

**GAP ANALYSIS:**

**CHILDREN AND CLIMATE CHANGE**

**IN**

**THE SMALL ISLANDS DEVELOPMENT STATES (SIDS)**

**OF THE EASTERN CARIBBEAN**

UNICEF Office for Barbados and Eastern Caribbean

Leonard O'Garro

(in collaboration with Violet Speek-Warnery)

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## **EXECUTIVE SUMMARY**

The UNICEF Office for Barbados and the Eastern Caribbean commissioned this paper to report on (1) the burdens borne by children in the face of threats posed by environmental degradation, climate change and natural disasters, (2) the arrangements in place for mitigating these threats and (3) the relevance of programming on the environment on behalf of children in Small Island Development States (SIDS) in the Eastern Caribbean.

The paper is based on the 2009 study, “Gap Analysis: Children and Climate Change in the Eastern Caribbean”, undertaken by the Business Development Office of the University of the West Indies and commissioned by the United Nation Children’s Fund (UNICEF), with support from the United Nations Environment Programme (UNEP). The main areas of the analysis included (a) environmental health hazards, (b) environmental health related diseases, (c) public education and (d) awareness and child survival in natural disasters and the impact of these hazards and threats on girls and boys in SIDS in the Eastern Caribbean.

Due to the lack of relevant and scientifically-linked information from the SIDS and regional data sources, the Gap Analysis was not able to clearly identify the environmental health hazards associated with climate change. However, the Analysis did come across some common environmental health related diseases for children, such as asthma and gastroenteritis, which could benefit from a better tracking system through improved data collection systems. Additionally, public education and awareness programmes on the environment were found to be well represented in the SIDS. In contrast, though, the Analysis found that there were little or no policies and programmes tailored specifically for children confronting natural disasters and other environmental emergencies.

Several interventions for improving the status of children have been proposed in this paper. Overall, these include greater commitment and awareness to single out children as an especially vulnerable group requiring special provisions for care and protection in the face of environmental threats. Suggestions for achieving this overall goal include:

- preparing regional and national periodic reports on relevant environmental issues to policymakers in tracking and planning the implementation of their obligations for care and protection of children;

- supporting regional and national data collection and reporting systems on environmental health hazards and environmental health related diseases relating to children;
- revising regional and national disaster/emergency plans to include special provisions for children and collaborating with executing and implementing agencies of education and awareness programmes on the environment to promote information sharing, best practices and development of synergies;
- better alignment of the applicable multi-lateral environmental agreements for safeguarding the environment and health with the environmental areas of concern for children and programming as it relates to the United Nation Convention on the Rights of the Child (CRC).

The statements in this document are the views of the authors and do not necessarily reflect the policies or the views of UNICEF.

## 1. Introduction

UNICEF is guided by the Convention on the Rights of the Child and strives to establish children's rights as enduring ethical principles and international standards of behaviour towards children. UNICEF insists that the survival, protection and development of children are universal development imperatives that are integral to human progress, even in times of emergency and crisis. For this reason, UNICEF's mandate cross-cuts and complements other major global and regional efforts catering specifically for children well-being and human development in general. In the Caribbean, UNICEF assists the Caribbean Community (CARICOM) on matters of care and protection of children through the Regional Framework for Action for Children 2002-2015<sup>i</sup> as well as individual Caribbean States on strengthening national legislation, policies and programmes for children and their families.

The most over-arching United Nations global framework catering for human development is the United Nations Millennium Declaration<sup>ii</sup>. An equivalent United Nations framework for Small Island Developing States (SIDS) is The Mauritius Strategy for the Further Implementation of the Programme of Action for the Sustainable Development of Small Island Developing States<sup>iii</sup>. UNICEF's work is well aligned to these frameworks on the basis of programming in a number of common, current and emerging thematic areas.

Fields of programmatic interest to child rights advocates in light of the prevailing climate change caused by global warming are the cross-cutting areas of environmental degradation and natural disasters, with emphasis on threats posed to children. A better understanding of the nature of these environmental threats and their impact on children as well as a review of existing regional and country level plans and programmes for children and how these areas are aligned with the CRC are required to inform policymakers, planners and programmers about the possible need to strengthen or initiate policies, plans and programmes for children.

The programmatic interest is in recognition of current widespread and heightened concerns in the Caribbean about threats posed by environmental degradation and natural disasters. Highly publicized and frequent occurrences of massive destruction of life and property and severe economic dislocation caused by natural disaster events around the world, including the Caribbean, and projections on the negative impacts of climate change have fuelled the concerns.

Trends in the Caribbean during the last 30 years are already showing significant changes to the environment due to climate change. A warming of the ocean surface around small island states has been detected (around 1 per cent Celsius), and this pattern is expected to continue. Projections show that this warming will be accompanied by an increase in heavy rainfall events and other temporal and spatial changes in precipitation patterns, and by more intense or frequent cyclones/hurricanes. Arable land, water resources and biodiversity are already under pressure from increases in population and development on the SIDS and the unsustainable use of available natural resources. With climate change further negative impacts are being witnessed. For example, 80 per cent of the coral reefs are being threatened (“coral bleaching”) by increased sea surface temperatures and acidification of the oceans; mangroves are being exposed; beaches are eroding due to the sea level rise and an increase in extreme weather events and water resources are under stress by changes in precipitation patterns.

The main environmental degradation concerns in the Caribbean currently revolve around the related issues of deforestation, fresh water reserves or catchments, unsustainable land use practices and contamination of water sources, including coastal seas. Ground and surface fresh water reserves in SIDS in the Eastern Caribbean are limited. Generally, ground water reserves cannot satisfy domestic demand and there are further concerns about their quality with respect to salinity and hardness and their vulnerability to contamination. In most of these countries, surface water reserves are the primary source of fresh water and result from rain run-off. On account of the rugged topography of many of the countries, most run-off water flows to the sea with little possibility for ground storage. Natural forests intercept surface water flow by allowing infiltration into the land sub-surface. The interception creates base water flows well beyond rainy periods. It is this intercepted water that is harnessed for domestic use. The major concern about water catchments is deforestation mainly for commercial agriculture coupled with overall land degradation. Uncontrolled commercial agriculture is well known to introduce harmful pesticides into the environment, including water reserves. Contamination of water reserves by chemical fertilizers also occurs through uncontrolled agricultural practices.

