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**DISASTER RISK REDUCTION IN THE EDUCATION SECTOR
AMONG SELECTED CARIBBEAN SMALL ISLAND
DEVELOPING STATES**

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Abstract

Caribbean Small Island Developing States (SIDS), by their very nature, are vulnerable to external shocks. Research shows that the Caribbean subregion experienced 165 natural disasters between 1990 and 2008 and the total impact of natural disasters on the subregion was estimated at US\$136 billion. The impact on the social sectors was estimated at US\$57 billion, or 42% of the total effect.

As small open economies, the Caribbean SIDS are also vulnerable to the vagaries of the international economic system and have experienced declines in tourism, merchandise exports receipts, remittances and capital flows throughout the financial crisis.

The negative impact of natural hazards exacerbates the capacity of Caribbean SIDS to overcome the development challenges, such as those posed by the current global economic and financial crisis. Disaster risk reduction (DRR), therefore, is of critical concern to subregional governments and their people.

For the purpose of this study, six Caribbean SIDS were selected for detailed analyses on the macro socio-economic impact of extreme events to the education sector. They are the Cayman Islands, Grenada, Guyana, Haiti, Jamaica, and Montserrat.

This paper proposes that better integration of DRR in the education sector cannot be easily achieved if policymakers do not recognize the social nature of risk perception and acceptance in Caribbean SIDS, which necessitates that risk reduction be treated as a negotiated process which engages all stakeholders.

I. THE CONTEXT

A. VULNERABILITY OF CARIBBEAN SMALL ISLAND DEVELOPING STATES

Caribbean Small Island Developing States (SIDS), by their very nature, are vulnerable to external shocks. Research undertaken by Pantin and Attz (2009)¹ indicate that the Caribbean subregion experienced 165 natural disasters between 1990 and 2008 and, based on Economic Commission for Latin America and the Caribbean (ECLAC) assessments of those events, the total impact of natural disasters on the subregion was estimated at US\$136 billion. The impact on the social sectors, which include damage and loss to housing, health and education subsectors, was estimated at US\$57 billion, or 42% of the total effect.

As small open economies, the Caribbean SIDS are also vulnerable to the vagaries of the international economic system. The last three years confirmed this notion as SIDS in the Caribbean felt the strongest impacts of the financial crisis on export volumes and prices, remittances and the deterioration in consumer and producer expectations². There is little disagreement that the global financial crisis is presenting serious economic challenges for the Caribbean³ in key sectors or 'drivers' of the economies.

Throughout the crisis, Caribbean SIDS have experienced declines in tourism, merchandise exports receipts, remittances and capital flows⁴. Remittances to the Caribbean from the United Kingdom have declined at an alarming rate and United States remittances are flat⁵. There have been significant declines in the myriad forms of investment flows to the subregion⁶. Caribbean destinations for their goods are also now in recession while the international prices of key Caribbean exports have fallen from their peak levels⁷. So there are serious implications for both trade balances and fiscal revenue. The oil price reduction has benefited many Caribbean SIDS, which are oil importers, while those that are exporters of hydrocarbon are suffering from significant declines in revenue. In addition, domestic food inflation has continued to rise in most Caribbean SIDS. Countries have had to withstand increased fiscal and foreign exchange pressures, rising current account deficits concurrent with increased protectionism and contracting GDP⁸.

Actually, ECLAC estimates that, after growing continuously for six years, the gross domestic product (GDP) of Latin America and the Caribbean will fall by 1.9% in 2009. This fall will bring about a reduction in per capita GDP of 3.1% and will take its toll on the labour market as the region's unemployment rate is expected to climb from 7.5% (2008) to around 9% in 2009⁹. In the Caribbean subregion, joblessness has been on the increase for most of 2008 while there has been a shrinking of opportunities for temporary work overseas for Caribbean Community (CARICOM) workers¹⁰. According to Professor Norman Girvan, concern over unemployment and competition for jobs from nationals may

¹ Economic Impact of Climate Change, Regional Analysis of Extreme Events. 2009 (unpublished paper submitted to ECLAC)

² Economic Survey of Latin America and the Caribbean, ECLAC 2008/2009

³ <http://americas.sas.ac.uk/events/docs/EconomicCrisisPapers/Clegg.pdf> Dr Peter Clegg May 2009

⁴ Girvan, Norman. The Caribbean in a Turbulent World. 22nd September, 2009

⁵ Don Robotham, The Caribbean, the Developing World and the Global Crisis

⁶ What will happen to the region's economy. Dr. Clive Thomas. Jan 18th 2009

<http://www.stabroeknews.com/2009/features/01/18/guyana-and-the-wider-world-66/>

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⁷ <http://americas.sas.ac.uk/events/docs/EconomicCrisisPapers/Clegg.pdf> Dr Peter Clegg May 2009

⁸ P. Desmond Brunton. The Global Financial Crisis and the Caribbean: Impact & CDB Response

⁹ Economic Survey of Latin America and the Caribbean, ECLAC 2008-2009

¹⁰ What will happen to the region's economy? <http://www.stabroeknews.com/2009/features/01/18/guyana-and-the-wider-world-66/>

be slowing down implementation of existing CARICOM Single Market and Economy (CSME) commitments for free movement of certain categories of labour, e.g. artisans.

Also, it has been suggested that the prolongation of the crisis may result in the reversal of social gains thereby disproportionately affecting the already vulnerable groups.¹¹ Thus, new stumbling blocks may appear on the road towards achievement of the Millennium Development Goals .

The present global financial crisis has led to resurgence in International Monetary Fund (IMF) borrowing. Many Caribbean SIDS have been described as being among the most highly indebted countries in the world. Yet by September 2009, seven of these countries had resorted to IMF assistance for crisis-related financing¹². A Third World Network (TWN) study of IMF financial crisis loans, reveals that the Fund's fiscal and monetary policies remain as tight and restrictive now as they have been in previous years¹³. Debt service charges for developing countries have already jumped because their bonds have been downgraded by the rating agencies. In the Jamaican case, government long-term bonds had declined in value by more than 40% between August and December 2008. The fiscal situation of governments has deteriorated.

There is little disagreement that the negative impact of natural hazards exacerbates the capacity of Caribbean SIDS to overcome the development challenges, such as those posed by the current global economic and financial crisis. Disaster risk reduction (DRR), therefore, which is a comprehensive approach to sustainable development and whose expected outcome is the substantial reduction of disaster loss in lives, the social, economic, and environmental assets of communities and countries,¹⁴ is of critical concern to subregional governments and their people.

Disasters are a key constraint to development, but as United Nations Development Programme (UNDP) (2009) argues, it is not geography alone that generates disasters, but rather development processes that have shaped human vulnerability and hazards, paving the way for disasters.

B. THE MULTI HAZARD NATURE OF THE CARIBBEAN

The Caribbean is exposed to multiple hazards that include metrological phenomena such as hurricanes and tropical storms; excessive rainfall leading to flooding; drought; damaging wind effects; and storm surges and coastal area flooding. The subregion is also prone to geophysical phenomena which can be unpredictable. These include landslides (which may be triggered by excessive rainfall); earthquakes; tsunamis; and volcanic activity. Exposure to epidemics such as the recent A H1N1 or industrial accidents, when dangerous materials are released into the environment, also poses a hazard.

Global data examined for the last two decades, suggest that four natural hazard types: earthquakes, tropical cyclone (hurricanes), flood and drought, have been responsible for 94% of deaths triggered by natural disaster.¹⁵ Table 1 presents the details of exposure to natural disasters by type of event and country for the period 1990–2008. The Caribbean is subjected to all of the four most devastating types of natural hazard as table 1 suggests. The data presented further indicates that the subregion has been subjected to a significant number of storms, 100, and 48 floods during the period. It also highlights the fact that Haiti, followed by the Dominican Republic, Jamaica, Belize and Bahamas

¹¹Dr. C.Y. Thomas. "Global Economic Crisis: CARICOM Impacts and Responses". Unpublished, ECLAC 2009

¹²[IMF Financial Crisis Loans: No Change in Conditionalities, Third World Network](#)

¹³[IMF Financial Crisis Loans: No Change in Conditionalities, Third World Network](#)

¹⁴Hyogo Framework for Action: 2005-2015. The outcome document of the World Conference on Disaster Reduction, held from 18 to 22 January 2005, in Kobe, Hyogo, Japan. UNISDR

¹⁵Reducing Disaster Risk: A Challenge for Development. UNDP. Bureau for Crisis Prevention and Recovery.2004

have been the countries in the subregion most impacted by natural disasters during the period under review. The loss of life in Haiti from storms and floods is the highest in the subregion and continues to be of concern.¹⁶

Table 1: Natural Disasters by Type and country 1990-2008

Country	Drought	Earthquake (seismic activity)	Epidemic	Extreme Temperature	Flood	Mass movement wet	Storm	Total
Belize				1	3		8	12
Guyana	1				4	1		6
Suriname					2			2
Anguilla	0	0	0		0	0	1	1
Bahamas	0	0	0		0	0	12	12
Cayman Islands	0	0	0		0	0	7	7
Dominica	0	1	0		0	0	5	6
Dominican Rep	0	1	3		13	0	16	34
Grenada	0	0	0		0	0	4	4
Haiti	3	0	1		22	0	23	49
Jamaica	1	0	2		4	0	14	21
Netherlands Antilles	0	0	0		0	0	1	1
St Lucia	0	1	0		0	1	4	6
Turks and Caicos Is	0	0	0		0	0	5	5
Total	5	3	6	1	48	2	100	165

Source: Pantin and Attz (2009).¹⁷

Although the data in table 1 is presented singularly, it is important to note that hazards rarely occur individually. There are often synergies and complex hazards that occur in a serialized manner or with two or more hazards occurring at the same time. This multifarious nature of hazards requires DRR policymakers and practitioners to think and treat with multi-hazard contexts, communities, regions and zones.

C. PERCEPTION OF RISK IN CARIBBEAN SIDS

Many, complex reasons have been proffered for the extent of vulnerability found among Caribbean SIDS. Reasons, such as the patterns of development, the social structures that result in high levels of poverty and inequality, and socio-economic exclusion and environmental degradation, have been identified. What can be agreed upon is that the degree to which exposed people or economic assets are actually at risk is a function their vulnerability.¹⁸

¹⁶ See Government of Haiti Report on devastation caused by Hurricane Faye, Gustav, Hanna and Ike, 2008.

¹⁷D. Pantin and M. Attz. Economic Impact of Climate Change: Regional Analysis of Extreme Events. Unpublished study. ECLAC 2009

¹⁸ Vulnerability has been defined by ISDR as “the characteristics and circumstances of a community, system or asset that make it susceptible to the damaging effects of a hazard”.

Disaster risk has been defined as “the probability of future damage and losses associated with the impact of an external physical event on a vulnerable society, where the magnitude, extension and effect of these are such that they exceed the capacity of the affected society to absorb the shock and to recuperate autonomously”.¹⁹ On most occasions when risk is discussed, it is within a financial context, as in a personal insurance policy used to offset the risk of a person who is unable to meet their financial obligations as a result of incapacity due to illness or death. In the discourse of disaster risk, governments speak, too, of insurance to offset the financial impact of disasters.²⁰

The Caribbean is rich with anecdotal sayings indicating that God possesses the nationality of one country or another, suggesting that no harm will befall that particular country. As a consequence, there is little or no need to engage in processes that reduce risk, increase resilience, or build capacity to resist, absorb, accommodate to and recover from the effects of a hazard in a timely and efficient manner. Ultimately, there is little reason to reduce the vulnerability of the populations. Such attitudes, although shaken by the devastation of Grenada following Hurricane Ivan in 2004, still provide an insight into the notions and perceptions of risk among the general population in Caribbean SIDS.

