Children, and Excluded Populations in situations of vulnerability in Latin America and the Caribbean	Canadian International Development Agency (CIDA)	PAHO/WHO	Ministry of Public Health	3 years	Not available	Strengthened health systems based in primary health care in the region for children and excluded populations with a specific focus on women and girls

Guyana Country Cooperation Strategy: 2016-2020	PAHO/WHO	PAHO/WHO	Ministry of Public Health	5 years	Not available	Strengthened health services for mothers, new-borns and children. Improved access to health interventions for adolescents and youth
CARICOM/UNFPA Integrated Strategic Framework	United Nations Population Fund (UNPF)	CARICOM/United Nations Population Fund (UNPF)	Government of Guyana	5 years	16,800,000 (among 22 countries)	Reduce adolescent pregnancy by 20 % by the year 2019 Safeguard adolescents' access to quality sexual and reproductive health services and commodities; age appropriate, comprehensive sexuality education; social protection mechanisms for the prevention of all forms of violence; and countries adopt common legal standards concerning age of marriage and consent across the region.
Solar Lanterns Project	Panasonic Corporation	United Nations Development Programme (UNDP)	Ministries of Finance, Health and Education	Not available	Not available	120 solar lanterns to off-grid communities to extend the duration of social services such as medical services, schools, and ensuring women's safety at night.
Energy Security and Climate Change Adaptation Japan-Caribbean Climate Change Partnership Project (JCCCP)	Government of Japan	United Nations Development Programme (UNDP)	Office of Climate Change	3 years	600,000	Advancing the process of inclusive low-emission risk-resilient development by improving energy security and integrating medium to long-term planning for adaptation to climate change within, or aligned with, improved development planning and budgeting processes. Specific actions include policy instruments such as Nationally Appropriate Mitigation Actions (NAMAs) and National Adaptation Plans (NAPs).
Youth Engagement for Community Based Disaster Risk Management (CBDRM) Project	United Nations Education, Science and Culture Organization (UNESCO)	UNESCO	Civil Defence Commission	1 year	15,000	Promote disaster risk management awareness among youths while ensuring their active involvement in DRM.

Strengthen Disaster Management Capacity of Women	Government of Japan	United Nations Development Programme (UNDP)	Ministry of Agriculture	3 years	5,000,000 (Guyana and Dominica)	<p>Indirectly: Reduce vulnerabilities and risks in the agriculture sector by targeting three broad drivers of these problems: gaps in gender analysis, hazard and risk data; limited integration of climate change and disaster risk planning and practices in the agriculture sector; and limited access to appropriate, sustainable finance for vulnerable small farmers and women's groups.</p> <p>Strengthening community and women's capacities in applying mitigation and adaptation measures to reduce livelihood vulnerability, strengthening accessibility and availability of preparedness measures (community-based and national Early Warning System), enhancing opportunities for micro-grant mechanisms, and enhancing the adoption of best practices through knowledge exchange between communities and women's groups.</p>
ICT Access and e-Services for Hinterland, Poor and Remote Communities project	Guyana REDD+ Investment Fund (GRIF)	United Nations Development Programme (UNDP)	National Data Management Authority (NDMA)	5 years	17,000,000	<p>Strengthen Guyana's E-government policy environment and legislation with respect to Hinterland, Poor and Remote (HPR) communities.</p> <p>Ensure that citizens in these communities have increased access to Public e-services and information and training to build their capacity to use ICTs.</p>
IADB Country Strategy: 2017-2021	Inter-American Development Bank (IADB)	Inter-American Development Bank (IADB)	Government of Guyana	5 years	164,280,000	<p>Indirectly: Establishing a modern national strategy and planning framework for undergirding the new Green State Development Strategy, including to drive economic diversification efforts and pursue modern industrial policies.</p> <p>Strengthening fiscal policies and the framework managing natural resource revenues.</p> <p>Facilitating private sector development to support the delivery of better services, mainly through enhancing the business environment.</p> <p>Delivering critical infrastructure to facilitate human and private sector development.</p>
Water and Sanitation Infrastructure	Inter-American Development Bank (IDB)/	European Union Commission	Ministry of Communities	4 years	21,350,000 euros	<p>Indirectly: Improvement of the water supply system in priority areas of Guyana</p>