Land degradation resulting from the misuse of land overtime reduces soil fertility and structure. Loss of fertility results from the removal of organic matter and mineral nutrients. Leaching of toxic metals also occurs from degraded soil. Land slippage and loss of top soil are also manifestations of land degradation. Forest soil, in particular, is

held by an extensive meshwork of tree roots and when deforestation occurs, sliding and slippage of soil result. When linked to contamination of land, usually through illegal and or indiscriminate disposal of household and industrial wastes, land degradation is also associated with the introduction of other hazards, including allergens, toxic chemicals and faecal material, into to the environment, notably water sources. Pollution of land and water sources by toxic chemicals and faecal matter has serious implications for human health and the environment.

Deforestation activities are generally associated with reduced river flow and poor water quality. Poor water quality may in turn damage human health and the environment, including coastal marine ecosystems. Degraded land results in low agricultural productivity, which in turn threatens livelihoods. Degraded land is also a potential source of contamination of water reserves by agricultural chemicals and other pollutants and it is prone to land-slides and floods, both of which pose danger to human settlements, including life and vital infrastructure. Deforestation also results in reduction or loss of forest biodiversity and may threaten the existence of communities whose livelihoods are supported or sustained by services forests provide.

In addition to concerns about environmental degradation, Eastern Caribbean SIDS are especially vulnerable to natural disaster threats. These threats are mainly from hurricanes, storms, floods, earthquakes, tsunamis and volcanic eruptions which heighten the vulnerabilities to the disruption of climate-dependent human activities such as agriculture, loss or reduction of biodiversity, drastic changes in weather patterns, submergence of low lying coastal areas, including beaches and human settlements, damage to fisheries and marine ecosystems, changes in the spread and prevalence of pests and diseases and increases in frequency and intensity of meteorological hazards such as floods, storms and hurricanes.

Tourism and agriculture, in particular, will be negatively impacted by threats posed by environmental degradation and natural disasters causing concerns about the ability to ensure the achievement of the sustainable development; potentially deepening children's poverty and increasing their vulnerability to abuse, exploitation and displacement. It could also stall or reverse progress made towards achieving the Millennium Development Goals and goals contained in the Mauritius Strategy.<sup>1</sup>

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<sup>1</sup> The Mauritius Strategy was the outcome document of the **UN Conference on Small Islands Concludes in Mauritius in January, 2005**. It emphasizes that small island developing States, or SIDS "are located among the most vulnerable regions in the world in relation to the intensity and frequency of natural and environmental disasters and their increasing impact, and face disproportionately high economic, social and environmental consequence," as highlighted by the 26 December Indian Ocean tsunami and the hurricane/cyclone/typhoon season in the Caribbean and Pacific in 2004.

All of these are expected to negatively impact children and families in SIDS of the Caribbean vis a vis:-

- lost/reduced earnings for families from loss in the agricultural, fishing and tourism sectors;
- threatened environmental displacement– 50 per cent of the population live within 1.5 km from the coast lines;
- increased vector and water-borne diseases;
- family separation due to migration because of challenges in some countries;
- loss of school/teaching time for children due to emergencies during stormy season;
- the rights of children not addressed within most emergency plans/policies.
  - Constant fear of natural disasters
  - Further family separation and migrationiv.

Children as an especially vulnerable group will bear a disproportionately large share of the burden. The vulnerability of children and the burden borne by them in the face of threats presented by environmental degradation referenced to health hazards are documented by the World Health Organization<sup>v</sup> and Bunyavanich and Landrigan in 2003. In Table 1, some of these specific vulnerabilities to climate change for children are detailed.

**Table 1.** Modalities and mechanisms by which children may be more susceptible to climate change than adults

Modality	Mechanism	Increased risk due to climate change
Metabolic	<ul style="list-style-type: none"> <li>- respiratory rate</li> <li>- metabolic rate</li> <li>- water demand per unit body mass</li> </ul>	Air pollution, allergens malnutrition, thermal extremes gastrointestinal disease, dehydration
Behavioural	<ul style="list-style-type: none"> <li>- outdoor time</li> <li>- vigorous activity</li> <li>- ability to avoid unhealthy situations</li> <li>- swimming capacity</li> </ul>	Infectious diseases, air pollution, allergens weather extremes, UV radiation, thermal extremes, drowning
Physiology	<ul style="list-style-type: none"> <li>- less surface area: volume</li> <li>- detoxifying capacity</li> <li>- skin development</li> <li>- immunity</li> </ul>	Infectious diseases, air pollution, infectious diseases, thermal extremes  UV radiation Allergens/mycotoxins
Time	<ul style="list-style-type: none"> <li>- latency for genetic/ long-term effect</li> <li>- lifetime exposure time</li> </ul>	UV radiation, allergens, malnutrition
Development	<ul style="list-style-type: none"> <li>- undergoing development</li> </ul>	malnutrition, stunting, psychosocial trauma, morbidity, quality of life

Source: (Bunyavanich, S., C. P. Landrigan, et al. (2003). "The impact of climate change on child health." *Ambul Pediatr* 3(1): 44-52.)

When referenced to the UN CRC, environmental degradation and natural disasters especially impact children's rights to adequate health, standard of living, education, and protection from violence, abuse and exploitation. More specifically, environmental degradation and natural disasters will increase the likelihood of children's susceptibility to health and physical injury, disruption of schools and other vital infrastructure catering for children, economic dislocation, and disruption and or displacement of families and communities. These major threats have recently been highlighted again in the Pacific in 2009, during the Asian tsunami in 2004<sup>vi</sup> and the passage of Hurricane Ivan in Grenada, also in 2004<sup>vii</sup>.

Unless measures are put in place to prevent degradation of the environment and to mitigate the effects of natural disasters, the mistakes or shortcomings of the past will be repeated with disastrous consequences for children and their families.

## 2. Purpose of Paper

The overall purpose of this paper is to provide an overview of the status of children's well-being in the face of threats posed by environmental degradation and natural disasters and to illustrate the alignment between multilateral environmental agreements catering for protection of the environment and human health and the CRC, for the purpose of advocate for policy development and programming on the environment and climate change for and with children of SIDS in the Eastern Caribbean.