This paper argues that the notion of risk is a social construct. It is a construct that is shaped by the social position, the relationship and roles played by the different actors (individuals, households, communities, institutions) in a society. Simply put, what is considered unacceptable risk for some is recognized as an acceptable or accepted risk by others. Cultural beliefs and social positions may influence the degree to which an individual judges a risk to be immediate or distant. Risk reduction, then, has to be recognized as a complex social process which must engage diverse and frequently antagonistic social actors in the risk reduction scenario. It is not purely a technocratic problem with a technocratic solution. Prof. P.C. Joshi (2008) suggested that culture, as a shared, learned and transmitted body of knowledge, beliefs and practices, plays a very important role in all stakeholders’ perception, understanding and activities undertaken to mitigate, manage and face a disaster. The Coordinating Centre for the Prevention of Natural Disasters in Central America (CEPREDENAC) (2005) argues that risk is derived from an ongoing tension between so-called physical hazards and social vulnerabilities. This view has been supported by the UNDP (2009) Global Assessment Report on Disaster Risk Reduction, which indicated that empirical evidence confirms that disaster risk is fundamentally associated with poverty at the both the global and local levels.²¹ It follows then that human agency and social conditions emerge as key factors in determining a people’s response to natural disasters and risk reduction (Hewitt, 2008).

Disaster risk reduction, therefore, needs to become a permanent process targeted to reduce existing and future risks and should be included in the national development frameworks. In order for societies to achieve a sufficient level of disaster risk reduction, it requires capacities at all levels – micro (community), meso, local government level and macro (at the national development level) and at the regional level.

The notion of disaster risk and its prevention and mitigation has, only within the last decade, taken its place within the development discourse and within development planning. One of the key lessons learnt by ECLAC through the technical support it provides in the evaluation of natural disasters across the subregion is that more emphasis needs to be placed on the reduction of risk and the vulnerabilities of Caribbean SIDS. There is sufficient evidence to suggest that natural disasters can

¹⁹ Allan Lavell et al. Local Level Risk Management: concept and practices. CEPREDENAC –UNDP 2005

²⁰ There are a number of risk insurance facilities that have been established to assist small states to limit the financial impact of natural disasters, such as the Caribbean Catastrophe Risk Insurance Facility (CRIF) established in 2007 and the Commonwealth Disaster Management Agency (CDMA) still under negotiations.

²¹ 2009 Global Assessment Report on Disaster Risk Reduction. UNISDR 2009

decrease the momentum of development, as much time and resources in the Caribbean subregion may be spent on reconstruction or getting back to the same level which countries had been before.

United Nations International Strategy for Disaster Reduction (UNISDR) suggests four approaches to improving the integration of disaster risk reduction processes into development planning. The first approach calls for increasing public awareness of risk, vulnerability and disaster reduction; secondly, obtaining commitment from public authorities to implement disaster reduction policies and action; thirdly, stimulating interdisciplinary partnerships, including the expansion of risk reduction networks; and lastly, improving scientific knowledge about disaster reduction.

It is now widely accepted that DRR efforts must be integrated into sustainable development and poverty reduction policies, plans and programmes, and supported through bilateral, regional and international cooperation. The goals of sustainable development, poverty reduction, good governance and DRR are mutually supportive and their realization depends on accelerated efforts to build national and community capacities to manage risk. This approach is crucial for achieving international development goals such as the Millennium Development Goals. Recently, the importance of promoting DRR efforts internationally, regionally, nationally and locally has been recognized through several key multilateral frameworks and declarations. The Hyogo Framework for Action (HFA) 2005-2015 (Building resilience of nations and communities to disasters) was adopted at the World Conference on Disaster Reduction in Hyogo, Japan in January 2005 to pursue “the substantial reduction of disaster losses, in lives and in the social, economic and environmental assets of communities and countries” (ISDR, 2006). Of the 5 Priorities for Action, education features prominently in Priority 3: “Use knowledge, innovation and education to build a culture of safety and resilience at all levels”.

II. DISASTER RISK REDUCTION AND THE EDUCATION SECTOR

A. THE SIGNIFICANCE OF THE EDUCATION SECTOR IN DISASTER RISK REDUCTION FOR CARIBBEAN SIDS

A former United Nations Educational, Scientific and Cultural Organization (UNESCO) representative in the Caribbean, in writing about education in the Caribbean, suggested that education was an optimistic enterprise. This was particularly so, she surmised, because of the inherited structures of Caribbean society with its rigid system of stratification which had excluded the majority from opportunity and access.²² She went on to argue that because of this history, education was seen as a key to success. Education continues to be viewed as the vehicle through which better opportunities and improved standards of living are achieved.

Education is also one of the key elements in the notion of human development and is considered an engine of development, leading many post-independence Caribbean Governments to introduce policies of free and equal access to education. There is growing evidence that education plays a crucial role in reducing poverty and inequality and improving child and maternal health.²³ Data suggests that knowledge is a key factor in explaining the difference between poverty and wealth and education is still considered a critical factor in the creation of a flexible people, who are adaptable to change. In the UNDP Global Report, *Reducing Disaster Risk: A Challenge for Development*, the authors argue that human development can contribute to a reduction of disaster risk. They suggest that such risk can be reduced through the development choices which individuals, households, communities and nations make.

²² Dr. Claudia Harvey. *The EFA Assessment Process in the Caribbean and the Quest for Inclusion and Quality*. Monograph Series No. 25. UNESCO 2000

²³ EFA Global Monitoring Report . UNESCO 2008

Education possesses intrinsic value and facilitates a society's development. Any threats to its smooth delivery, therefore, are reasons for concern. The threats to the education sector in Caribbean SIDS from the impact of natural disasters are real and frequent with every passing hurricane season. It can be posited that the need for disaster risk reduction in the sector is critical as it may be considered one of the most vulnerable sectors to any form of natural hazard. Using Jamaica as an example, the Planning Institute of Jamaica (PIOJ) suggested that this may be so by virtue of the size of the subsector, both in terms of magnitude of the infrastructure and the share proportion of the population which it serves; the scope and coverage of the sector; geographical location of education facilities; the age and design features of some structures; and the critical short- and long-term impact which disasters may have on the sector.²⁴

UNESCO argues for the significance of the sector, noting that education saves lives and brings normalcy during periods of emergency, such as at the time of a natural disaster. In a presentation on Integrating Disaster Risk Reduction into Education, at an Expert Group Meeting convened by ECLAC and hosted by the Government of Jamaica, UNESCO suggested that education sustains life by offering structure, stability and hope for the future during a time of crisis, particularly for children and adolescents, and provides essential building blocks for future economic stability. It contended that education protected children from harm and exploitation, and assisted in meeting their psychological needs. Further, it noted that in times of crisis, affected communities strongly requested education for their children. In concluding, UNESCO reiterated the fact that education allowed for the passage of essential life skills messages to children and their families, on issues such as health and hygiene, HIV/AIDS prevention and disaster risk reduction.

Table 2 provides a look at a number of selected education indicators for the Human Development Index (HDI)-ranked Caribbean SIDS. In the English-speaking Caribbean countries, it has been the practice that a larger share of national income would be allocated to education than in many other regions of the developed world (Kambon and Busby 2000). Among Caribbean SIDS there are variations, however. Table 2 indicates that public expenditure in Haiti per pupil in primary education of US\$52 is well below the average expenditure of US\$652, for the Caribbean SIDS under review; Jamaica's expenditure per pupil of US\$547 also falls below the Caribbean SIDS average of those selected countries, but is well above that of Haiti. Haiti has the lowest rank both for HDI and in the education index, and has been defined as the most vulnerable of Caribbean SIDS (Pantin and Attzs, 2009). The data set presented in table 2 is too sparse to provide answers definitively about the links between HDI ranking, value of the education index, and vulnerability to natural disasters, but the data suggest that education may play a significant additional role in assessing a country's vulnerability.

In summary, the education sector's significance to the efforts of disaster risk reduction, aside from its contribution to national and personal development, are crucial and lie in the fact that education can help prevent and mitigate disasters in the future and increase the cost effectiveness of disaster risk reduction measures in the present. In addition, Akpotu (2008) argues that education is the largest growth industry in the world and governments invest huge sums of money on education.

²⁴ Dr. Pauline Knight. Opening Remarks by Director General Ag. Planning Institute of Jamaica (PIOJ) to Regional Expert Group Meeting on Disaster Risk Reduction (DRR) in the Education Sector 26-27 October 2009. Kingston, Jamaica (Unpublished).

Table 2: HDI Ranking and Selected Education Indicators for Selected CARIBBEAN SIDS

HDI ranking	Country	Public expenditure on education		Education index	Adult literacy rate (% aged 15 and above) 1999–2007	Adult literacy rate (% aged 15 and above) 1999–2007	
		per pupil in primary education US\$ 2003-2006	as % of total government expenditure 2000–2007			Female	Male
52	Bahamas	..	19.7	0.878	.. k	.. m	.. m
69	Saint Lucia	949	19.1	0.889	5.2 q
74	Grenada	766	12.9	0.884	4.0 q
93	Belize	846	18.1	0.762	24.9 q
100	Jamaica	547	8.8	0.834	14.0 i	91.1	80.5
114	Guyana	752	15.5	0.939	.. k	.. m	.. m
149	Haiti	52 p	10.8 p	0.588	37.9 j,n	64.0 f	60.1 f

Notes:

f - Data refer to an earlier year than that specified.

k - In the absence of recent data, estimates for 2005 from UNESCO Institute for Statistics (2003), based on outdated census or survey information, were used and should be interpreted with caution: Bahamas 4.2 and Guyana 1.0

q - Data are from the Secretariat of the Caribbean Community, based on national sources.

j - Data refer to an earlier year than that specified.

n - Data are from a national census of population.

p - Data from WB 2008 for FY'05-'07

B. EDUCATION IN EMERGENCIES

According to Robinson (2006), “Education is a human right enshrined in: the Universal Declaration of Human Rights, the Geneva Convention, the Convention on the Rights of the Child and numerous other international laws and treaties.” These rights also apply to children and youths displaced during wars or natural disasters. Despite these guarantees, education often is one of the first victims of an emergency, and millions are denied this right in conflict and fragility (Turrent, 2009). Thus, conflict and post-conflict environments present huge challenges to educators (Burde, 2004). The provision of education during emergencies and the timely return to school of children after a disaster:

- (a) Ensure that children are guaranteed their right to education
- (b) Provide a sense of hope and normalcy
- (c) Promote psychological and social well-being and cognitive development
- (d) Offer protection and safe havens for learning and recovery (Robinson, 2006)

Kirk (2006) summarizes “Education in emergencies” as life-saving and life-sustaining formal and non-formal educational activities critical for children, youths and families during crises. The education programmes are situation-specific and can be short-term, temporary solutions or longer-term education policy and programme development in chronic crises. Children in these circumstances need new and different knowledge, skills and learning experiences to survive and thrive. Kirk (2006) also states that education in emergencies is a crucial intervention in the promotion of gender equality. Moreover, in addressing the increased risks of physical and emotional harm, education has to offer protection and promotion of psycho-social well-being. In recent years, awareness of the importance of education in emergencies has grown and education is now included in international disaster relief funding appeals

along with 'traditional' humanitarian sectors, supported by non-governmental organizations and United Nations agencies. A common feature of emergency education programmes is the training of new and inexperienced teachers as 'emergency teachers' through condensed, fast training programmes in situations where teacher shortage is a major problem. The timely restoration of education programmes in a crisis is a significant step towards restoring normalcy and providing routine, continuity and hope for the future of the children and communities.

The Inter-agency Network for Education in Emergencies (INEE) Minimum Standards is a useful framework for developing, implementing, monitoring and evaluating education policies/interventions in emergencies, chronic crises and reconstruction (INEE, 2006). The INEE was formed in 2000 to share knowledge and experiences, promote greater donor awareness, advocate for inclusion of education in the emergency response, make teaching and learning resources widely available, direct attention to gender issues, and document and disseminate best practices. The standards categories are: community participation, analysis, access and learning environment, teaching and learning, teachers and other education personnel, education policy and coordination. With the launch of the handbook in 2004, the Minimum Standards have been integrated into national education programmes, and used in the 2004 global natural disasters such as the south Pacific tsunami, Hurricane Katrina and the Pakistan earthquake (Kirk, 2006).