Improvement Programme	Caribbean Investment Facility (CIF)							
EU National Indicative Programme for Guyana: 2014-2020	European Union Commission	European Union Commission	Government of Guyana	7 years	34,000,000 euros	Indirectly: Climate change adaptation and disasters reduction - infrastructure (including sea defences) and support measures.		
Guyana Early Childhood Education Project	World Bank	World Bank	Ministry of Education	3.3 years	1,700,000	Indirectly: Improve emergent literacy and numeracy outcomes for children at the nursery level and primary grade one in Hinterland regions and targeted remote riverine areas.		
Flood Risk Management Project	World Bank	World Bank	Ministry of Agriculture	6 years	11,890,000	Indirectly: Reduce the risk of flooding in the low-lying areas of the East Demerara.		

Table 7: Ongoing and planned initiatives supported by development partners

8. THE UNICEF COUNTRY PROGRAMME AND LINKAGES TO CEE

The Country Programme of Agreement for the period 2017-2021 has three components: (a) safety and justice; (b) life-long learning; and (c) social inclusion and child rights monitoring. Table 8 below explains briefly how climate, environment and energy issues can affect the UNICEF CP outcomes.

UNICEF Country Programme of Agreement (2017-2021) Outcomes	CEE Issues and Implications
<p>1. By 2021, national legislation is implemented to prevent, mitigate and address violence and other childhood abuses and the justice, education, public health, security and other sectors observe children’s rights to this protection.</p>	<ul style="list-style-type: none"> • Lack of knowledge increases vulnerability when one considers the consequences of a changing climate. Climate change education is therefore a pre-requisite to resilience building among children and youth. The use of formal, informal and non-formal approaches are critical, given the fact that are those who are not catered for by the formal education system, but are extremely vulnerable to climate change • Basic education access is key to climate change education; therefore, all efforts must be made to provide safe schools, particularly with regard to the impact of intense precipitation and dry spells that impact children’s learning ability due to discomfort, as described earlier in this Report. • Lack of energy security can impact a child’s learning environment with particular emphasis on the need to facilitate their involvement in extra-curricular activities that may involve Eco-clubs as supported by the EPA in Guyana.
<p>2. By 2021, all children and adolescents, especially the most disadvantaged among them, have improved their education and developmental outcomes and accessed equitable and inclusive learning environments across the life cycle, including in emergencies.</p>	<ul style="list-style-type: none"> • Increased intensity of rainfall and floods, as well as increased frequency of droughts decrease the quality of life for both coastal and hinterland children due to the loss of climate dependent livelihood activities such as agriculture. Consequently, children must leave homes in search of food, firewood and even employment opportunities to assist with income in families. • Climate change will cause a reduction in food and water security leading to poor health and malnutrition • Floods and droughts induce migration or relocation of

	<p>indigenous families; thereby destabilising family unit and affecting children’s schooling.</p> <ul style="list-style-type: none"> • There is limited climate change awareness and education programmes that focus on resilience building among children. • Social exclusion to the benefits of CEE programmes that target predominantly coastal communities • Culturally inappropriate (for example, use of language) in communicating CEE issues to rural and hinterland children who may not have benefited from formal schooling; as well as those who have embraced their traditional language and culture. • Climate change will exacerbate the problem of inaccessibility of areas, particularly in rural and hinterland communities; thereby reducing their capacity to access primary health care or emergency services. • Lack of electricity affects children’s schooling, as well as their social development, as facilities to enhance their quality of life are impacted.
<p>3. By 2021, national systems and policies are to effectively address multiple deprivations affecting the most vulnerable boys and girls across the life cycle. It should also build their resilience through adequately funded social investments and rights-based quality social policies using data on children.</p>	<ul style="list-style-type: none"> • Increased vulnerability of children who require primary health care services due to inaccessibility of areas affected by floods. • Climate change events will reduce health and education services for children in hinterland areas due to poor construction of buildings and use of inappropriate materials. • Loss of livelihood in rural and hinterland areas can force parent to migrate to neighbouring Brazil or to Georgetown; thereby leaving their children without any adults who can take care of them. • Children who do not have equal access to opportunities for learning about CEE and individual actions they can take to enhance their capacity to adapt are often disadvantaged; therefore, the creation of an inclusive learning environment will promote a feeling of belonging, and will motivate children (with or with disabilities) to be pro-active. • Climate change events require increased capacity of institutions to prepare for and respond to any likely impact on food crops, water systems etc.; hence the need for early warning systems. • Natural hazards such as floods and droughts develop into disasters because of failure of current systems to fully plan