The paper is divided into four sections:

1. A description on the nature of the environment and its degradation
2. A review of the linkages of multilateral environment agreements and conventions with the UN Convention on the Rights of the Child (CRC)
3. An overview of the gap analysis of children and climate change in 10 SIDS in the Eastern Caribbean with an emphasis on:
  - Environmental health hazards
  - Environmental health related diseases
  - Education and awareness of environment
  - Child survival in natural disasters.
  - Conclusion of the situation
4. Recommendation on how to address the identified gaps to ensure care and protection for children in circumstances of threats posed by climate change.

This paper takes into account the *Gap Analysis: Children and the Environment in the Eastern Caribbean* undertaken by the Business Development Office of the University of the West Indies, Barbados. The Analysis was commissioned by the Barbados-based *UNICEF Office for Barbados and the Eastern Caribbean* in conjunction with United Nation Environment Programme (UNEP), through the Office of the *Regional Biosafety Coordinator for the Caribbean*, also based in Barbados. The Analysis focussed on the multi-country sub-region within the Eastern Caribbean including the following 10 SIDS: Antigua and Barbuda, Barbados, Dominica, Grenada, Montserrat, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines and Turks and Caicos.

### **3. The Nature of the Environment and its Degradation**

#### *Nature of the environment*

The environment is the total of all external conditions affecting life, development and survival of an organism. From the standpoint of an organism, the external conditions refer to the living and non-living parts of the surroundings. The living parts constitute biodiversity which in turn refers to the many living things, including the living sections of the surroundings and their variability. The living sections of the surroundings are usually referred to as ecosystems, such as forests, grasslands and deserts. The non-living components, as the term implies, will be constituted from the physical environment exclusive of the life forms.

#### *The environment: value and susceptibility to degradation*

Concerns about environmental degradation have primarily focused on the conservation and sustainable use of biodiversity and protection of human health, both of which are cross-cutting areas. Loss of biodiversity through environmental degradation or its unsustainable exploitation may impact humankind adversely. This is because biodiversity is centrally important for human, including children's, welfare. It is the basic source of food, fibres for clothing, building materials, drugs, cosmetics and numerous raw materials for industries. It also plays an important role in the correct functioning of climate. Biodiversity maintains and safeguards water resources, stabilize soils and has important functions in leisure and landscaping.

Human health can also be impacted by environmental degradation through the introduction of hazardous substances, usually in the form of wastes that are by-products of society. Typical hazardous substances are toxic, corrosive, reactive or ignitable and they can pose substantial danger to health and the environment when improperly managed.

Of major current global concern for the environment and human health is climate change induced by global warming which in turn is linked to the release and build up of greenhouse gases in the atmosphere by mankind. Among these gases are carbon dioxide, nitrous oxide, methane and chlorofluorocarbons. They are implicated in the trend of increasing temperatures of the earth's surface and lower atmosphere by causing entrapment of solar heat. Although a good understanding of the likely effects of climate change induced in this way is yet to emerge, there are projections for sea level rise by melting of glaciers. Increase in sea level will impact low lying countries, including many SIDS, which are especially vulnerable. Another forecast is for an increase in sea surface temperature, which will impact marine biodiversity. There is

also an increasingly common view that climate change will affect prevalence and distribution of pest and diseases and incidence and severity of weather-induced natural disasters.

Of major global importance also are the ozone-depleting substances, collectively referred to as chlorofluorocarbons. These compounds are inert, non-toxic, easily liquefied and are used in refrigeration, air conditioning, packaging, insulation or as solvents and aerosol propellants. When released, the chlorofluorocarbons drift into the upper atmosphere where they destroy the ozone layer, which shields the earth from the sun's ultraviolet radiation's harmful health effects on humans and the environment.

#### **4. Linkages between the Nature of the Environment, Multilateral Environmental Agreements with the United Nations Convention on the Rights of the Child**

This section of the report reviews the nature of the linkages between the multilateral environmental agreements and conventions and the CRC for the purpose of advocating policies and programmes on the environment for and with children. The extent of alignment between the multilateral environmental agreements, the Millennium Development Goals<sup>viii</sup> and the Mauritius Strategy for the Further Implementation of the Programme of Action for the Sustainable Development of Small Island Developing States<sup>ix</sup> is also discussed.

Global concerns about the environment and human health have led to the adoption of several conventions of a multilateral nature. These conventions are agreements Governments have ratified to achieve goals related to sustainable development, taking environmental considerations into account. Altogether, about 2000 such agreements with sub-regional, regional and global scopes have been signed into force. A sample of global agreements developed under the auspices of the United Nations and which focus mostly on safeguarding the environment is selected here for mention. The importance of safeguarding the environment has been taken up by the SIDS in the Eastern Caribbean through implementation of the related multi-lateral environmental agreements. These agreements are also important vehicles for attaining many of the rights of children.

The following multilateral environmental agreements are selected to highlight a sample of important environmental concerns and illustrate approaches for safeguarding the environment in the face of climate change.

**Table 2.** A sample of important multilateral environmental agreements, protocols and conventions to protect children and their families from the consequences from climate change