Robinson (2006) proposes several actions to ensure the right to Education for All (EFA):

- (a) Link with other organizations/networks working on education (e.g. INEE)
- (b) Encourage and support community education coordinating committees, parent-teacher associations
- (c) Translate INEE Minimum standards for education in emergencies, chronic crises and early reconstruction (MSEE) into local languages
- (d) Organize activities and awareness-raising events
- (e) Work with communities to develop an advocacy campaign
- (f) Act on government reports submitted to international treaty-monitoring bodies

Education provides the skills to address poverty and conflict and is essential for recovery and development of conflict-affected, fragile States (CAFS) such as Haiti, yet it remains under-funded (Robinson, 2006; Turrent, 2009). Moreover, it was recognized in the 2002 Dakar World Education Forum that the EFA targets will be unattainable without emphasis on education in conflict- and disaster-affected areas.

A number of international policy developments have helped to shape an evolving field of practice known as 'education in emergencies' which is now integrated into education policy frameworks of relevant United Nations agencies (primarily United Nations Children's Fund (UNICEF), United Nations High Commissioner for Refugees (UNHCR) and UNESCO) and multilateral and bilateral donors. Education in emergencies is also gaining ground as a new field for study and research (Kirk, 2006).

C. DISASTER RISK REDUCTION IN THE EDUCATION SECTOR AND THE HYOGO FRAMEWORK FOR ACTION

In Hyogo, Japan, in January 2005 the HFA 2005-2015 entitled, Building Resilience of Nations and Communities to Disaster, was adopted at the world conference by 168 countries in attendance. Of the five priorities for action, education features prominently in Priority 3: “Use knowledge, innovation and education to build a culture of safety and resilience at all levels”.

In progressing towards the implementation of the Hyogo Framework for Action 2005-2015 and the United Nations Decade of Education for Sustainable Development (2005-2014), it was generally agreed that education for disaster reduction and for global climate change must be an integral part of the educational strategy aimed at promoting sustainable societies. In response the World Disaster Reduction Campaign “Disaster Risk Reduction Begins at School”, has given a global thrust to efforts which encourage the integration of DRR into school curricula in countries vulnerable to natural hazards, and the construction and retrofitting of school buildings to withstand hazards (UN/ISDR, 2007; ADPC, 2008 a, b, c; CDP, 2008).

1. Hyogo Framework: Caribbean initiatives

According to International Strategy for Disaster Reduction (ISDR) (2009), national efforts worldwide still focus on strengthening policy, legislation, institutional frameworks and capacities for disaster preparedness, response, risk assessments and early warning (HFA Priorities 1, 2 and 5). Much more efforts are needed in use of knowledge, education and innovative outreach programmes to develop a culture of disaster resilience, and to address “the underlying drivers that configure disaster risk in social, economic and infrastructure development across rural and urban contexts” (HFA Priorities 3 and 4). For HFA Priority for Action 3 (using knowledge, innovation and education to build a culture of safety and resilience at all levels) average global progress generally is weak especially in development and application of research methods and tools for multi-risk assessments; inclusion of DRR and recovery concepts and practices in school curricula and education material; and development of a nationwide public awareness strategy. ISDR (2009) states that “a lot is being done with regard to each of these indicators, but countries report the need to do more and better”.

For selected Caribbean countries, details on national initiatives in the education sector are provided through reporting of their progress in the implementation of the HFA.

(a) Cayman Islands

ISDR (2009) lists the Cayman Islands as among high-income countries that perform well across all HFA Priorities for Action. Regarding ‘relevant information on disasters is available and accessible at all levels, to all stakeholders,’ there has been substantial achievement but with recognized limitations in financial resources and/or operational capacities (PreventionWeb, 2008a). Specific to education, DRR outreach targets schools and an information activity booklet produced for children under 10 years which is broadly distributed in schools and at public events. Work is still needed to inform the public on low probability disaster risks such as earthquakes and tsunamis. Related to “school curricula, education material and relevant training including DRR and recovery concepts and practices,” institutional commitment has been attained, but achievements are not comprehensive or substantial as the program is just started. Discussions are underway to incorporate risk reduction and recovery into the education system. The key contextual challenge is that prior to January 2008, no full-time office was dedicated to risk reduction, and public awareness efforts focused mainly on hurricanes. New schools are being constructed to withstand a category 5 strength hurricane.

(b) Grenada

In Grenada, DRR-related educational programmes are implemented at the Grade 5 primary level, and a teacher's manual and student handbook have been developed for this purpose. Disaster risk education is now being institutionalized at the tertiary level (<http://www.eird.org/wikien/index.php/Grenada>). The teaching guide on disaster preparedness, was developed in 2006 jointly by the Ministry of Education and United Nations Children's Fund (UNICEF), for primary school Grade 3, 4 and 5 students. Primary school teachers were trained to use the guide, and also the UN/ISDR and UNICEF information booklet "Let's Learn to Prevent Disasters!" and workbook. This raised the awareness of risks and disaster preparedness among primary school teachers and pupils. The teaching guide helped to improve the "National Disaster Awareness Week Primary School Quiz" competition held annually at the start of the Atlantic Hurricane Season. Through the teaching guide and quiz competitions, there was increased participation and level of knowledge of Grade 5 students in the school quiz, and hence a more people acquiring knowledge of disaster preparedness, prevention, mitigation and response. Also, 157 teachers were trained to use the teaching guide and related tools, and their subsequent discussions stressed the importance of psychological first aid resources. As a consequence, the National Disaster Management Agency has incorporated psychological first aid into their presentations to schools. The project is considered a good practice as it: raised awareness and knowledge of disaster reduction and response among teachers and pupils; improved and reinforced existing arrangements, such as the school quiz; and won support of key stakeholders, such as the Ministry of Education, UNICEF, schools, media and private sector. The major challenges with the project implementation were: scheduling training for all primary schools within the school year and replenishing supplies of teaching materials/ tools. Challenges specific to organizing the school quiz include: sourcing facilitators and ensuring full school participation. The Project easily can be replicated once the training facilitator has significant and applicable teaching tools (National Disaster Management Agency, 2007).

(c) Haiti

Despite the tremendous difficulty which Haiti has undergone within the last two decades, Haiti's government, civil society, and international partners are engaged in the development of a national training strategy and a national training manual for the education sector. An awareness campaign for the 2005 hurricane season focused on risks from hurricanes, storm and floods (<http://www.eird.org/wikien/index.php/Haiti>). According to a policy brief on education in Haiti, prepared by ECLAC, Education in Haiti is faced with severe challenges, among them are:

- (a) Very low literacy rates – population aged 13 years and over: 43%
- (b) Only 71% of children aged 6-12 are enrolled in school (compared to developed countries rate: 98%)
- (c) Eighty per cent of those who do attend do so at private schools
- (d) Schools fees are prohibitively expensive, between US\$ 70-80 per child per year
- (e) Insufficient number of schools, especially in rural areas
- (f) Seventy-five per cent of all teachers lack adequate training.

(d) Jamaica

Jamaica reported significant achievement in dissemination of Disaster Preparedness information to a broad cross-section of its population. Early childhood, primary and secondary school curricula have embraced the importance of disaster preparedness, and several schools have begun to include disaster management in their programmes. The official inclusion of disaster preparedness into the school curriculum has been advanced and is being considered by the Ministry of Education. Additionally, the number of schools trained in Disaster Preparedness annually has significantly increased. Major stakeholders such as the Ministry of Education and school administrations have been actively involved in increasing awareness, and in a recent UNICEF project, over 300 principals, teachers and caregivers from 100 schools and childcare centres were trained in building resilience of schools to disasters. Consequently, disaster plans were developed by participating institutions and a communication channel established between the National Disaster Organization, the local authority and schools. Educational challenges include: lack of financial resources to disseminate the Disaster Preparedness message; lack of capacity at educational facilities to increase resistance to disaster impacts; and the slow pace of mainstreaming. Some recommendations to address these concerns are: increase in emphasis on local level budgetary allocation and partnerships with donor agencies, and inclusion of DRR in the school curricula (PreventionWeb, 2008b). As Jamaica is vulnerable to natural hazards with dire economic, social and environmental consequences, a project was developed to protect students using emergency preparedness and response plans. The project which ran from 2005 to 2006, was a collaborative effort between the Office of Disaster Preparedness and Emergency Management (ODPEM), the Ministry of Education and Youth and UNICEF, and implemented in communities most vulnerable to flooding and landslides. The project trained and equipped 150 school-based professionals and Parent Teachers Association representatives from 30 schools with knowledge and skills to inform the development of school emergency plans and sensitized communities about emergency preparedness and disaster management procedures. Of the 150 school professionals, 41 gained knowledge and skills on radio communication in emergency situations and increased their awareness on how to protect children's rights in emergency situations. The Project is considered a good practice as it assisted with the development of 30 school emergency plans and increased the capacities of the targeted 30 schools and school communities to better protect 40,000 children from potential hazards. Communication protocols and communication mechanisms were established in partnership with targeted schools, the Ministry of Education and Youth and ODPEM to facilitate preparedness and response activities. The emergency plans increased the capacities of the schools and communities to improve protection of about 30,000 children. ODPEM and the Ministry of Education and Youth will expand the project by building on lessons learnt to further strengthen the schools' capacities to handle emergencies, and such an expansion will inform streamlining of emergency plans into schools. Moreover the Ministry and the Child Development Agency may consider expanding the development of the emergency plans to the other schools and child care centres. Key lessons learnt from the Project are: the use of a standardized tool greatly facilitates the development of thorough and quality plans; the availability and access to basic psychosocial support to children and caregivers after an emergency can substantially aid recovery and reduce the impact of post-traumatic stress syndromes; and increased emphasis must be placed on the protection children in disaster situations. A major challenge was the limited time for school-based professionals to participate in the training activities. As a result, training activities were designed to facilitate the out-of-office time required for the professionals to participate. Replicating the project in other countries should be easy and would require the support of relevant ministries and technical expertise, and the capacity to extend the training activities to other schools and follow-up (ODPEM, Ministry of Education and Youth & UNICEF, 2007).

(e) Montserrat

A critical assessment of the social and political barriers to effective implementation of emergency response efforts which continue to create management challenges was conducted by Haynes (2006).

Specific to education, one of the lessons learnt was that “During a long-running crisis it is important to continually update and renew education and outreach activities with innovative techniques.” In Montserrat, disaster risk information is regularly circulated by the Government Information Unit and media. Education programmes and public information campaigns are the responsibilities of the Information and Education Officer, and disaster risk education occurs at both primary and secondary levels (<http://www.eird.org/wikien/index.php/Montserrat>). DRR is not high on the political agenda in Montserrat. Education is represented on the National body for multi-sector coordination and collaboration in disaster risk reduction, and there are sector plans, including education, that incorporate disaster reduction concepts. Information management and communication, education and training, public awareness and research are all important in improving and managing knowledge on disaster risks and reduction. This is a huge challenge given Montserrat’s limited resource capacity, its need to regularly upgrade the skills of service providers and the constant need to update the public. A success from the education campaigns is the recognition that primary school students are the best conduit of information to adults. A major challenge is the introduction of a consistent disaster reduction programme to all levels of schools in education system. The school system is linked to the Emergency Department through the Ministry of Education, and the Information and Education Officer of the Emergency Department manages disaster reduction public information and education programs. Post-graduate research is conducted on the island, and a disaster management centre is being established to provide field-based training for research students and disaster management/disaster risk reduction practitioners. The Centre will be linked to other institutions providing disaster risk reduction educational programs and training. There are educational programmes in disaster risk in the primary and secondary schools. A community college is to be opened shortly and its curricula will include disaster reduction. Educational materials for teachers exist at the primary school level. Existing materials of Caribbean Disaster Emergency Response Agency (CDERA), UNICEF, European Community Humanitarian Aid Office (ECHO), and ISDR are also used. The Emergency Department and other technical agencies deliver programmes. One of the major lessons learnt was that the best vehicles to influence parents were through the primary schools system (Government of Montserrat, 2005).