	<p>and prepare for such events, as well as to rebuild in a more resilient manner (in other words to reconstruction without the same risks).</p> <ul style="list-style-type: none"> • Climate change will worsen poverty conditions and will induce poverty in areas that are likely to be affected. Children’s right to drinking water supply, food security, and good health should be guaranteed by social protection services. • Climate change and environmental degradation can force children to become child labourers in an effort to augment income opportunities in their family; hence the need for monitoring. • Service provision (of health, etc.) has not optimised the opportunities created by the current regional and local governance system. Decisions and actions are still largely centralised; however, resilience to climatic hazards necessitates a more bottom-up, community based approach and localised responses. This will enhance the service provided as well as accountability.
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Table 8: UNICEF Country Programme of Agreement and linkages to CEE

Source: Results and resources framework Guyana and Suriname – UNICEF country programme of cooperation, 2017-2021

9. RECOMMENDATIONS

The impacts of climate variability (ENSO) and longer term climate change, coupled with environmental degradation pose grave consequences for the sustainable human development of society, particularly children, given that structural issues limit the extent to which their rights can be fully guaranteed. The role of UNICEF in helping to ensure that children rights are honoured and fulfilled, there is need for the integration of several measures into the next Country Programme. The following are a set of recommendations that have been informed by an analysis of the issues and stakeholders' views. Kindly see Annex III for the Implementation Plan.

Recommendations are grouped into nine thematic areas, namely:

- Strengthen UNICEF Country Office (CO) Engagement in CEE
- Strengthen the mainstreaming of CEE in the 2018 Country Programme
- Support Child Sensitive CEE Policy and Planning
- Promote greater collaboration with the CDC
- Engage the MOE to support Education for Sustainability
- Support the creation of child friendly information
- Promote and support greater equity in accessing potable water supply, schools and health centres in rural and hinterland areas
- Support the design of Child Friendly Infrastructure
- Further research on barriers to children engagement in CEE

1) Strengthen UNICEF CO Engagement in CEE

The UNICEF CO should consider meeting with the national focal point for climate (OCC), energy (GEA) and Environment (DOE) to discuss their strategic plans and programmes and areas of synergies with CO Plan for 2018, with a view to fostering greater partnership for more effective delivery of outcomes. Importantly, such engagement can introduce the idea of including children as a direct beneficiary of all policies and programmes. For example, GEA has developed an activity booklet on energy titled “What is Energy”, which seeks to educate children from Grades 4 to 6 in primary schools. In 2018, financial support is needed to print approximately 10,000 booklets for distribution.

2) Strengthen the mainstreaming of CEE in the 2018 Country Programme

The CO should consider mainstreaming CEE in their 2018 programme (subsequent to the meeting with focal points) by hosting workshops with stakeholders of each of the three thematic areas (climate, energy, and environment) as well as representatives of those entities that have legal mandate for safeguarding the rights of children (example, The Commission on the Rights of the Children and Ministry of Social Protection). Issues such as the availability of clean water, and mitigating health risks, especially those posed by infectious vector borne diseases such as dengue and newer threats such as Chikungunya and Zika, which have serious implications for pregnant women and their babies

should be discussed. An outcome of this meeting should be to discuss specific actions that aim to reduce children's vulnerabilities to climate change, energy insecurity and environmental degradation.