<b>Multilateral Environmental Agreements</b>	<b>Brief description of the Agreements</b>
Convention on International Trade in Endangered Species.	This multilateral agreement came into force in 1975. It seeks to ensure that international trade in species of wild animals and plants does not threaten their survival. It also prohibits and penalizes international trade in endangered species.
Montreal Protocol	This agreement came into force in 1989 and it aims to protect the ozone layer by phasing out production of ozone-depleting halogenated hydrocarbons. The treaty provides a timetable on which the production of those substances must be phased out and eventually eliminated
Basel Convention	This convention came into force in 1992. It is designed to reduce movement of hazardous wastes between nations, especially from developed to less-developed countries. It is also intended to minimize the amount and toxicity of waste generated and to ensure their environmentally sound management as closely as possible to the source of generation, and to assist the least developed countries in similar management of the hazardous wastes they generate.
Convention on Biological Diversity	This multilateral agreement was adopted in 1992. It provides a comprehensive framework to address all aspects of biological diversity, including species, ecosystems and genetic diversity. It was negotiated in response to concerns about world-wide loss of biodiversity. It focuses on three main issues, namely, the conservation of biodiversity, sustainable use of biological resources and sharing benefits of biodiversity.
Cartagena Protocol on Biosafety of the Convention on Biological Diversity	This agreement came into force in 2003. The drafters of the Convention on Biological Diversity, anticipating the importance of global trade in specific modern biotechnology products, referred to as living modified organisms (LMOs), sought to put mitigating measures in place in the face of potential concerns about the environment and health. Accordingly, Parties to the Convention on Biological Diversity adopted the Cartagena Protocol on Biosafety to cater for these potential concerns. The objective is to provide a high standard of protection to the environment and health by implementing biosafety regimes to regulate trade in LMOs.
United Nations Framework Convention for Combating Climate Change.	This convention was entered into force in 1994. Its global mandate is to set out a framework for action aimed at stabilising atmospheric concentrations of greenhouse gases at a level that would prevent human-induced actions from leading to “dangerous interference” with Earth’s climate. It is aimed at reducing emissions of greenhouse gases implicated in global warming. Specific targets for reduction of the greenhouse gases are set out in the Kyoto Protocol.

These outlined multilateral environmental agreements, protocols and conventions cater for the environment and human health in the face of potential threats posed to them by human activities. The fall-out from environmental degradation will be a disproportionately large burden on children, given their special vulnerability. Bearing in mind the importance of biodiversity to human welfare and the concerns about health and the environment, including biodiversity, linked to ozone-depleting substances, greenhouse gases, introduction of LMOs and exposure to hazardous substances and other pollutants, SIDS in the Eastern Caribbean would do well to reduce the threats to climate change to children by implementing the above-mentioned multilateral environmental agreements, protocols and conventions.

At least four major areas of benefits can be identified if the above mentioned multilateral environment agreements, protocols and conventions would be addressed:

1. prevention of ozone layer depletion will minimize the incidence of cancers and damage to biodiversity caused by dangerous solar ultraviolet radiation,
2. reduction in exposure to hazardous wastes will reduce the incidence of many of the correlated environmental health related diseases and physical injuries,
3. reduction in greenhouse gas emissions is intended to mitigate against the projected negative impacts of climate change,
4. reduction of loss of biodiversity has positive implications for material (food, clothing, shelter, medicines, industries, etc) cultural and spiritual support of human kind.

These benefits are also specifically captured in many of the declarations on the rights of the child contained in the CRC and there are strong linkages to the *Millennium Development Goals* and several declarations of the *Mauritius Strategy for the Further Implementation of the Programme of Action for the Sustainable Development of Small Island Developing States*. The extent of the linkages is summarized in Table 2.

**Table 3:** Relationship between Multilateral Environmental Agreements (MEAs), the United Nations Convention on the Rights of the Child (UNCRC), the Millennium Development Goals (MDG) and the Mauritius Strategy (Mauritius Strategy) for the Implementation of the Programme of Action for the Sustainable Development of Small Island Developing States.

Sample of benefits associated with MEAs	Declarations of children rights (UN CRC) that are aligned with benefits associated with MEAs	MDGs that are aligned with benefits associated with MEAs	Mauritius Strategy declarations that are aligned with benefits associated with MEAs
Conservation and sustainable use of biodiversity	<ul style="list-style-type: none"> <li>• Adequate standard of living.</li> <li>• Adequate health.</li> <li>• Other rights that will be impacted by economic gains that can accrue from exploitation and utilization of biodiversity.</li> </ul>	<ul style="list-style-type: none"> <li>• Environmental sustainability.</li> <li>• Eradication of extreme poverty and hunger.</li> </ul>	<ul style="list-style-type: none"> <li>• Protection and conservation of biodiversity resources.</li> </ul>
Maintenance of ozone layer	<ul style="list-style-type: none"> <li>• Adequate health.</li> <li>• Other rights associated with conservation and sustainable use of biodiversity.</li> </ul>	<ul style="list-style-type: none"> <li>• Reduction in child mortality.</li> <li>• Improvement in maternal health.</li> <li>• Ensuring environmental sustainability.</li> </ul>	<ul style="list-style-type: none"> <li>• Safeguarding human health.</li> <li>• Protection and conservation of biodiversity resources.</li> </ul>
Reduction in exposure to environmental health hazards	<ul style="list-style-type: none"> <li>• Adequate health.</li> </ul>	<ul style="list-style-type: none"> <li>• Reduction in child mortality.</li> <li>• Improvement in maternal health.</li> </ul>	<ul style="list-style-type: none"> <li>• Proper management of hazardous wastes.</li> <li>• Safeguarding human health.</li> </ul>
Reduction in greenhouse gases	<ul style="list-style-type: none"> <li>• Adequate health.</li> <li>• Adequate standard of living.</li> <li>• Adequate means for survival and development.</li> </ul>	<ul style="list-style-type: none"> <li>• Eradication of extreme poverty and hunger.</li> <li>• Reduction in child mortality.</li> <li>• Improvement in maternal health.</li> <li>• Ensuring environmental sustainability.</li> </ul>	<ul style="list-style-type: none"> <li>• Mitigation against climate change effects.</li> <li>• Mitigation against natural and other environmental disasters.</li> <li>• Safeguarding human health.</li> <li>• Protection and conservation of biodiversity resources.</li> <li>• Control of freshwater resources.</li> <li>• Control of marine resources.</li> </ul>

## 5. Gap Analysis of Children and Climate Change in SIDS in the Eastern Caribbean

The *Gap Analysis: Children and the Climate Change in the Eastern Caribbean*<sup>x</sup>, prepared by the Business Development Office of the University of the West Indies, Barbados, identified the most critical areas of environmental concerns impacting children's health, well-being and development in SIDS in the Eastern Caribbean as being:

- ✓ Environmental health hazards
- ✓ Environmental health related diseases
- ✓ Education and awareness of environment
- ✓ Child survival in natural disasters.

Information on these areas of concern was gathered mainly by consulting country reports and other literature and by questionnaires and interviews.

### *Environmental health hazards*

According to a World Health Organization report<sup>xi</sup>, the environment presents potential risk factors for children's health.