In summary, UN/ISDR had identified a number of challenges to the successful achievement of HFA Priority 3. Although these were raised in relation to the Central American and Dominican Republic educational platform, they apply to the Caribbean SIDS as well. These were

- (a) Lack of capacity among educators and trainers
- (b) Difficulties in addressing needs in poor areas
- (c) Lack of validation of methodologies and tools and little exchange of experiences
- (d) Sometimes absence of policy and guidelines on how to integrate DRR into curricula, education materials and training
- (e) Most countries that are yet to integrate DRR into school curricula cite lack of educational materials as a major obstacle.

III. THE EFFECTS OF NATURAL DISASTERS ON THE EDUCATION SECTOR IN SELECTED CARIBBEAN SIDS

For the purpose of this study, six Caribbean SIDS were selected for detailed analyses on the macro socio-economic impact of extreme events to the education sector. The criteria for selection of the countries, were (a) the availability of information, based on the macro-socio economic assessment of the events using the Damage and Loss Assessment (DALA) methodology, by ECLAC; (b) the type of events, seeking to ensure the effect of different types of events were examined; (c) the frequency and duration of the events, with the intention to examine countries that were impacted by more than one event; and (d) countries that were representative of Caribbean SIDS with both high and low GDPs.

In seeking to fulfil the above criteria, the following countries were selected for inclusion in the study, the Cayman Islands, Grenada, Guyana, Haiti, Jamaica, and Montserrat.

A. THE ECONOMIC COSTS

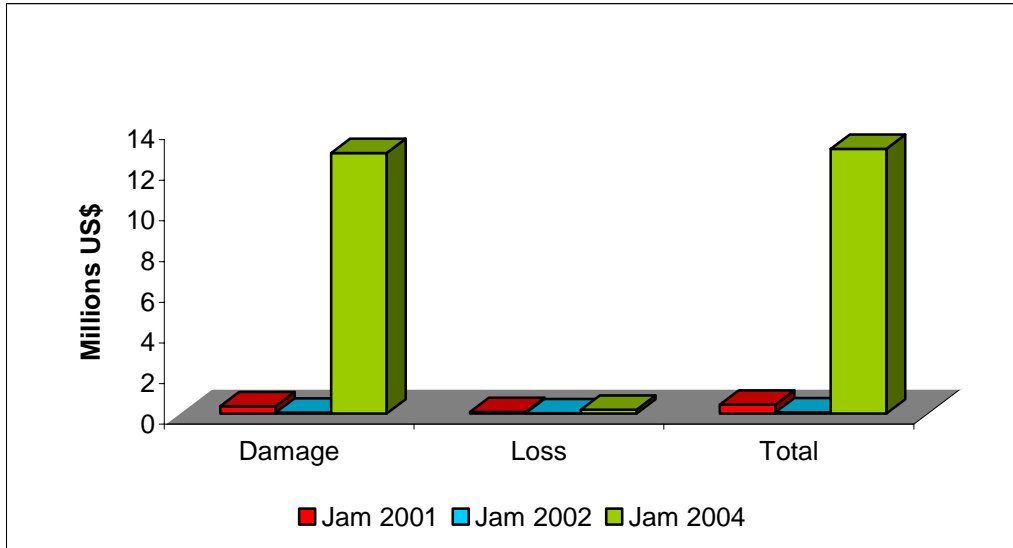
The DALA methodology which has been developed by ECLAC and is in use across Latin America, the Caribbean, Asia and Africa, and in the Latin America and Caribbean region for the past 40 years, seeks to determine the value of an event and its magnitude in relation to the key economic and social indicators of the country. It does so by using a multi-sectoral and multi-disciplinary approach to the valuation of damage and loss, by the key sectors of an economy and society. It is a post hoc evaluation and is grounded in the accounting framework of stocks and flows. Because disasters are not only viewed as a crisis but as an opportunity for countries to ‘build back better’, in the conduct of a macro-socio economic assessment of a natural disaster, strategic recommendations are made for disaster risk reduction.

For ECLAC the education subsector captures not only information about schools and their facilities but includes cultural and heritage sites and sporting facilities. In regard to the education sector which is a subsector of the social sector, these costs are estimated by deriving the value for the repair and reconstruction of school buildings, libraries and furnishings, materials and supplies that were damaged by the natural disaster. These are calculated as damage and occur as an immediate result of the event. Loss to the education sector is determined by calculating costs derived as a result of damage caused to schools and their facilities which may be used as shelters. Costs incurred by either the private or public sector to accommodate children elsewhere until school buildings become available are also considered a loss to the sector as are costs associated with the provision of social support services to children and teachers within the school system. Last but by no means least may be costs incurred through non-payment or non collection of school fees. Cost of demolition and clearing of facilities is also calculated as a loss to the sector.

The following charts illustrate the economic impact of natural disasters on the education sector in the selected Caribbean SIDS.

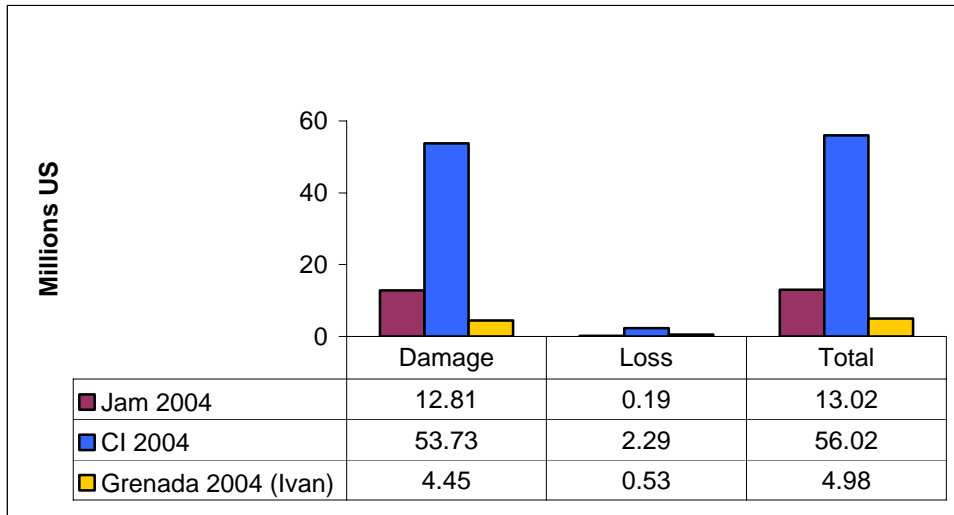
Figure 1 provides a comparative illustration of the impact of three separate events on Jamaica, Hurricane Michelle in 2001, flooding and landslides in May 2002 and Hurricane Ivan in 2004. Although the destruction to schools and their accompanying facilities was fierce following the landslides of 2002, it was a localized event, whereas, Hurricane Ivan was widespread. Hurricane Ivan therefore, had the largest impact on the infrastructure of the education subsector than any of the three events in Jamaica.

Figure 1: Jamaica 2001- 2004 Education Sector Impact



Source: ECLAC based on official data

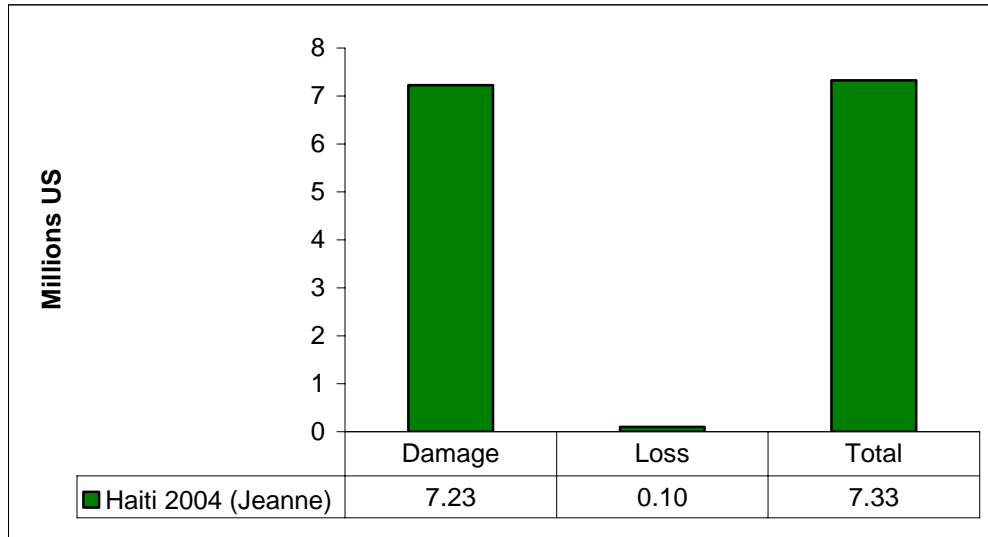
Figure 2: Comparing Ivan across countries



Source: ECLAC based on official data

Figure 2 illustrates the extent of damage and loss caused by Hurricane Ivan to three Caribbean SIDS, Jamaica, the Cayman Islands and Grenada. In comparison to the Grenada and Jamaica, the extent of total impact on the Cayman Islands was four times as great as that of Jamaica and 14 times as that of Grenada. This should not lead any one to believe that the impact on the education sector of the Jamaica and Grenada was any less severe. It may be concluded that the value of the infrastructure in the Cayman Islands that was destroyed, was of a greater monetary value than the infrastructure in other countries.

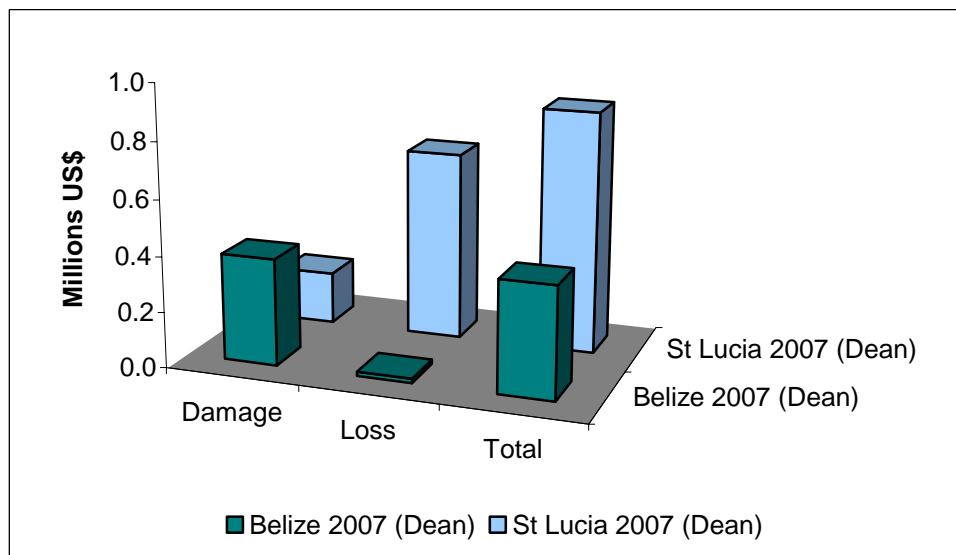
Figure 3: Impact of Hurricane Jeanne on Haiti 2004



Source: ECLAC based on official data

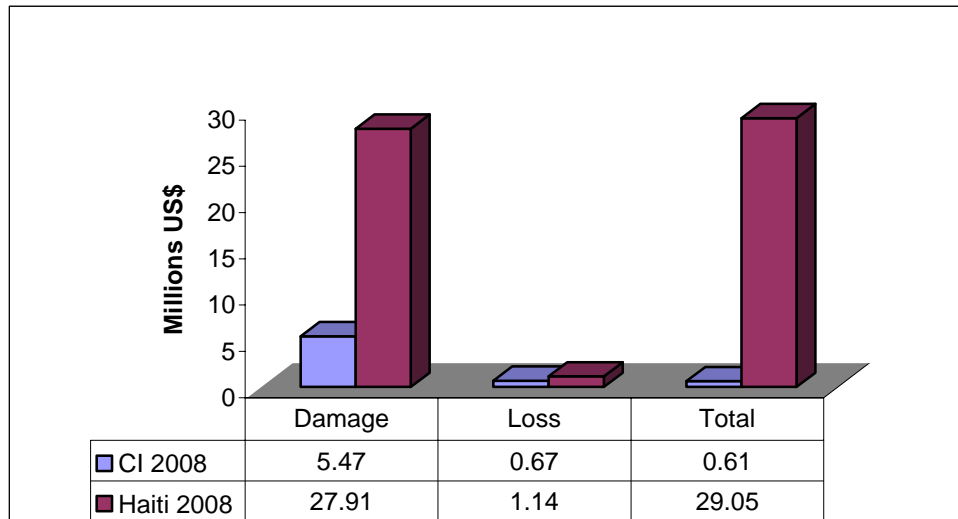
Figure 3 illustrates the impact of Tropical Storm Jeanne on Haiti. Almost the total effect of tropical storm Jeanne could be attributable to the destruction of the infrastructure of the education sector, which was already in a very precarious state.