3) Support Child Sensitive CEE Policy and Planning

Unarguably, the absence of child sensitive CEE policy and planning has impacted the extent to which sector specific programmes address issues that directly affect children. To this end, it is recommended that the CO provide technical support to CEE focal points in area of child sensitive policies, including a training workshop that aims to develop skills in developing child sensitive programmes in each thematic area. Opportunities currently exist in the National Climate Change Adaptation Plan and the proposed National Climate Change Policy being promoted by the OCC, as well as the GSDS that is developed by UN Environment (ROLAC's office) in collaboration with the Department of Environment of the Ministry of the Presidency.

4) Promote greater collaboration with the Civil Defence Commission

Given the lessons learned in promoting more local responses to disaster risks and the disproportionate impact of floods and droughts on hinterland communities, including children and youth, the CO should consider, as priority, the strengthening of their partnership with the CDC to enhance the decentralization of preparedness measures, including education and early warning systems that can complement traditional knowledge. Children should be taught school drills during emergencies, and should also acquire skills related to 'water safety' (for example, swimming) to build their resilience during floods.

5) Engage the MOE to support Education for Sustainability

UNICEF was engaged in the UN joint team initiatives for Capacity Building for Climate Change Education, a project led by UNESCO. Preliminary discussions were held with UNESCO and UNICEF as part of the development of the Education for Sustainable Development Policy. The CO should therefore continue the work with the Ministry of Education to support the implementation of its policies. Initially, UNICEF programmes that are related to climate change, energy and environment should be discussed with the Ministry of Education and piloted through the UNICEF's funded child friendly schools initiative. Additionally, those can be used as a model for energy and water conservation, recycling etc. and their WASH programme for health.

Further, the CO should also to support initiatives that allow the voices of children to be heard in respect of CEE issues. It is noted that UNICEF already has an initiative that is designed to increase youth engagement in climate change action is the Young Peoples Climate Change Mapping. The initiative encourages youth participation in climate action by getting them to identify local CEE they experience and to determine positive actions in their community that address these challenges. The OCC should be considered a critical partner for such an initiative.

6) Support the creation of child friendly information

Information provision should lead to awareness and understanding to aid participation in sustainable development efforts; hence the need for the CO should consider supporting more government agencies (particularly those with direct mandate for CEE) to create child/youth friendly information portals on their websites to aid students in their research. An area of priority is the Green State Development Strategy that is apparently too technical for children and youth. There exists an opportunity for the CO to consolidate with the Ministry of Education (through NCERD) the “World’s Largest Lesson”²⁵ which offers prototype lesson plans that can be reviewed and tailored to the local needs of children in Guyana. These lessons teach children and youth about the SDGs and unite them in action. Importantly, the EPA can be considered as a partner institution since the Agency is responsible for the establishment of Environmental Clubs throughout Guyana. Additionally, the GoG ICT 5 year project as a platform for e-governance can facilitate knowledge and information transmission through education centres that target Guyana’s hinterland population.

7) Promote and support greater equity in accessing potable water supply for schools and health centres in rural and hinterland areas

It is recommended that the CO should continue promoting and providing financial support to the GOG through Ministry of Health, Ministry of Communities, and the Ministry of Education to enhance their capability to provide services in rural and hinterland areas with the aim to ensuring greater equity in accessing potable water supply, schools and health centres and ultimately, a better quality of life for children (in those areas). The CO can partner with PAHO-WHO to achieve such this aim.

It is also recommended that the CO collaborates with the FAO and the MOE to accelerate the current nutrition programme, as well as design interventions during emergencies related to floods and droughts to ensure children remain healthy.

8) Support the design of Child Friendly Infrastructure

Given the physical discomfort of children during periods of droughts and floods and the associated health risks, the CO should consider working in partnership with the MOE and the MOH to ensure the design of child friendly schools, child care facilities, and family friendly buildings based on the approved building codes of Guyana. Moreover, during dry spells, the Guyana Energy Agency and the Office of Climate Change should also be targeted as potential partners given their respective roles in the context of the Green State Development Strategy Framework.

²⁵ For more information visit the website: <http://worldslargestlesson.globalgoals.org/>

9) Further research on barriers to children engagement in CEE

There is need for further research on the institutional and other barriers that prevent children and youth from being fully engaged in decision-making²⁶ and benefitting optimally from national initiatives with regard to CEE. This research is considered critical to any mainstreaming of children in climate, energy and environment in Guyana. The CO can therefore work in collaboration with OCC and the Faculty of Earth and Environmental Sciences of the University of Guyana.