For all the SIDS in the Eastern Caribbean, there is overwhelming absence or unavailability of sources of information on environmental hazards as potential risk factors for human health. The most complete information available on potential environmental risk factors for children health in SIDS in the Eastern Caribbean is on sources of drinking water and adequacy of toilet facilities. UNICEF estimates that the proportions of each population accessing improved drinking water and adequate sanitation facilities across rural and urban areas range from 93-100 per cent and 89 to 100 per cent, respectively<sup>xii</sup>.

Other available data are on imported/exported hazardous wastes for Barbados, Grenada and St. Lucia and on natural hazards or disasters for Dominica, St. Lucia and Turks and Caicos. Information on chemical fertilizers is also available for Dominica and St. Vincent and the Grenadines (see *Table 4*). However, when asked in an interview, none of the authorities questioned in the SIDS in the Eastern Caribbean attempted to correlate these types of information with burdens bore by children.

**Table 4:** Global environmental risk factors for children: correlated health concerns, risk levels and status report SIDS in the Eastern Caribbean

Risk factors	* Perinatal diseases	* Respiratory diseases	* Diarrhoeal diseases	* Insect-borne diseases	* Physical injuries	SIDS reporting on risk factors
Housing and shelter	+++	+++	++	+++	++	Not assessed
Water supply and quality	+	+	+++	++	+++	A NT, BAR, DOM, MON, SKN, SLU, SVG, TCI
Food safety and security of supply	++	++	+++	++	+++	Not assessed
Sanitation and hygiene	+	+	+++	+++	++	ANT, BAR, DOM, MON, SKN, SLU, SVG, TCI
Solid wastes	++	++	+++	+++	++	None
Outdoor air pollution	++	++	+	+	+	None
Indoor air pollution	+++	+++	+	+	+	None
Hazardous wastes	+++	+	+	+	+++	BAR, GRE and SLU
Accidents	++	++	++	+	+++	N/A
Natural hazards (disasters)	++	++	++	+++	+++	DOM, SLU, TCI (1960-2005)
Disease-carrying vectors	++	+	++	+++	+	DOM, SLU, SVG (2007)
Social/work environment	+++	++	+++	+++	+++	N/A

Key: \* refers to health concerns correlated with risk factors; high risk **+++**, medium risk **++**, low risk **+**; ANU (Antigua and Barbuda), BAR (Barbados), DOM (Dominica), GRE (Grenada), MON (Montserrat), SKN (St. Kitts and Nevis), SLU (St. Lucia), SVG (St. Vincent and the Grenadines), TCI (Turks and Caicos).

## Environmental Health Related Diseases

The Analysis identified (1) respiratory, (2) vector-borne and (3) food-borne diseases as the most important environmental health related illnesses affecting children in the study area.

### 1. *Respiratory diseases.*

Of the respiratory diseases, asthma was the reported as the number one concern for children. The disease is not considered for mandatory reporting, but indications based

on unpublished clinical observations referenced to internationally approved protocols are that the Caribbean is amongst the regions of the world with the highest incidence of asthma for girls and boys between the ages of 12 and 15. The annual deluge of African dust across the Caribbean has been implicated as a major triggering agent of asthma.

### *2. Vector-borne diseases*

The Analysis also concluded that dengue is the vector-borne disease of primary concern for children in the SIDS in the Eastern Caribbean. The disease is manifested as dengue fever and dengue hemorrhagic fever, which is the more serious form. Four different strains or serotypes of the dengue virus are present in the SIDS in the Eastern Caribbean and their infestations circulate simultaneously.

The implications are that the presence of the four serotypes increases the chance of repeated dengue infection in the same individuals and this in turn increases the risk of dengue hemorrhagic fever. Dengue is a reportable disease in the SIDS in the Eastern Caribbean, which are also mandated to report cases to the Caribbean Epidemiology Centre (CAREC), a regional surveillance agency for communicable and non-communicable diseases. Notwithstanding the reporting obligations, information on dengue for the SIDS in the Eastern Caribbean is marred by non-reporting and under reporting and available data are often not segregated to reflect the prevalence of dengue infection in per age and per sex.

### *3. Food-borne diseases*

On the basis of the Analysis, gastroenteritis is the food-borne illness of main concern to girls and boys in the SIDS in the Eastern Caribbean. Outbreaks of gastroenteritis in children are mainly caused by *Salmonella* species but *Staphylococcus aureus* and *Campylobacter* have also been reported in food-borne illnesses.

**Table 5:** Number of cases of gastroenteritis by age of patients SIDS in the Eastern Caribbean

Country	Cases of gastroenteritis	
	Cases < 5 years	Cases > 5 years
Antigua and Barbuda	613	1044
Barbados	439	923
British Virgin Islands	252	509
Dominica	404	590
Grenada	607	775
Montserrat	13	64
St. Kitts and Nevis	550	530
St. Lucia	583	952
St. Vincent and the Grenadines	394	596
Turks and Caicos	286	430
<b>Total</b>	<b>1141</b>	<b>6413</b>

\* Source: Appendix CAREC annual report, 2007. <sup>xiii</sup>

### Public Education and Awareness

General public education and awareness initiatives on the environment in the SIDS in the Eastern Caribbean are well represented. These initiatives are catered for at levels of policy and supporting programmes and activities. Also at policy level, global, regional and national frameworks cater for children education on the environment to varying extents. The programmes and activities supporting the regional policy frameworks are to be implemented at both regional and country levels by inter-governmental agencies and non-governmental organizations.

The multilateral environmental agreements, protocols and conventions signed by the SIDS all contain provisions catering for public education and awareness about the respective concerns they address but only the *Stockholm Convention on Persistent Organic Pollutants* specifically addresses the need to mount education and awareness programmes for children. Notwithstanding the presence of general education and public awareness provisions catering for environmental concerns in the other multilateral environmental agreements, there is little or no evidence that their implementation and operation in SIDS in the Eastern Caribbean actively take children education on the environment into account.

At the regional level, the main policy frameworks for addressing environmental concerns in the SIDS in the Eastern Caribbean are the *Mauritius Strategy for the Further Implementation of the Plan of Action for Small Island Developing States*, *CARICOM Regional Environmental Policy Framework* and the *OECS St. George's*

*Declaration of Principles for Environmental Sustainability in the OECS*<sup>xiv</sup>. Most of the SIDS in the Eastern Caribbean indeed have or are willing to develop national policy frameworks which support environmental education directed at children and adolescents.