Figure 4: Impact differential of Hurricane Dean



Source: ECLAC based on official data

Figure 4 illustrates the differential impact of Hurricane Dean on Saint Lucia and Belize. The data suggests that the overall effect of Hurricane Dean to the education subsector was greater on Saint Lucia than Belize. Belize apparently reaped the benefits of reduced damage and loss to the education sector through efforts at mitigation to the education infrastructure either through relocation or retrofitting of school buildings following the destruction caused by Hurricane Keith in 2000.

Figure 5: Impact of 2008 disasters on Cayman Islands and Haiti

Source: ECLAC based on official data

Figure 5 offers a comparative look at the impact of disasters in the year 2008 on Cayman Islands and Haiti. At the end of 2008 the value of the damage to the infrastructure in Haiti was near US\$30 million. It was of course as a result of the cumulative effects of four Hurricanes on Haiti. The value of damage to the Cayman Islands was much smaller as the impact of the Hurricane which affected TCI in 2008 fell mostly on the smallest and least populated islands, Little Cayman and Cayman Brac.

B. THE EFFECTS

The following boxes provide details of the effect of natural disasters on the education sector in the selected Caribbean SIDS. The selection of the Caribbean SIDS reinforces the heterogeneous nature of the countries in the subregion and the multi-hazard nature of the threats to which they are exposed.

Box 1. Cayman Islands



In 2003/04, the Cayman Islands education system consisted of 24 pre-primary, primary and secondary schools (14 government-run and 10 privately-run). Total student enrollment was 6855, with 4537 in government schools and 2318 in private schools (ECLAC, 2004). In 2007, the education system had 27 pre-primary, primary, middle and secondary schools (17 government-run and 10 privately-run). Total student enrollment was 7329, with 4637 in government schools and 2692 in private schools (ECLAC, 2009). The school system is the basis of the support network for women who comprise 49.9% of the population, 50.6% of the labor force, 35.5% of heads of households, 53.8% of the poor and 51.5% of the vulnerable (ECLAC, 2004; 2009).

For the period 2000 to 2008, Cayman Islands was impacted by Hurricanes Ivan (September 2004) and Paloma (November 2008). Grand Cayman, the main hub of the important tourism industry, was devastated by Hurricane Ivan to the tune of over 183% of GDP. Hurricane Paloma in 2008 affected mainly Cayman Brac and Little Cayman with an estimated cost of 7.4% of GDP or CI\$154.4 million (ECLAC, 2009).

The education and culture sub-sector accounted for 1.6% of the total impact of Hurricane Ivan (ECLAC, 2004) and 3.2% of Paloma (ECLAC, 2009). Total economic cost to this sector was CI\$44,819,456 (US\$56,024,321) and CI\$4,914,518 (US\$6,143,148) in 2004 and 2008 respectively, with direct damage representing 96% and 89% of total damage. In 2004, 16 schools were affected, displacing 4385 students (64% school population); while 6 schools were affected in 2008, displacing 305 students (4% school population). The number of school days lost in 2004 as a result of Ivan was 25-40 (ECLAC, 2004; 2009).

Of the 18 approved shelters on Grand Cayman, 11 were schools, and 13 schools were among the 37 buildings designated for temporary accommodation. Losses to the education sector from their use as shelters in 2004 was CI\$1,500,000 (US\$1,875,000) and CI\$32,690 (US\$40,862) in 2008 (ECLAC, 2004; 2009).

Box 2: Grenada

In 2004/05, the Grenada education system comprised a network of pre-primary, primary, secondary and tertiary schools and skills training institutions. Grenada's school system is an important support network for women who comprise 49.9% of the population, 38% of the labor force and 48% of heads of households (OECS, 2004; 2005).

From 2000 to 2008, Grenada was impacted by Hurricanes Ivan (September 2004) and Emily (July 2005), which affected over 80% and 38.1% of the population respectively. Total devastation by Hurricane Ivan was estimated at EC\$2.4billion (US\$0.89 billion) or 212% of GDP, while Emily was estimated at EC\$140 million (12.9% of GDP). The Education sub-sector accounted for 8.2% of the total impact of Hurricane Ivan and 3.2% of Emily. Total economic cost to the education sector was EC\$195,820,884 (US\$72,526,253) in 2004 and EC\$13,433,225.00 (US\$4,975,269) in 2005, with direct damages representing 99% and 89% of overall costs respectively. In 2004, 93 schools were affected, displacing 30,481 students; while 21 schools were affected in 2005, displacing 6854 students. The cost of using schools as shelters was EC\$1,260,000 (US\$466,667) in 2004 and EC\$1,271,320 (US\$470,859) in 2005 (OECS, 2004; 2005). To reduce the wear and tear of school buildings, it was suggested that sturdy community centres could replace schools as shelters (OECS, 2004).



Box 3: Guyana



Education in Guyana is free and compulsory, with the Government assuming full responsibility from nursery to university. Primary and secondary schools generally are separate, but the lack of facilities does not allow for separation of classes in some cases. The main university is the University of Guyana, and there are several technical colleges and teacher-training schools (<http://www.eird.org/wikien/index.php/Guyana>).

During the period 2000 to 2008, Guyana was impacted by two extensive floods in January/February 2005 and December 05-January 06 (ECLAC, 2005; 2006). The 2005 floods in Regions 3, 4 & 5 affected 37% of the national population severely and 48% moderately, while that in Regions 2 & 5 in 05/06 affected 4% of national households. Total impacts was estimated at GY\$93 billion (US\$465.1 million) or 59.5% of GDP in 2005 and GY\$6 billion (US\$30.1 million) or 4.8% of GDP in 05/06. Total economic cost to the education sector in 2005 was \$GY396 million (\$US184,888) or 0.24% of GDP, with direct damage representing 95% of overall damage, and 76% of total damage attributed to tertiary level institutions (ECLAC, 2005). For the 05/06 event, total economic cost to the education sector was comparatively minor \$GY1.1 million (\$US5,505) or 0.00% of GDP, with losses (cost of cleaning schools and use of schools as shelters) of GY\$0.84 million (US\$4,204) representing 79% of overall costs, and no damage to tertiary level institutions (ECLAC, 2006). The losses by schools being used as shelters in 2005 was GY\$24 million (US\$112,150) (ECLAC, 2005).

The 2005 floods affected 50% of national schools, displacing 124,413 students (59% national school population) and 5433 teachers (55% teacher population, excluding University of Guyana), and over 30 school days were lost (ECLAC, 2005). The 05/06 floods affected 16 schools or 1% of the national stock (7 in Region 2 by direct flooding and 9 in Region 5 from use as shelters), displacing 30269 students (14% national school population) and 1204 teachers (12% national teacher population) (ECLAC, 2006).

Box 4: Haiti

During 2000 to 2008, Haiti was impacted by Hurricane Jeanne (September 2004) and Tropical storm Fay, and Hurricanes Gustav, Hanna and Ike (August-September 2008). The former affected over 4% (298,000 persons) of Haiti's population, resulting in 3000 deaths (60% children), 900 missing and 2,600 injured (ECLAC, 2005). The hurricanes in 2008 affected 800,000 persons, with 348 injured, 793 deaths and 310 missing (ECLAC, 2008). Total damages/losses by Jeanne was estimated at GDS\$9541.8 million (US\$265.1 million) or 6.5% of GDP, while that of the 2008 hurricanes was estimated at US\$897.39 million (14.6% of GDP). The Education sub-sector accounted for 2.1% of the total impact of Hurricane Jeanne

and 3.2% of Fay, Gustav, Hanna and Ike. Total economic cost to the education sector was GDS\$203.8 million (US\$5.7 million) in 2004 and US\$29.05 in 2008, with direct damages representing 98% and 96% of total costs respectively. In 2004, 74 schools were affected (6 destroyed), and 964 schools (6% of national stock; 46% public; 54% private) affected in 2008, displacing 212,705 students. For 2008, the school days lost was 20 to 40, and the losses from schools (43) being used as shelters was GD\$2.8 million (US\$101,046) (ECLAC, 2005; 2008).

Box 5: Jamaica



The education system comprises 1004 schools with 673,679 students enrolled at the pre-primary (18%), primary (42%), secondary (31%), post-secondary (5.4%), and tertiary (4%) levels. Approximately 97% of the student population is enrolled in the public education sector (ECLAC, 2004).

From 2000 to 2008, Jamaica was impacted by Hurricanes Michelle (October 2001) and Ivan (September 2004), and flood rains and landslides (May, 2002), which affected approximately 8%, 14% and 50% of the population respectively (ECLAC, 2001; 2002; 2004). Total devastation by Hurricane Michelle was estimated at J\$2521.0 million (US\$53.6 million) or 0.8% of GDP, while Ivan was estimated at J\$36886.3 million (US\$594.9 million) or 8% of GDP, and the 2002 floods/landslides amounted to J\$2473 million (US\$51 million) or 0.7% of GDP (ECLAC, 2001; 2002; 2004).

The education and culture sub-sector accounted for 1% of the total impact of Hurricane Michelle, 2.2% of Hurricane Ivan, and 0.1% of the 2002 floods and landslides. Total economic cost to the education sector in 2001, 2002 and 2004 respectively was J\$20,700,000 (US\$440,426), J\$3,220,000 (US\$66,667) and J\$806.9 million (US\$13 million), with direct damage representing 83%, 78% and 98% of overall damage. In 2001, 18 schools were affected, 16 in 2002, and 333 schools (33% of national stock) affected in 2004 displacing 204,000 students or one third of the national school population (ECLAC, 2001; 2002; 2004). The minor damage suffered by the education sector in the 2002 floods and landslides was attributed to good planning by the Ministry of Education, which had schools built on high ground as many are used as shelters during natural disasters (ECLAC, 2002). The extensive damage by Hurricane Ivan was linked to the age of the school system (many buildings over 50 years old) and low levels of maintenance. Despite this, many schools reported minor damage (ECLAC, 2004).

The loss to the sector by schools being used as shelters in 2001, 2002 and 2004 was J\$3,500,000 (US\$74,468) for 6 damaged schools, J\$700,000 (US\$14,493) for 4 damaged schools, and J\$10 million (US\$161,290) for 10 schools (ECLAC, 2001; 2002; 2004). In 2001, the Ministry of Education moved quickly to seek alternative accommodation for families housed in school premises to reduce the extent of damage (ECLAC, 2001). In 2002, the damage to schools from use as shelters was minimal as most families opted to move in with the extended family, friends or neighbors (ECLAC, 2002). Most schools were occupied as shelters immediately after Hurricane Ivan's passage in 2004, but arrangements for quick return of families to their homes resulted in minor damage to schools (ECLAC, 2004).