²⁶ A good point of reference for the study can be obtained from website: https://www.unicef.org/environment/files/UNICEF_Sustainable_Energy_for_Children_2015.pdf

10. REFERENCES

- Arnaudov, N. (2017). Nationally Appropriate Mitigation Actions. Georgetown, Office of Climate Change.
- Bynoe, P and Lancaster, A. (2010). *Diagnostic and Analytical Review of Environmental Governance Systems of Guyana*. CARICOM Secretariat. Georgetown.
- Bureau of Statistics (2014). Guyana Population and Housing Census 2012: Preliminary Report.
- Clarke, R. (2016). Report 2- Draft National Energy Policy of Guyana-Green Paper.
- ECLAC and UNDP. (2005). Guyana Socio-economic assessment of the damage and losses caused by the January – February 2005 flooding. With contribution from IICA. http://www.cepal.org/cgi-bin/getProd.asp?xml=/publicaciones/xml/0/26950/P26950.xml&xsl=/publicaciones/ficha-i.xsl&base=/publicaciones/top_publicaciones-i.xsl#
- Emergency Events Database (EM-DAT). (2015). Guyana Country Profile. Http.
- *Environmental Capacity Development for Biodiversity, Climate Change, and Land Degradation*, EPA, Georgetown. March 2007.
- *Environmental Protection Act. 1996*.
- *EPA, (2006). Guyana National Capacity Self-Assessment of the United Nations Framework Convention on Climate Change*.
- EPA. (2007). *National Biodiversity Action Plan II (2007-2011) and Situation Analyses*.
- Garlati, A. (2013). *Climate change and extreme weather events in Latin America: An Exposure Index*, Inter-American Development Bank, Department of Research and Chief Economist, available here: <http://publications.iadb.org/bitstream/handle/11319/5654/Climate%20Change%20and%20Extreme%20Weather%20Events%20in%20Latin%20America%3a%20An%20Exposure%20Index.pdf;jsession-id=9948B56530A6C92002B8CB8BFC8039EB?sequence=1>.
- Government of Guyana. (2001). *Climate Change Action Plan*.
- Government of Guyana. (2001). National Climate Change Adaptation Policy and Implementation Plan.
- Government of Guyana, (2005). *Poverty Reduction Strategy Paper*.
- Government of Guyana. (2012). *RIO + 20 Guyana Stocking Report. A Green Economy and Institutional Framework for Sustainable Development: The Guyana Context*.
- Government of Guyana. (2012). *Second National Communication to the United Nations Framework Convention on Climate Change*. Prepared by the Government of Guyana with support from the UNDP and the National Communication Support Programme.
- Government of Guyana. (2013). *Low Carbon Development Strategy Update*.
- Government of Guyana. (2013). *National Integrated Disaster Risk Management Plan and Implementation Strategy for Guyana*.
- Government of Guyana. (2001). *National Development Strategy: 2001-2010*. Ministry of Finance, Georgetown.
- Government of Guyana. (2011). *Low Carbon Development Strategy*. www.lcds.gov.gy
- Government of Guyana. (2016). *Climate Resilience Strategy and Action Plan (2015-2020)*. Draft.