The main regional inter-governmental programmes catering for children education on the environment are: (1) the secondary school curriculum of the **Caribbean Examination Council**<sup>xv</sup> and (2) the directives of the **OECS Education Reform Unit** for primary schools<sup>xvi</sup>. Additionally, through the **Sandwatch Programme**<sup>xvii</sup> sponsored by UNESCO, school children with the assistance of local communities, participate in activities for the enhancement and better management of the beach environment in Barbados, British Virgin Islands, Dominica, Montserrat, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines and Turks and Caicos. A resource guide developed by the Caribbean Disaster Emergency Response Agency (CDERA, now renamed the **Caribbean Disaster Emergency Management Authority (CDEMA)**<sup>xviii</sup>, has also started to assist school in disaster preparedness planning and in mounting educational programmes on the environment.

The main regional non-governmental programmes include **Green Schools**<sup>xix</sup> initiated by the Upper Canada College to promote general understanding and appreciation of ecosystem processes and benefits, **People and Corals**<sup>xx</sup> sponsored by the Darwin Initiative Coral Reef Education Project to promote coral reef conservation and the **Caribbean Youth Programme for Action on Climate Change (CARYPACC)**<sup>xxi</sup>, implemented by the Caribbean Youth Environment Network to raise public awareness on the potential dangers of climate change. To date CARYPACC activities are reported in Barbados, Grenada, St. Lucia and St. Vincent and the Grenadines. Green Schools and People and Corals have each been reported so far in Grenada and St. Vincent and the Grenadines.

National level activities sponsored by government agencies and non-governmental organizations to educate children and youths about the environment also exist in SIDS in the Eastern Caribbean. An overview of the primary focus of these actions are presented in Table 6.

**Table 6:** National policies and activities undertaken SIDS in the Eastern Caribbean to promote children’s education on the environment.

SIDS	Name of National Policy Framework	Main National Level Activities Undertaken in Support of National Policy and Sponsoring Agencies*
Antigua and Barbuda	Antigua and Barbuda National Plan to Reduce Vulnerability of School Buildings to Natural Disasters	<ul style="list-style-type: none"> <li>Promoting awareness of climate change (Antigua and Barbuda Red Cross).</li> </ul>
Barbados	The National Strategic Plan of Barbados 2005-2025	<ul style="list-style-type: none"> <li>Promoting environmentally and socially sustainable use of marine areas (Barbados Marine Trust).</li> <li>Youth involvement in environmental protection (Barbados Environment Youth Programme)</li> <li>Promoting public awareness of the importance of the marine environment (Coastal Zone Management Unit).</li> <li>Promoting awareness of the environment among youth and schools (Barbados Environmental Youth Programme).</li> <li>Fostering greater understanding of the Caribbean Sea and its resources (Caribbean Sea Project).</li> </ul>
British Virgin Islands	Integrated Development Strategy	<ul style="list-style-type: none"> <li>Promoting importance of disaster preparedness (Department of Disaster Management).</li> <li>Advancing environmental protection and sustainable development (Jost van Dykes Society).</li> <li>Promoting respect for and sustainable use the environment (Jean-Michel Cousteau’s Ocean Futures Society).</li> <li>Publishing newsletter encouraging students to become environmentally aware and to be engaged in the preservation of their environment (Robinson O’Neal Memorial Primary School).</li> <li>Promoting marine conservation (Sail Caribbean Foxtrot Environment Service and Sailing Adventures Programme).</li> </ul>
Dominica	Dominica: A Plan of Action for Localizing and Achieving the Millennium Development Goals	<ul style="list-style-type: none"> <li>Promoting projects for the protection of rivers and streams (Youth Development Division of the Ministry of Education, Human Resource Development, Sports and Youth Affairs; Dominica National Commission for UNESCO).</li> <li>Promoting involvement of youths in the preservation of the natural environment/Dominica Youth Environment Organization</li> </ul>
Grenada	Basic Education Reform Project	<ul style="list-style-type: none"> <li>Providing public education on solid waste targeting schools and youth clubs (Grenada Solid Waste Management Authority).</li> <li>Promoting environmental awareness and conservation (The Grenada Education and Development Project).</li> <li>Promoting the importance of tourism and the role of environmental protection in enhancing the beauty of Grenada (Grenada Board of Tourism).</li> </ul>
Montserrat	Not available	<ul style="list-style-type: none"> <li>Promoting beach conservation (Department of Environment and Coastal Resources Adopt- a-Beach Programme).</li> </ul>
St. Kitts and Nevis	St. Kitts: A Plan of Action for Achieving the Millennium Development Goals	<ul style="list-style-type: none"> <li>Using Information Communication Technology to raise environmental awareness (The Nevis Historical and Conservation Society).</li> <li>Promoting environment awareness (Nevis Public Library).</li> </ul>
St. Lucia	National Youth Policy	<ul style="list-style-type: none"> <li>Promoting waste management (St. Lucia Waste Management Authority).</li> </ul>

Key: \* The sponsoring agencies of the national level activities in support of each policy are given in brackets following the activities.

## **Child Survival in Natural Disasters**

Policy frameworks and supporting programmes and services catering for the care and protection of children exist to varying degrees in SIDS in the Eastern Caribbean. A total of 16 international agreements/declarations relevant to the care and protection of children were found to be under implementation or operation in each of the SIDS in the Eastern Caribbean. However, only four of these agreements/declarations only contain specific provisions for the care and protection of children in disasters and other emergencies:

- ✓ United Nations Declaration on the Protection of Women and Children in Emergency and Armed Conflict (1974)
- ✓ United Nation Convention on Rights of the Child
- ✓ United Nations General Assembly Special Session on HIV/AIDS and United Nations Convention on the Rights of Persons with Disabilities

The remaining international agreements/declarations included in the analysis are:

ILO Minimum Wage (1973), ILO Worst Forms of Child Labour Convention, ILO Convention Against Torture and other Cruel Inhumane or Degrading Treatment or Punishment, UN Declaration on the Rights of the Child(1959), Declaration on the Protection in Emergency and Armed Conflict (1974), UN Standard Minimum Rules for Administration of Juvenile Justice (1985), UN Convention on Rights of the Child (1990), UN Guidelines for the Prevention of Juvenile Delinquency (1990), UN Rules for the Protection of Juveniles Deprived of their Liberty (1990), UN Standard Minimum Rules for Non-custodial Measures- the Tokyo Rules (1990), Convention on the Elimination of all forms of Discrimination against Women (1992), UN Guidelines for Action on Children in the Criminal Justice System (1997), UN General Assembly Special Session on HIV/AIDS (2001), Convention on the Convention Against Organized Crime and its two Protocols (2001), UN Guidelines in Matters involving Child Victims and Witnesses of Crime (2005) and Convention on the Rights of Persons with Disability.