Although disaster planning and response capacity have developed significantly over recent years, Jamaica still remains vulnerable to natural disasters, with weaknesses in planning, land use policies and building practices. There is a need to build further resilience through changes in land use and building practices (ECLAC, 2002).

Box 6: Montserrat

Montserrat is an overseas territory of the United Kingdom (UK) administered by a complex set of economic and political relationships. Prior to the 1995 volcanic eruption, health, education and living standards were among the highest in the Caribbean (Clay *et al.*, 1999). With the onset of major and on-going volcanic eruptions in 1995, over two thirds of Montserrat's population of 12,000 relocated overseas after losing their homes, properties and jobs. Displaced persons were housed in public buildings such as schools, clinics, churches (Anon). The population of 4,600 (2001 census), inhabits the 'Safe Area' in the northern one third of the island. The rest of the island is an official 'Exclusion Zone,' which includes the capital, main seaport, airport, major villages, schools, key industrial areas, hotels, golf course and tourism related sites and infra-structure. As a result of the eruptions, Montserrat is in a dire economic state and now receives budgetary aid from the UK government (Government of Montserrat, 2009).



(Smith, David A.Y.)

Traditionally, Montserrat has had an excellent primary and secondary school education system, with consistently good results in the UK General Certificate of Secondary Education

(GCSE) and the Caribbean Examinations Council (CXC) examinations. However, due to the volcanic eruptions, education was hard hit and many schools were destroyed or rendered inaccessible. A shortage of school places resulted in many children being sent abroad (Anon). From 1996 to 1998, schools in the 'safe zone' were used as shelters resulting in an unavoidable suspension of schooling—a major determinant for emigration. Now there are 3 primary schools, which cater for approximately 400 pupils and 1 secondary school with 300 pupils. The Montserrat Community College offers first level tertiary education, and the University of the West Indies (UWI) has a small centre in Montserrat with modern teleconferencing facilities, which offers distance-learning modules in certain subject areas. Students however have always pursued tertiary education abroad, mostly at UWI but also in the US, UK and Canada. Montserrat is now incorporating information and communications technology into the teaching and learning process in the education system (Government of Montserrat, 2009).

C. LIMITATIONS ON THE ESTIMATION OF THE TOTAL EFFECT

One of the key limitations on the estimation of total effect or impact of natural disasters on the education sector is the absence of the full social cost of education.

Social costs are defined as the value of all resources directly used in the production of education. It includes private costs borne by students or their families such as fees, books, uniforms and transportation and those costs that are usually associated with the delivery of education (or the public cost provided by the state) that is, teacher's salaries and non teacher's salaries and wages, educational materials, transportation and infrastructure. It also includes other costs, which may not be as easy to value and which may vary from one country to another or between different socio-economic groups in the same country. In economic terms these costs are referred to as external costs and/or benefits²⁵.

²⁵ External costs are those economic costs borne by affected parties, but which are not normally priced by the market.

An example of an external cost may be the cost of socializing or readying a child for participation in the structured programme of learning as exemplified by early childhood education. In many low income communities, this task falls on the mother or guardian of the child. Another external cost may be the cost of maintaining stability of families or the non disruption of the family life, which allows the student to participate fully in and benefit from the education services being provided. Informal knowledge transfer which supports social capital may also be an example of an external cost.

The second limitation to the estimation of total effect has to do with the inability to measure the extent to which the disruption caused by the natural disaster has affected the quality of the educational performance of the teacher or the student, in the short, medium or long term. Research has not fully explored the relationship between damaged school facilities and the stresses associated with natural disasters and examination outcomes.

Such research, at a minimum, requires the collection and analysis of data that measures attendance and class performance by age and sex of the students in the affected schools and by socio-economic and other demographic characteristics of the children .

IV. THE WAY FORWARD

A. SALIENT ISSUES OF DISASTER RISK REDUCTION IN THE EDUCATION SECTOR

A number of salient issues in disaster risk reduction in the education sector have been identified for the attention of policymakers in Caribbean SIDS. Such issues include the safety of schools, the use of schools as shelters, the knowledge of DRR of students and teachers, and the psychosocial trauma of children.

1. Safety of schools

One example drawn from the global community, which heightened the awareness of all to the need for improved safety in schools, was the impact of the Sichuan earthquake which occurred in China in 2008. When the earthquake had passed, more than 7,000 children had lost their lives while in their schools and an estimated 7,000 classrooms were destroyed. The Caribbean has never suffered proportionally any such level of devastation but, because Caribbean SIDS are threatened by earthquakes, storm surge , flooding and other hazards, there is a strong impetus to ensure that schools in the subregion meet safety standards.

In the Guidance Notes for Safer School Construction (2009) The Global Facility for Disaster Reduction and Recovery (GFDRR) suggests a number of reasons why safer schools are an urgent matter. They underline that, besides the value of saving lives and minimizing harm to students, teachers and school personnel, safer schools reduce the disruption of education activities following a disaster and can act as a centre for community activities and a space from which a coordinated response and recovery effort can take place. GFDRR also suggest that safer schools should be able to serve as emergency shelters.

In order to achieve a status of safer schools, UNICEF suggests that it is important that all school buildings adhere to building codes that incorporate disaster resilience. It is also necessary to conduct safety reviews of existing school infrastructure with respect to local hazards. These reviews ought to be followed up by setting transparent time-bound targets for repair and rebuilding schools. Lastly, UNICEF

suggests that it is imperative that ministries of education develop a legal framework for systematically implementing, monitoring and evaluating school protection with key stakeholders.

Two best practices in regard to safer schools comes from implementation of recommendations for DRR following devastation caused by Hurricane Keith in 2000 in Belize, and Hurricane Luis and Marilyn in 1995 in Saint Kitts and Nevis. In the case of Saint Kitts and Nevis, since 2003, the policy of the construction of multipurpose centres has been initiated. These centres can be used as shelters in time of a disaster and as community centres throughout the year. Belize improved the construction of schools taking cognizance of the building codes, resulting in schools that are set back from river banks and whose roofs are strapped. Both the actions of policymakers in Saint Kitts and Nevis and Belize have resulted in more robust school structures and less damage to the infrastructure of the buildings in the aftermath of disasters.

2. Schools as shelters

In most Caribbean SIDS, schools alternate as shelters in time of disasters and, in some cases, their grounds are used to store emergency equipment. Their facilities have been used as distribution centres for food and non-food items and other forms of aid. This has been very problematic not only due to the additional cost which ministries of education have incurred from the destruction of school fittings and vandalism of school property, but because of the delay caused through these alternative uses, in the opening of schools following natural disasters.

ECLAC estimates that during the period 2000-2008, well over one million children suffered some level of disruption in school attendance due to natural disasters in Caribbean SIDS. Schools form an integral part of communities and, as such, when communities are faced with difficulties such as damaged transport links, destruction of homes and livelihoods, this, too, affects school attendance.

In regard to the value of damage suffered by schools, ECLAC estimates for the period show that more than 50% of the effect was attributable to schools having been used as shelters.

There are a number of possible solutions to the problem. One such recommendation is that alternative, multi-purpose centres are built such as in the case of Saint Kitts and Nevis. Although this is an attractive option, it may not be feasible for many highly-indebted Caribbean SIDS. The other possibility is a different and improved design and construction of schools, **that have to be rebuilt after a disaster** to better accommodate families who have to use the facility as a shelter. Whichever solutions are developed, there is little doubt that better management of school and shelter facilities is integral. Greater interaction among the disaster managers, education managers and the communities in which schools are located will achieve the best results, if and when schools have to be used as shelters.

3. Knowledge of teachers and students in DRR

The Hyogo Framework challenges ministries of education to “use knowledge, innovation and education to build a culture of safety and resilience at all levels”. There is little disagreement that disasters can be substantially reduced if people are well informed and motivated towards a culture of disaster prevention and resilience which, in turn, requires the collection, compilation and dissemination of relevant knowledge and information on hazards, vulnerabilities and capacities.

Best practice among the ministries of education in seeking to build a culture of safety has come from the Bahamas which has produced a Disaster Preparedness Manual for use in secondary schools and a primary school Supplementary Workbook, both of which adopt a multi-hazard approach to disaster risk reduction education. There has been much debate as to whether there ought to be stand alone courses or

infusion of the DRR information in the schools' curriculum. An examination of the evolving process, as it occurs in Caribbean SIDS, seems to suggest a move towards infusion at the primary and secondary levels with stand alone courses offered at the tertiary level. The infusion approach should avoid the necessity of burdening the curriculum at the primary and secondary level with a new subject and, at the same time, ensure that the DRR information reaches all students during their education career. The content of the material available also demonstrates an appreciation of the multi-hazard landscape that is Caribbean SIDS.

Caribbean Disaster Emergency Management Agency (CDEMA) acts as a catalyst in embedding DRR in the education sector. One such mechanism is the Education Sector Sub Committee of the Comprehensive Disaster Management (CDM) Coordination and Harmonization Council. It is chaired by the University of the West Indies, lead agency for CDM implementation in education and has, as one of its aims, to provide overall technical guidance for the implementation of CDM in the education sector. CDEMA has been involved in providing scholarships for disaster management-related training, the delivery of safer building courses for informal contractors and a graduate-level disaster management certification. It has also been involved in the production of educational materials, both electronic and print, for use by teachers and students. CDEMA advocates for greater standardization of existing education and training materials across Caribbean SIDS.

An area that requires strengthening is the recognition of the relevance of gender analysis in the field of disaster risk reduction in the education sector. Policymakers in the ministries of education should be guided by the Hyogo Framework for Action which states that "a gender perspective should be integrated into all disaster risk management policies, plans and decision-making processes, including those related to risk assessment, early warning, information management, and education and training". The operationalization of the Hyogo guideline requires ministries of education to ensure that tools for gender analysis are utilized in the production and delivery of DRR education materials and training.

4. Psycho social trauma of students

During the ECLAC assessment of the affected population following natural disasters in Caribbean SIDS, the issue of the psychosocial trauma of children and families was often brought to its attention (ECLAC, 2009). The term psychosocial relates social conditions to a person's mental health. Following catastrophic events, such as earthquakes, hurricanes, tsunami or volcanic eruptions, people may experience physical or psychological trauma. Such trauma may result in realistic or unrealistic stresses and fears being aroused, which can overwhelm individual and communities' ability to cope. It is to be noted that people react differently to catastrophic events, some coping better than others (Greenstone, 2008).

Psychosocial trauma or the manner in which natural events, such as hurricanes or other events, impact on a person's social conditions (their livelihoods or living conditions) and, concomitantly, their mental health, has been known to be present in the aftermath of disasters. It may influence family functions and may contribute to the inability of family members to fulfil their work responsibilities or perform in school, thus exacerbating living conditions following a natural disaster. Data suggest that men, women, girls and boys all react differently to psychosocial trauma.

Clarke (2009) indicated that manifestations of psychosocial trauma in children include hyper vigilance, anxiety symptoms, changes in sleep and eating patterns, aggression and withdrawal and avoidance behaviours. She called on ministry of education officials to be mindful of the impacts of disasters on children who may display behaviours indicative of trauma stress and are not identified, assessed nor treated, but are labeled and stereotyped as disruptive, disorderly and beyond control. She

also called for increased training of personnel who could deliver psychosocial support services to students.

Box 7: A response to psycho social trauma: The case of Jamaica



In 2004 Jamaica was ravaged by Hurricane Ivan, a category four hurricane. The hurricane with winds of up to 270 kilometers per hour resulted in 17 deaths, eight of which were in Portland Cottage in southeast Clarendon, a seacoast village of fishermen and their families. Among the dead were three children. Houses were swept away taking with them family belongings and aspirations.