- Government of Guyana. (2017). *Green State Development Strategy Framework*. <http://www.motp.gov.gy/index.php/notices/policies/2016-framework-for-guyana-green-state-development-strategy>
- Government of Guyana. (2016). *State of the Environment Report 2016*. Department of Environment. Georgetown.
- Government of Guyana. (2016) *Guyana's Revised Intended Nationally Determined Contribution*. <http://www4.unfccc.int/ndcregistry/PublishedDocuments/Guyana%20First/Guyana's%20revised%20NDC%20-%20Final.pdf>
- Government of Guyana. (2012) "*Energy Access at Community Level for MDG Achievement in Hinterland Areas*" *Project Final Report*.
- Government of Guyana/PAHO. (2004). *Solid Waste Sectoral Analysis*. Georgetown.
- Government of Guyana (2012). *Second National Communication to the United Nations Framework Convention on Climate Change*. Prepared by the Government of Guyana with support from the UNDP and the National Communication Support Programme.
- *Guyana Environmental Profile Final Report*. Project Number: 9 ACP GUA 005/2 June 2006
- *Guyana Initial Communication*. 2002.
- *Guyana National Capacity Self-Assessment (PIMS 2864) Part II. Strategy and Action Plan for Synergistic Environmental Capacity Development for Biodiversity, Climate Change and Land Degradation*. EPA. Georgetown.
- *Guyana's Assessment Report of Barbados Plan of Action Plus 10*. 2004.
- Guyana Energy Agency (GEA) (2014b): *Strategic Plan 2014-2018*.
- Intergovernmental Panel on Climate Change (IPCC). (2014). *Climate Change 2014: Impacts, Adaptation and Vulnerability*. IPCC Fifth Assessment Report, Cambridge University Press.
- Khan, M., (2001). *National Climate Change Adaptation Policy and Implementation Plan for Guyana*. National Ozone Action Unit of Guyana/Hydrometeorological Service, Georgetown.
- Index for risk management for Latin America and the Caribbean (Lac-Inform)
- Loxley, M. (2017). *Climate Change Impacts and Adaptations, Current Context of UNICEF LAC Sectors and Programming*.
- McSweeney, C., New, M. and Lizcano, G. (2010). *UNDP Climate Change Country Profiles: Guyana*. Available at: <http://country-profiles.geog.ox.ac.uk>
- Ministry of Agriculture. (2013). *A National Strategy for Agriculture in Guyana, 2013-2020*. <http://agriculture.gov.gy/National%20Agriculture%20Strategy%202013-2020.pdf>
- Ministry of Agriculture. (2013). *Disaster Risk Management Plan for the Agriculture Sector 2013 – 2018. Developed in partnership with the Food and Agriculture Organization (FAO) of the United Nations*. http://www.un.org.gy/index.php?option=com_k2&view=item&id=144:disaster-risk-management-plan-for-the-agriculture-sector-2013-2018&Itemid=740.
- Ministry of Communities & UNICEF (2017). *Risk-informed, Child Friendly Regional Profiles*.
- *National Determined Contributions to UNFCCC (NDCs)*.
- Office of Climate Change, Ministry of the Presidency, Guyana and UNEP-DTU. (2017). *Technology Action Plan for Adaptation*. Technology Needs Assessment Project.
- Office of Climate Change, Ministry of the Presidency, Guyana and UNEP-DTU. (2017).

- Technology Action Plan for Mitigation. Technology Needs Assessment Project.*
- Parsram, Kemraj. (2010). *Guyana Water Resources 2010*.
 - United Nations Office for Disaster Risk Reduction (UNISDR). (2015). *Global Assessment Report on Disaster Risk Reduction, Country Profile: Guyana*.<http://www.preventionweb.net/english/hyogo/gar/2015/en/home/data.php?iso=GUY>.
 - United Nations Environment Programme (UNEP), (2010): *National Environmental Summary Guyana*. Prepared by Dr. Paulette Bynoe for UNEP/ROLAC.
 - UNICEF (2012). *Climate Change Adaptation and Disaster Risk Reduction in the Education Sector Resource Manual*. Available at <https://www.unicef.org/cfs/files/UNICEF-ClimateChange-ResourceManual-lores-c.pdf>
 - UNICEF. (2016). *Analysis on Children and Women in Guyana*. Available at https://www.unicef.org/guyana/UNICEF_Situation_Analysis_2016.pdf
 - UNICEF. (2016). *State of the World's Children Report: a fair chance for every child*. Available at <https://www.unicef.org/sowc2016/>
 - UNICEF. (2017). *Climate Landscape Analysis for Children in the Philippines*.
 - UNICEF and Global Water Partnership. (2017). *WASH Climate Resilient Development Strategic Framework 2014, updated 2017*.