The regional inter-governmental policy framework of relevance to care and protection of children confronting natural disaster and other environmental emergencies is the CARICOM *Regional Plan of Action for Children*. This provides specific guidelines for care and protection of children in emergency shelters.

National policies of relevance to the care and protection of children in SIDS in the Eastern Caribbean have also been identified below in Table 7. Most of these policies and legislations, however, need revision and updating to comply with the CRC and as such would not serve well to ensure the protection and care of children in the aftermath of natural disasters and other environmental emergencies let alone in preventing and mitigating of risks to girls and boys by climate change.

**Table 7:** National policies catering for the care and protection of children and their relevance in circumstances of natural disasters in SIDS in Eastern Caribbean.

<b>SIDS</b>	<b>Policies of relevance to the care and protection of children</b>	<b>Objectives of policy in relation to care and protection of children</b>
Antigua and Barbuda	Childcare and Protection Act 2003	Provide for the protection of children from abuse and neglect
	Sexual Offences Act 1995	Protect children from sexual abuse
Barbados	Protection of Children Act (1991).	Provide for protection from exploitation and pornographic activities.
	The Prevention of Cruelty to Children Act. (1981)	Provide for protection from abuse and neglect
	The Sexual Offences Act (1992)	Provide for protection from Sexual abuse
	The Maintenance Act (1981 & Regulation 1982)	Ensure financial support of children by parents
	Offences Against the Person Act (1992)	Provide protection of children from abuse
	The Family Law Act (1981 & Regulation 1982)	Provide for the resolution of matters for dissolution of marriages or unions other than marriage. Provide also for parental rights and the custody and guardian of children.
	Child Care Board Act (1981)	Provide for a range of service of services to children to ensure their care and protection
	Domestic Violence (Protection Orders) Act (1992)	Provide for granting of protection orders in domestic violence and related matters
	The Drug Abuse Prevention and Control Act (1994)	Provide for protection of school children from involvement in drug related activities
	The Status of Children Reform Act (1979)	Establish status and inheritance rights of minors
	The Education Act (2001)	Provide for the education of children, including those with disabilities
	The Juvenile Offenders Act (1932)	Provide for juvenile justice for children in conflict with the law
	Health Services Act	Provide for health services to children, including those living with HIV/AIDS
British Virgin Islands	Domestic Violence Act (1996)	Protection of family members in situations of domestic violence
Dominica	Sexual Offences Act (1998)	Provide protection from sexual abuse
	Children and Young Persons Act (1990)	Provide for the care and control of children and young persons
	Maintenance Act	Provide for maintenance of children by parents
	Infant's Protection Act	Provide for protection of infants
	Guardianship of Infants Act	Provide for guardianship
Grenada	Child Protection Act (1998)	Provide for protection of children
	Adoption Act (1994)	Provide for the adoption of minors
	Status of Children Act (1991)	Establish status and inheritance rights of minors

<b>SIDS</b>	<b>Policies of relevance to the care and protection of children</b>	<b>Objectives of policy in relation to care and protection of children</b>
Montserrat	Family Act (1995)	Establish provision for family welfare
St. Kitts and Nevis	The Probation and Child Welfare Board Act (1994)	Provide for the care and protection of abused and neglected children and children in conflict with the law. Provide also for mandatory reporting of child abuse cases
	The Juvenile Act	Provide for jurisdiction over juveniles in conflict with the law
	The domestic Violence Act (2000)	Provide for protection of family members in situations of domestic violence
St. Vincent and the Grenadines	Domestic Violence Act (1995)	Protection of family members in situations of domestic violence
St. Lucia	Education Act (1999)	Provide for education of all children, including those with disabilities
	The Health Act	Establish provisions for health care
	Domestic Violence Act (1995)	Provide for protection of family members in situations of domestic violence
	Children and Young Persons Act (1972)	Provide for the care and control of children and young persons

Disaster management at the regional level is coordinated by the Caribbean Disaster Emergency Management Authority, formerly CDEMA, which developed a comprehensive disaster management framework for its client countries and encouraged the development of national emergency/disaster plans. The disaster/emergency preparedness response plans identified for SIDS in the Eastern Caribbean listed in Table 8 below.

**Table 8:** The extent to which national disaster plans cater specially for children, mothers and families in the partner countries of the UNICEF Office for Barbados and the Eastern Caribbean.

SIDS	Name of disaster plan	Main objectives of plan	Special provisions for children, mothers and families
Antigua and Barbuda	National Disaster Management Act (2002)	Prepare for meteorological hazards and man-made emergencies	None
	Emergency Shelter Policy	Provide for efficient operation of shelters during disasters and emergencies.	Yes. (Special programme for supervision of children).
	National Disaster Management Plan		
Barbados	The Emergency Management Act ( 2006)	Prepare country for meteorological hazards and man-made emergencies	None
	National Disaster Emergency Plan		
Dominica	National Disaster Management Plan	Prepare country for meteorological hazards and man-made emergencies	None
Grenada	National Disaster Management Plan	Prepare country for meteorological hazards and man-made emergencies	None
	Disaster Psychosocial Response Plan	Provide counselling and services to traumatized children and families in the aftermath of natural disasters	Yes
Montserrat	Disaster Management Act (57/2002)	Prepare country for meteorological hazards and man-made emergencies	None
	State of Emergency Act (64/1997)		
	Disaster Management Plan		
St. Kitts and Nevis	Disaster Management Act (5/1998)	Provide legal framework for emergency management	None
	National Disaster Management Plan (1999)	Mobilize human and material resources of the island in disaster/emergency planning and management	None
	St. Kitts Disaster Mitigation Plan and Policy (2001)		
	Development Control and Planning Act (2000)		
Nevis Disaster Plan (2005)			
St. Lucia	The Disaster Management Act (30/2006)	Provide for disaster management	None
	Occupational Health and Safety Act (1985)	Protect employees from industrial hazards and injury	None
	Police Ordinance (1965)	Mandate police to assist in the protection of life during emergencies and disasters	None
	National Emergency and Disaster Response Plan		
St Vincent and the Grenadines	National Emergency and Disaster Management Act (2006) Replaced the National Disaster Relief Act and National Disaster Management Plan	Provide for prevention, preparedness, response, mitigation and recovery in relation to hazards, disasters and emergencies and the establishment of the National Emergency Management Organization	None