Families and children were grieving from separation and loss as they had lost parents, children, relatives, homes, personal belongings, the tools of their livelihood, playgrounds, familiar scenes and activities. The school nearby was closed as it was being used as an emergency centre for over 20 families, so that, too, added to the children's experience of loss and separation.

There was a call from the Chief Medical Officer for persons to be given psychological attention and several health centres across the island screened for post traumatic stress disorders. There was the call for "more emphasis and recognition to be placed on the mental health challenge resulting from disasters". One international agency (UNICEF), in its assessment, was struck by the sense of loss and devastation of the children in the programme for Rural Family Support of which three of the casualties had been beneficiaries. In addition, several agencies expressed concern about the children in the area and others across Jamaica who were impacted by the hurricane.

Community workers and mental health professionals noted a wide range of behaviours manifested by children including sleep disturbances, flashbacks, physical complaints, irritability, withdrawal, anger, expressions of guilt and grieving. This concern led to the development of a six-month project to address the problem in the parishes most impaired by the hurricane.

A project was developed to support the children and their families from six parishes. The interventions were aimed at strengthening the capacity of children and, especially, parents to deal with post-traumatic stress. The activities of the project included the recruitment of a cadre of professionals, para professionals and service providers for training in psychosocial support. A team of psychologists and social workers were identified to develop the training programme and to conduct the training of trainers' workshops. Those who were trained then identified and trained community-based service providers and other service delivery personnel in their immediate environs. The project was successful as it trained and delivered support services to children and their families who were screened for post-traumatic stress disorders following the disaster.

Clarke (2009)

B. RECOMMENDATIONS

Policymakers in Caribbean SIDS have given measured thought to DRR. National Emergency Management Organizations (NEMOs) are well established and work coherently with the lead agency responsible for disaster management in Caribbean SIDS, CDEMA. However, most NEMOs have worked in the area of response and are now seeking to shift their emphasis into DRR. Collaboration with ministries of education naturally has also been in the area of disaster response, and particularly with regard to the use of schools as shelters. Partnership on disaster risk reduction either at the national level or subregional level is a relatively new phenomenon. In order to reduce the vulnerability of the education sector to the effects of multi hazards in Caribbean SIDS, policymakers at various levels are seeking ways to move the agenda forward.

That agenda is based on a number of strategies, some multifaceted.

One foundation area is that of the management of the infrastructure within the sector for DRR. Where construction of new infrastructure is the issue, strengthened compliance with the building codes for Caribbean SIDS is necessary. This, combined with more widespread use of vulnerability assessments to ensure best use of locations appropriate for new educational facilities, would go a long way in addressing the DRR needs of the infrastructure in the education sector. Where there are already existing structures, retrofitting with mitigation may be required and more rigorous attention to maintenance schedules would need to be established and observed. A second area of focus is on the ability of the sector to fulfil its primary role of imparting knowledge to its beneficiaries. Most ministries of education in the subregion have begun this process, but far more needs to be done to increase knowledge among its target population regarding the multi hazard nature of Caribbean SIDS and measures for DRR. Included in this measure of knowledge management is the notion of facilitating education during times of emergency. A third area of focus is strengthening the capacity to monitor and evaluate the level of success in implementing the DRR measures within the sector and the impact of extreme events on the school population.

Enabling the fulfilment of such an agenda in Caribbean SIDS requires a number of actions. Among them are formal recognition by governments and ministries of education of the importance and urgency to include DRR as a priority for the development policy of these ministries. Another is for the inclusion of DRR in school curricula, either through infusion or stand alone courses. The scaling up of DRR knowledge management, particularly research, to support decision-making is yet another area which requires attention, as both the natural and social knowledge about DRR is rapidly expanding. .

In almost all aspects relevant to the measurement of the quality of life in Caribbean SIDS, the concern for quality and available data can be heard. It is no different in the area of educational statistics. A critical area for improvement in human resources is in that of data management capacity. This is evident as administrative statistics collected by the ministries of education in Caribbean SIDS are not readily available to facilitate a better assessment of the total effect of natural disasters on the performance of children in the education system following the impact of natural disasters.

Policymakers in Caribbean SIDS already recognize the possibilities which technology and innovation play in enhancing the development potential of their societies. Such technologies can be applied to achieve greater accessibility to DRR knowledge.

Lastly , this paper proposes that better integration of DRR in the education sector cannot be easily achieved if policymakers do not recognize the social nature of risk perception and acceptance in Caribbean SIDS, which necessitates that risk reduction be treated as a negotiated process which engages all stakeholders.

Bibliographic References

- ADPC, 2008a. Mainstreaming Disaster Risk Reduction in the Education Sector in Cambodia. Asian Disaster Preparedness Centre (ADPC), Bangkok, Thailand. 101 pp.
- ADPC, 2008b. Mainstreaming Disaster Risk Reduction in the Education Sector in Lao PDR. Asian Disaster Preparedness Centre (ADPC), Bangkok, Thailand. 113 pp.
- ADPC, 2008c. Impact of Disasters on the Education Sector in Cambodia. Asian Disaster Preparedness Centre (ADPC), Bangkok, Thailand. 54 pp.
- Aguilera, A.S.; Le Berre, R.; Wettstein, M. & Szaszkievicz, B. 2004. Haiti. Bank's Transition Strategy 2005-2006. Document of the Inter-American Development Bank. 31pp; 2 Annexes.
- Akpotu, Nelson Ejiro, 2008. Social Cost Analysis of Secondary Education in South West Nigeria (1996-2001). J. Soc. Sci. 16(1):27-33
<http://www.krepublishers.com/02-Journals/JSS/JSS-16-0-000-000-2008-Web/JSS-16-1-000-000-2008-Abst-Text/JSS-16-1-027-08-475-Akpotu-N-E/JSS-16-1-027-08-475-Akpotu-N-E-Tt.pdf>
- Anon. Volcanic eruption: An unfolding management challenge to a natural environmental disaster-Montserrat. *Small Island Developing States* 2: 39-49.
- Barclay, R.; Bishop, J. & Hawes, J. 2005. The turning point Montserrat Project. Report prepared for the W.K. Kellogg Foundation. 44pp.
- Benthke, L. & Braunschweig, S. 2004. Global survey on education in emergencies. M. Diaz & D. Quick (eds.). *Women's Commission for Refugee Women and Children*. 156 + viii pp.
- Bitran, D. 2009. Metodologias para la evaluacion del impacto socioeconomico de los desasres. *Serie estudios y perspectivas* No.108: 36pp. Sede Subregional de la CEPAL en Mexico.
- Burde, D. 2004. Foreword, pp. 5-9. In: D. Burde (senior editor) *Education in Emergencies and Post-conflict Situations: Problems, Responses and Possibilities*. Society for International Education, Columbia University, New York.
- CDERA, 2007. Summary of impact of Hurricane "Dean" on CDERA participating states. Response actions, recovery and rehabilitation needs. Report prepared by the Coordinating Unit of the Caribbean Disaster Emergency Response Agency August 22, 2007. 23pp.
- CDERA Disaster Events Database. Top 20 disasters in CDERA member states, sorted by total losses. <http://www.cdera.org>
- CDP, 2008. Mainstreaming Disaster Risk Reduction in the Education Sector in the Philippines. Centre for Disaster Preparedness (CDP). 158 pp.
- Chapman, N.; Collins, P.; Visser, M.; Julien, M.; Miller, J. & Hinds, K. 2007. Caribbean Regional Programme. United Kingdom DFID Department for International Development Evaluation Report EV678, May 2007. 70pp.

Chapman, N.; Collins, P.; Visser, M.; Julien, M.; Miller, J. & Hinds, K. 2007. Evaluation of DFID's programme in the Caribbean 2000-2005. United Kingdom DFID Department for International Development Evaluation Summary EVSUM678. May 2007. 4pp.

Charveriat, C. 2000. Natural disasters in Latin America and the Caribbean: An overview of risk. Inter-American Development Bank Research Department Working Paper 434. 104pp.

Clarkson, Richard and Kathryn Deyes, 2002. Estimating the Social Cost of Carbon Emissions. Environment Protection Economics Division, Department of Environment, Food and Rural Affairs: London. 57pp
http://www.hm-treasury.gov.uk/tax_env_GESWP140.htm

Clay, E.; Barrow, C.; Benson, C.; Dempster, J.; Kokelaar, P.; Pillai, J. & Seaman, J. 1999. An evaluation of HMG's response to the Montserrat volcanic emergency. Volume I. United Kingdom DFID Department for International Development reports. Evaluation Report EV635, December 1999. 82pp.

Clay, E.; Barrow, C.; Benson, C.; Dempster, J.; Kokelaar, P.; Pillai, J. & Seaman, J. 1999. Evaluation of HMG's response to the Montserrat volcanic emergency. United Kingdom DFID Department for International Development report. Evaluation Summary EVSUM635, December 1999. 4pp.

CPREDENAC-PNUD, 2005. Local Level Risk Management: Concept and Practices. Regional programme for risk management in Central America. Ecuador

Crowley, M.M. 2004. Groundwork for development in education: emergency assistance in Haiti, pp. 55-63. In: D. Burde (senior editor) *Education in emergencies and post-conflict situations: Problems, responses, and possibilities*. Society for International Education, Columbia University, New York.

ECLAC, 2000. Education and its impact on poverty: equity or exclusion. LC/CAR/G.609. 29 February 2000. 39pp. Prepared for the UNESCO Forum on Education for all in the Caribbean: Assessment 2000. Santo Domingo, Dominican Republic, 10-12 February 2000.

ECLAC, 2001. Jamaica: Assessment of the damage caused by flood rains and landslides in association with Hurricane Michelle, October 2001. Implications for economic, social and environmental development. LC/CAR/G.672. 07 December 2001. 47pp.

ECLAC, 2002. Jamaica: Macro-socio-economic assessment of the damage done by flood rains and landslides, May 2002 LC/CAR/G.698. 22 July 2002. 74pp.

ECLAC, 2003. *Handbook for estimating the socio-economic and environmental effects of disasters*. LC/MEX/G.5 LC/L.1874. 111 +xiv pp.

ECLAC, 2004. Assessment of the socioeconomic and environmental impact of Hurricane Ivan on Jamaica. LC/MEX/L.636; LC/CAR/L.22. 20 October 2004. 77pp.

ECLAC, 2004. The impact of Hurricane Ivan in the Cayman Islands. LC/MEX/L.645/Rev.1; LC/CAR/L.25/Rev.1. 08 December 2004. 86pp.

ECLAC, 2004. Hurricanes Frances and Jeanne in 2004: Their impact in the Commonwealth of the Bahamas. LC/MEX/L.642/Rev.2; LC/CAR/L.23.Rev.2. 14 December 2004. 53 + iii pp.

ECLAC, 2005. Le cyclone Jeanne en Haiti: Degats et effets sur les departments du nord-ouest et de l'artibonite: approfondissement de la vulnerabilite. LC/MEX/L.648/Rev.1; LC/CAR/L.27. 17 March 2005. 66pp.

ECLAC, 2005. Guyana. Socio-economic assessment of the damages and losses caused by the January-February 2005 flooding. LC/CAR/L.31/Rev.1. 31 March 2005. 130pp.

ECLAC, 2005. Report on the national training workshop in the ECLAC methodology for estimating the socio-economic and environmental effects of disasters. 19-21 April 2005, Cayman Islands. LC/CAR/L.43. 14 June 2005. 6pp.

ECLAC, 2005. Grenada: A gender impact assessment of Hurricane Ivan-making the invisible visible. LC/CAR/L.48. 29 June 2005. 41pp.

ECLAC, 2005. Comparison of the socio-economic impacts of natural disasters on Caribbean societies in 2004. LC/CAR/L.39. 12 August 2005. 36pp.

ECLAC, 2005. Caribbean small states, vulnerability and development. LC/CAR/L.60. 15 November 2005. 38pp.