ANNEX I: LIST OF STAKEHOLDERS WITH WHOM CONTACT WAS MADE

No.	Name of Interviewee	Stakeholder Organisation	Date
1	Major Welcome	CDC	6/12/2017
2	Mr. Flatts Ms. Conway)	NDIA	24/11/2017
3	Mr. I Jones	UNICEF	7/11/2011
4	Ms. Cumberbatch	NCERD	7/12/2017
5	Ms. S. Razack	EPA	16/11/2017
6	Ms. T. Lieuw	IDB	13/11/2017
7	PS, Mr. A. King & Ms. M. Andrew)	Ministry of Indigenous Peoples' Affairs	28/11/2017
8	Dr. Hamilton	Ministry of Health	4/12/2017
9	Ms. S. Wood	Guyana Energy Agency	
10	Ms. Speede	Ministry of Social Protection	28/11/2017
11	Ms. J. Christian	Office of Climate Change	7/12/2017 & 14/2/2017
12	Ms. K. Dhairam	Hydromet	4/12/2017
13	Ms. E. Alleyne	Private Sector Commission	28/11/2017
14	Ms. Boston	Women across Differences	7/12/2017
15	Mr. Panday	National Commission on the Rights of the Child	29/11/2017
16	Nichola Duncan	United Nation Population Fund	7/12/2017
17	Mr. Robertson	FAO	29/11/2017
18	Mr. M. Mc Garrell	Amerindian Peoples Association	4/12/2017
19	Ms Sylvia	UNICEF Representative, Guyana and Suriname	3/2/2018
20	Ms. Audrey Michelle Rodrigues & Ms. Lilian Blair	Programme Officer (Education) Consultant, Early Childhood Development (Nutrition)	7/2/2018
21	Ms. Mikiko Tanaka	UN Resident Coordinator	12/2/2018

Table 9: List of Stakeholders with whom contact was made

ANNEX II: WHO'S WHO IN GUYANA

Focal Point	Name and Position	Address/Contact Details
Climate Change Focal Point	Ms. Janelle Christian Head	Office of Climate Change Shiv Chanderpaul Drive Bourda, Georgetown <i>Guyana</i> Tel. +592 223-0975 Website: www.motp.gov.gy
Energy Focal Point	Dr. Mahender Sharma Chief Executive Officer	Guyana energy Agency 295 Quamina Street, South Cummingsburg Georgetown Guyana Telephone: +592 226- 0394 <i>Website: www.gea.gov.gy/</i>
Environment Focal Point	Ms. Ndibi Schwiers Head	Department of Environment 68, high Street, Kingston Georgetown Guyana Telephone: +592 223-6313 Website: www.motp.gov.gy

Table 10: List of Focal Points

ANNEX III: PLAN OF IMPLEMENTATION OF RECOMMENDATIONS

The Table below present an Implementation Plan for all recommendations that have been outlined in this report.

Key: Short term – 6 months to 1 year; Medium Term-More than 1 year to 2 years; Long Term-Above 2 years to 3 years.

Recommendations	Duration			Activities	Proposed Collaborators
	Short Term	Medium Term	Long Term		
1. Strengthen UNICEF CO Engagement in CEE	X			<ul style="list-style-type: none"> • Host meeting with National Focal Points on Climate, Energy and Environment to discuss areas of collaboration, for example, production of education materials, hosting of children's forum, among others. Importantly, this collaboration can commence on World Environment Day-June 5, 2018. • Share UNICEF documents with National focal Point to promote the incorporation of children friendly programmes/projects with respect to CEE in Guyana. • If necessary, develop a MoU with each Focal Point to facilitate sharing of information, expertise, etc. • Develop an Action Plan that will receive support for implementation 	<ul style="list-style-type: none"> • Office of Climate Change • Guyana Energy Agency • Environmental Protection Agency
2. Strengthen the mainstreaming of CEE in the 2018 Country Programme	X			<ul style="list-style-type: none"> • Liaise with GoG through the various ministries/agencies/units to host workshops on CEE issues through the lens of children and utilise expertise available in UNICEF to demonstrate the process of mainstreaming children in CEE policies. • Form a small Task Force that will monitor and provide feedback on the mainstreaming of children into CEE policies, plans, programme, and projects 	<ul style="list-style-type: none"> • Department of Environment • Office of Climate Change • Ministry of Public Health • Guyana Water Incorporated • Ministry of Education • IDB