\* Examples of special provisions for children and families include protection and supervision of children in shelters, priority provision of relief to children with families, provision of counseling services, care and protection of children orphaned as a result of natural disasters, etc. Reference to “none” means that the policies did not cater for child-specific provisions.

Information on the objectives of these plans and their provisions for the care and protection of children, mothers and families is also presented. Where emergency/disaster plans exist in the SIDS of the Eastern Caribbean, there is almost always a glaring absence of provisions specifically tailored to address the care and protection of children, mothers and families impacted by natural disasters and other emergencies.

## **6. Conclusions from the Gap Analysis**

Overall, within the SIDS in the Eastern Caribbean there appears to be a low level of commitment to and awareness of the special vulnerabilities children in the face of risks posed by environmental degradation and natural disasters.

### *i. Environmental Health Hazards*

Data collection on environmental health hazards is unsystematic and lacking in uniformity. Data on hazards widely acknowledged as risk factors in several types of disease are also for the most part unavailable. The existing hazards data are not segregated to provide information on children as a separate category and are not correlated with environmental health related diseases, as suggested by the World Health Organization.

### *ii. Environmental Health Related Diseases*

Reporting on environmental health related diseases by SIDS in the Eastern Caribbean is also inadequate. For example asthma, which is a major cause of hospitalization for Caribbean children, is currently not a reportable disease and is seldom regarded as an environmental disease despite the apparent link to environmental factors, including pollen, dander and the presence of African dust in the Caribbean. Similarly, surveillance for dengue, which is also a significant health problem for children in SIDS in the Eastern Caribbean, and salmonella gastroenteritis are marred by non-reporting, suspect under-reporting and delayed reporting to the regional surveillance agency CAREC.

### *iii. Education and Awareness of Environment*

Despite the existence of a plethora of education and awareness initiatives on the environment for children, there is no evidence of a standard and mandatory curriculum. There seems to be a lack of collaboration between the implementing and executing agencies of these initiatives to share experiences or to exploit synergies. Notably, the public education and public awareness provisions of the UN-facilitated

multi-lateral environmental agreements have not targeted children during implementation. It appears that there is no awareness of a need to extend the coverage of these provisions to children.

*iv. Child Survival in Natural Disasters*

Despite the special vulnerability of children, they have not been singled out for special attention in the face of threats posed by natural disasters. This is reflected in the absence of specific policies for the protection and care of children impacted by natural disasters and emergencies. There is also an absence of specific planning for disaster and emergency relief for children.

Provisions for the care and protection of children are addressed through a multiplicity of multi-lateral agreements and national laws, but there are gaps or weaknesses in their applicability to natural disasters, other emergencies and compliance with the CRC. These multi-lateral agreements almost invariably contain general and or child/youth-focused provisions catering for communication, education, training and awareness with respect to the issues they address but children are generally not targeted during their implementation or service delivery.

## **7. Recommendations**

Although not exhaustive, there are a number of actions that are recommended to address the gaps identified in SIDS in the Eastern Caribbean in order to ensure the care and protection of children in light of the threats posed by environmental degradation and natural disasters due to climate change:

- ✓ Compile, on pre-determined time intervals, a comprehensive and authoritative status report on children and the environment, taking into account the areas of concerns identified in the gap analysis. The report should be intended as a definitive reference guide for SIDS in the Eastern Caribbean to track and plan their progress in creating an environment fit for children;
- ✓ Given the gaps in information and data in the areas of concern, the relevant data collection systems and the capacity building required for the necessary disaggregated data collection needs to be supported and strengthened;

- ✓ Further analyse the environmental health hazards in the Eastern Caribbean to study the correlation with reported environmental health related diseases in children,
- ✓ The regional and national disaster/emergency management plans in SIDS in the Eastern Caribbean should be reviewed and rectified to incorporate provisions for children, taking into account the emergency shelter management plan recommended
- ✓ For implementation by CARICOM for member states and contained in the *Regional Plan of Action for Children 2008 – 2015 and the various Inter-Agency Standing Committee guidelines<sup>xxii</sup>*.
- ✓ Different education and awareness programmes on the environment for children and youths are well represented in the SIDS in the Eastern Caribbean and there may be no significant need for further quantitative proliferation of similar initiatives. However, there should be a concerted effort to explore the creation of linkages for collaboration, exploiting synergies and sharing of information review. Undertake a mapping and develop a comprehensive database of the implementing and executing agencies of policies, programmes and project activities on children's education on the environment is required as an important first step.
- ✓ In school curricula should be reviewed, broadened, strengthened, made interactive and age appropriate and standardized for mandatory teaching within the pre-schools, primary schools and secondary schools.
- ✓ Promote and create a safe, healthy and protective environment in schools and communities in which children and their families become the agents of change and are encouraged to use renewable energy (sun or wind), recycle, plan for emergencies, and mitigate environmental risks.
- ✓ But increasing children's and young people's environmental awareness is not enough. For them to become effective agents of change, avenues must exist for their knowledge to be translated into advocacy and action. Existing programmes that promote children's participation in local environmental initiatives that strengthen children's clubs and networks, and that provide a

- ✓ voice for children in local, national and global development processes should be strengthened and supported.
  
- ✓ The provision for public education and public awareness, in some cases binding ones, within the majority of UN-facilitated multilateral environmental agreements must cater to the children of different ages.

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