ECLAC, 2006. Guyana. The impact on sustainable livelihoods caused by the December 2005-February 2006 flooding. LC/CAR/L.88/Rev.1. 31 October 2006. 66pp.

ECLAC, 2007. Suriname: The impact of the May 2006 floods on sustainable livelihoods. ECLAC Studies and Perspectives series-The Caribbean. No. 3. March 2007. 50pp.

ECLAC, 2007. Report of the Meeting on methodologies for disaster assessment-A regional approach. LC/CAR/L.116. 14 May 2007. 25pp.

ECLAC, 2007. St. Lucia. Macro socio-economic assessment of the damage and losses caused by Hurricane Dean. LC/CAR/L.140. 31 October 2007. 82 + v pp.

ECLAC, 2007. Commonwealth of Dominica. Socio-economic assessment of the damage and losses caused by Hurricane Dean. LC/CAR/L.145. 03 December 2007. 117 + v pp.

ECLAC, 2007. Information on Disaster Risk Management Case Study of Five countries: Jamaica. LC/MEX/L.836. 13 December 2007. 114pp

ECLAC, 2007. Belize. Macro socio-economic assessment of the damage and losses caused by Hurricane Dean. LC/CAR/L.153. 17 December 2007. 78 + v pp.

ECLAC, 2008. Turks & Caicos Islands. Macro socio-economic assessment of the damage and losses caused by Tropical Storm Hanna and Hurricane Ike. LC/CAR/L.185. 10 December 2008. 90 + vii pp.

ECLAC, 2009. Cayman Islands. Macro socio-economic assessment of the damage and losses caused by Hurricane Paloma. LC/CAR/L.193. 02 April 2009. 59pp.

Fox, A.P. Montserrat-A case study in the application of multiple methods to meet a post disaster housing shortage.

Global Facility for Disaster Reduction and Recovery, 2009. Guidance Notes on Safer School Construction. A collaborative production of INEE, the World Bank and ISDR. <http://gfdrr.org/index.cfm?Page=3&ItemID=103>

Government of Guyana/UNDP Country Team, 2003. Report on the progress towards the achievement of the Millennium Development Goals.

Government of Haiti, 2008. Rapport d'évaluation des besoins après desastre cyclones Fay, Gustav, Hanna et Ike. A report prepared by the Government of the Republic of Haiti with the approval of the World Bank, United Nations and the European Commission. November 2008. 100pp + Annexes xxxiii.

Government of Haiti, 2009. Conference on the economic and social development of Haiti III: "Towards a new paradigm of cooperation" Washington 14 April 2009. 17pp.

Government of Montserrat, 2005. Montserrat National Report and Information on Disaster Reduction prepared for the World Conference on Disaster Reduction, Kobe-Hyogo, Japan, 18-22 January 2005. 10pp.

Government of Montserrat, 2009? E-Government Strategy Draft 1.1. 26pp.

Greenstone, James L. 2008. The Elements of Disaster Psychology: Managing Psychosocial Trauma, An Integrated Approach to Force Protection and Acute Care. Charles C. Thomas Publisher, Ltd. Springfield, Illinois U.S.A.

Harvey, Claudia, 2000. The EFA Assessment Process in the Caribbean and the Quest for Inclusion and Quality. Kingston, Jamaica . UNESCO. 52pp

Haynes, K. 2006. Volcanic Island in crisis: investigating environmental uncertainty and the complexities it brings. *The Australian Journal of Emergency Management* 21(4): 21-28.

Heger, M.; Julca, A. & Paddison, O. 2008. Analysing the impact of natural hazards in small economies. The Caribbean Case. United Nations University-World Institute for Development Economics Research Paper No. 2008/25: 1-27.

Hewitt, K. 2008. Culture and Risk: Understanding the Socio-Cultural Settings that influence Risk from Natural Hazards. Draft Synthesis Report. <http://community.eldis.org/.59bb6210>

Howgego, C. M. 2004. Gender imbalance in secondary schools. *Forced Migration Review* 22: 32-33.

ISDR, 2006. Extract from the final report of the World Conference on Disaster Reduction (A/CONF.206/6) 18-22 January 2005, Kobe, Hyogo, Japan. Hyogo Framework for Action 2005-2015. International Strategy for Disaster Reduction. 22pp.

ISDR, 2009. Global Assessment Report on Disaster Risk Reduction. United Nations, Geneva, Switzerland. 197 + xiv pp.

INEE, 2006. *Minimum Standards for Education in Emergencies, Chronic Crises and early Reconstruction*. New York: International Network for Education in Emergencies.

Jamaica News Bulletin, 2009. Jamaica making significant progress in most MDG targets. <http://www.jamaicanewsbulletin.com/>

Kambon, A. and L. Busby, 2000. Education and its Impact on Poverty: Equity or Exclusion. Kingston, Jamaica. UNESCO. 53pp

Knight, Pauline 2009. Opening Remarks by Director General Ag. Planning Institute of Jamaica (PIOJ) to Regional Expert Group Meeting on Disaster Risk Reduction (DRR) in the Education Sector 26-27 October 2009. Kingston, Jamaica. (Unpublished)

Kirk, J. 2006. Education in emergencies: The Gender implications-Advocacy brief. UNESCO, Bangkok. 12 + iii pp.

MDG Monitor, 2007. Tracking the Millennium Development Goals: Grenada fact sheets.

MDG Monitor, 2007. Tracking the Millennium Development Goals: Guyana fact sheets.

National Disaster Management Agency, 2007. Grenada. Teaching guide and quiz competitions help enhance preparedness, pp. 12-15. In: Towards a Culture of Prevention: Disaster Risk Reduction begins at school. Good Practices and Lessons Learned. UNESCO-International Strategy for Disaster Reduction. 143 + xii pp.

OCHA, 2008. Situation Report 22-Caribbean Hurricane Season 16 October 2008. Caribbean Hurricane Season Report No. 22. United Nations Office for the Coordination of Humanitarian Affairs. 14pp.

OCHA, 2008. Situation Report 23-Caribbean Hurricane Season 23 October 2008. Caribbean Hurricane Season Report No. 23. United Nations Office for the Coordination of Humanitarian Affairs. 7pp.

OECS, 2005. Grenada: Macro socio-economic assessment of the damages caused by Hurricane Ivan. Organisation of Eastern Caribbean States. 07 September 2004. 127pp.

OECS, 2004. Grenada: Macro socio-economic assessment of the damage caused by Hurricane Emily. Organisation of Eastern Caribbean States. 14 July 2005. 87pp.

Office of Disaster Preparedness and Emergency Management, Ministry of Education and Youth, and UNICEF, 2007. Jamaica. Protecting school children through preparedness and response plans, pp. 83-85. In: Towards a culture of prevention: Disaster risk reduction begins at school. Good Practices and Lessons Learned. UNESCO-International Strategy for Disaster Reduction. 143 + xii pp.

Pantin, D. and M Attzs, 2009. Report of Regional Analysis of Extreme Events. Unpublished paper presented to ECLAC .

Plummer, M. 2001. Assessment of ICT Infrastructure in OECS Ministries of Education, schools and the OERU. Eastern Caribbean Education Reform Project (ECERP) WBS 2500: Electronic Networking. 68pp.

PreventionWeb, 2008a. Cayman Islands. National progress report on the implementation of the Hyogo Framework for Action, 2007-2009. An HFA Monitor update published by PreventionWeb. <http://www.preventionweb.net/english/countries/americas/cym/>

PreventionWeb, 2008b. Jamaica. Interim national progress report on the implementation of the Hyogo Framework for Action, 2007-2009. An HFA Monitor update published by PreventionWeb. <http://www.preventionweb.net/english/countries/americas/jam/>

Quamina-Aiyejina, L. 2007. Gender and education in the Commonwealth Caribbean: An annotated bibliography. Institute of Education Publication Series Volume 3. 242 + ix pp. Published with the support of UNESCO.

Robinson, J.P. 2006. Right to education during displacement. A resource for organizations working with refugees and internally displaced persons. Women's Commission for Refugee Women and Children. 43 + v pp.

Rotberg, R. 2002. The new nature of nation-state failure. *The Washington Quarterly* 25(3): 85-96.

Thompson, K. 2009. Three of 14 millennium goals achieved, five on track. *Jamaica Observer*. 2pp.

Turrent, V. 2009. Last in line, last in school 2009. Donor trends in meeting education needs in countries affected by conflict and emergencies. International Save the Children Alliance. 37 + vii pp.

UNDP, 2004. Regional Report on the Achievement of the Millennium Development Goals in the Caribbean Community. United Nations Development Programme. 75pp.

UNDP, 2008. Jamaica's progress toward the MDGs. United Nations development Programme Jamaica. <http://www.jm.undp.org/millennium-development-goals/ja-progress-toward-the-mdgs/>

UNDP, 2009. Millennium Development Goals. United Nations Development Programme, Barbados and the OECS. <http://www.bb.undp.org/>

UNESCO, 2007. Education counts. Benchmarking progress in 19 WEI countries. World Education Indicators-2007. UNESCO Institute for Statistics, Montreal.145pp.

UNESCO, 2009. Regional overview: Latin America and the Caribbean. Education for All Global Monitoring Report. 19pp.

UNESCO Institute for Statistics. 2000-2008. <http://www.UNESCO.org>.

UN/ISDR, 2005. Hyogo Framework for Action 2005-2015: Building the resilience of nations and communities to disasters. World Conference on Disaster Reduction 18-22 January 2005, Kobe, Hyogo, Japan. International Strategy for Disaster Reduction.

UN/ISDR, 2007. Towards a culture of prevention: Disaster risk reduction begins at school. Good Practices and Lessons Learned. UNESCO-International Strategy for Disaster Reduction. 143 + xii pp.

UN/ISDR, 2007. Gender perspectives: Working together for disaster risk reduction. Good practices and lessons learned. United Nations secretariat of the International Strategy for Disaster Reduction. Geneva, Switzerland. 54 + vii pp.

UN/ISDR, 2008. Gender perspectives: Integrating disaster risk reduction into climate change adaptation. Good practices and lessons learned. United Nations secretariat of the International Strategy for Disaster Reduction. Geneva, Switzerland. 76 + x pp.

UN/ISDR, 2008. Towards national resilience: Good practices of national platforms for disaster risk reduction. United Nations secretariat of the International Strategy for Disaster Reduction. Geneva, Switzerland. 72+ viii pp.

United Nations, 2009. Background note: The interactive thematic dialogue of the UN General Assembly on access to education in emergency, post-crisis and transition situations-caused by man-made conflicts or natural disasters. 5pp.

United Nations, 2009. Concluding remarks by Miguel d'Escoto Brockmann, President of the General Assembly, to the closing session of the interactive thematic dialogue on access to education in emergency, post-crisis and transition situations caused by man-made conflicts or natural disasters. 2pp.

United Nations, 2009. Deputy Secretary-General's remarks to General Assembly thematic debate on the right to education in emergency, post-crisis and transition situations caused by man-made conflicts and natural disasters president. 2pp.

United Nations, 2009. Risk and poverty in a changing climate: Invest today for a safer tomorrow. Summary and recommendations: 2009 Global Assessment Report on Disaster Risk Reduction. 20pp.

United Nations, 2009. Ways must be found to feed young minds, create safe havens for learners, president of UN General Assembly says during debate on access to education in times of crisis. GA/10812 Sixty-third General Assembly Thematic Dialogue on Access to Education. 10pp.

World Bank, 2007. School and work: Does the Eastern Caribbean education system adequately prepare youth for the global economy? Skill Challenges in the Caribbean: Phase I Report. Report No. 38555. 61 + iii pp.

Zapata Marti, R. 2005. The 2004 hurricanes in the Caribbean and the Tsunami in the Indian Ocean. Lessons and policy challenges for development and disaster reduction. *Serie estudios y perspectivas* No.35: 62pp. Sede Subregional de la CEPAL en Mexico.