<p>3. Support Child Sensitive CEE Policy and Planning</p>		<p>X</p>	<ul style="list-style-type: none"> • Liaise with youth and support Youth for Climate, Energy and Environment, for example, young scholars can undertake research activities to monitor impacts on children. • Facilitate forum for youth to interact with policy makers and propose ways in which children, utilising expertise available to in UNICEF to demonstrate the process of mainstreaming children in CEE policies. • Hold discussions with UN Environment and Department of Environment to explore opportunities to address issues affecting children with regard to CEE in the proposed Green State Development Strategy. 	<ul style="list-style-type: none"> • Department of Environment • Ministry of Culture and Youth • Caribbean Youth Environment Network-Guyana Chapter • UN Environment
<p>4. Promote greater collaboration with the CDC</p>	<p>X</p>		<ul style="list-style-type: none"> • Increase collaboration with the CDC to build resilience to climate variability (floods and droughts) of children, particularly in hinterland regions, for example, through Safe Schools. • Develop child-friendly materials on disaster –risk reduction and disaster mitigation measures (example, water safety measures and the WASH programme for health) in response to risk profiles prepared for the administrative regions in Guyana. 	<ul style="list-style-type: none"> • Civil Defence Commission • CDEMA • FAO
<p>5. Engage the MOE to support Education for Sustainability</p>	<p>X</p>		<ul style="list-style-type: none"> • Undertake assessment of past interventions in respect of educational materials for children on CEE. • Liaise with the Focal Points for CEE to develop additional materials for use in schools by teachers in an effort to enhance the content of lessons that address CEE issues. • Provide support to School Clubs for their awareness efforts related to CEE • Involve School Clubs in the UNICEF Young Peoples Climate Change Mapping. 	<ul style="list-style-type: none"> • NCERD-Ministry of Education • Office of Climate change • Guyana Energy Agency • Environmental Protection Agency

6. Support the creation of child friendly information		X	<ul style="list-style-type: none"> • Hold meetings with government agencies (particularly those with direct mandate for CEE) to create child/youth friendly information portals on their websites to aid students in their research. • Consolidate with the Ministry of Education (through NCERD) the “World’s Largest Lesson” to ensure children have access to educational materials that will empower them to take proactive measures against the impacts of CEE. 	<ul style="list-style-type: none"> • Ministry of Education • Ministry of Public Telecommunication • OCC, GEA, EPA
7. Promote and support greater equity in accessing potable water supply, schools and health centres in rural and hinterland areas		X	<ul style="list-style-type: none"> • Host meeting with Ministry of Communities, Ministry of Health and PAHO on the issue of safe water supply to indigenous communities, and particular schools • Select a few schools or communities and develop pilot programmes that would include the awareness component, the improved infrastructure, and monitoring of impacts and feedback to UNICEF by School Clubs 	<p>Ministry of Communities</p> <p>Ministry of Public Health</p> <p>PAHO</p>
8. Support the design of Child Friendly Infrastructure		X	<ul style="list-style-type: none"> • Collaborate with the Ministry of Education to design more child-friendly schools in response to climate variability impacts (floods and droughts) • “Explore options for sustainable sourcing of water” 	<p>Ministry of Education</p> <p>Ministry of Finance</p> <p>Ministry of Communities</p>
9. Further research on barriers to children engagement in CEE		X	<ul style="list-style-type: none"> • Collaborate with the Faculty of Earth and Environmental Sciences to undertake areas of child-related applied research that would improve base-line information for policy design. 	<p>Faculty of Earth and Environmental Sciences of the University of Guyana</p>

Table 11: Implementation Plan

iii Garlati, A. (2013). Climate change and extreme weather events in Latin America: An Exposure Index. Inter-American Development Bank, Department of Research and Chief Economist, available here: <http://publications.iadb.org/bitstream/handle/11319/5654/Climate%20Change%20and%20Extreme%20Weather%20Events%20in%20Latin%20America%3a%20An%20Exposure%20Index.pdf;jsessionid=9948B56530A6C92002B8CB8BFC8039EB?sequence=1>.

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