EXECUTIVE SUMMARY

August 2005

The Economics of Disaster Mitigation in the Caribbean:

Quantifying Benefits and Costs of Mitigating Natural Hazard Losses - Lessons Learned from the 2004 Hurricane Season

INTERNATIONAL COMMUNITY FACING WORSENING NATURAL PHENOMENA

The 2005 Atlantic hurricane season began as the busiest ever recorded. By August 2005, hurricanes Arlene, Bret, Cindy, Dennis, Emily and Katrina killed more than 400 people, destroyed more than 100,000 homes and caused over US$80 billion in damages. For countries like Grenada, Haiti and others, still staggering from hurricanes Jean and Ivan of 2004, the implications of the 2005 hurricanes are alarming. For example, only a part of the 90 percent of entire housing stock and infrastructure damaged or destroyed in 2004 in Grenada has been repaired before the start of the 2005 season. The recent damages will obviously make reconstruction efforts there and elsewhere all the more difficult.

The 2005 hurricane season reinforces the widely held view that the frequency and severity of hurricanes in the region are increasing. So too is the rise in human and economic losses. For example, the financial cost of natural disasters in the Latin American and Caribbean region overall has risen from US$700 million per year two decades ago, to more than US$3.3 billion per annum. This mirrors a global trend. The insurance company Munich Re estimates that the annual cost of natural disasters worldwide has climbed from US$75.5 billion during the decade of the 1960s, to US$659.9 billion during the 1990s. Munich Re recently concluded that 2004 was the most expensive natural catastrophe year in insurance history. The economic losses in 2004 were US$145 billion. Many insurance companies have concluded that these economic losses will increase, due to the combined risks of climate change and the rapid expansion of mega-cities, particularly in developing countries.

These warnings suggest that the unprecedented devastation of 2004, and early indications of a repetition in 2005, are not anomalies but presage longer-term and worsening trends. Clearly, the Caribbean region is especially vulnerable. In the past century, the Caribbean region has experienced over 150 natural disasters, of which more than 130 are linked to hurricanes, tropical storms and flooding. Hurricanes and other events disproportionately affect low-income countries and low-income households. In Haiti, some 2,000 people lost their lives in 2004. In the southern coast of Jamaica, throughout the islands of the Bahamas, and among several other Caribbean islands, the damages to bridges, water delivery systems, roads and others in 2004 were severe to moderate.

The vulnerability of the Caribbean countries due to their geographic location is compounded by the absence of economic diversity, whereby hurricanes and flooding exert economic shocks comparable to other kinds of macroeconomic and other kinds of shocks. Most Caribbean countries are strongly dependent on tourism and small-range of export farm commodities, such as

Main Natural Disasters in the Caribbean (1979-2001)

Year	Country *(Hazard Type)*	Persons Affected	Damage US (000's)*
1979	Dominic *(David and Frederick)*	72,100	$44,650
1980	St. Lucia *(Allen)*	80,000	$87,990
1988	Dominican Republic *(Flood)*	1,191,150	/
1988	Haiti *(Gilbert)*	870,000	$91,286
1988	Jamaica *(Gilbert)*	810,000	$1,000,000
1989	Montserrat *(Hugo)*	12,040	$240,000
1989	Antigua, St. Kitts/Nevis, Tortolla, Montserrat *(Hugo)*	33,790	$3,579,000
1991	Jamaica *(Flood)*	551,340	$30,000
1992	Bahamas *(Andrew)*	1,700	$250,000
1993	Cuba *(Storm)*	149,775	$1,000,000
1993	Cuba *(Flood)*	532,000	$140,000
1994	Haiti *(Storm)*	1,587,000	/
1995	St. Kitts & Nevis *(Luis)*	1,800	$197,000
1995	US Virgin Islands *(Marilyn)*	10,000	$1,500,000
1998	Dominican Republic *(Georges)*	975,595	$2,193,400
2000	Antigua/Barbuda, Dominica, Granada, St. Lucia *(Jenny)*	/	$268,000
2001	Cuba *(Michelle)*	5,900,012	$87,000

*valued at the year of the event.
Source: OFDA/CRED International Disaster Database (EM-DAT) 2002. #USAID/Jamaica 2000, Hurricane Lenny Recovery in the Eastern Caribbean

Incorporating Mitigation into International Development Assistance

Measuring Mitigation …" finds that many of the standard tools currently used by aid agencies to design projects could also be used to assess risk emanating from natural hazards and potential returns to mitigation. These include a variety of tools for economic, environmental and social appraisal, as well as risk and vulnerability analysis and logical framework analysis. In most cases, they are designed to take interacting hazard-risk-vulnerability issues into account. Often, all that is needed is a shift in emphasis when they are being applied or a more explicitly integrated approach that brings individual methods together. There is nothing intrinsically difficult about either appraising natural hazard-related risks or monitoring and evaluating risk reduction activities."

Benson, C. and Twigg, J. ***Measuring Mitigation – Methodologies for assessing natural hazard risks and the net benefits of mitigation – a scoping study.*** ProVention Consortium 2004

bananas, sugar and coffee. Moreover, the relatively narrow geographical parameter of most Caribbean countries means that a single hurricane or severe flooding event affects the entire national territory, exerting measurable negative impacts on Global Domestic Product (GDP), through various channels, including dampened fiscal revenues, loss of employment, loss of foreign direct investment.

Despite the staggering economic effects of hurricanes, most countries and donor agencies have tended to focus on emergency response and reconstruction after events occur. By contrast, developed countries have concentrated on preparing emergency response management plans with mitigation and other forms of risk management, *before* hurricanes occur. Indeed, there is a compelling economic and development argument that investing in disaster mitigation makes more economic sense than concentrating solely in post-disaster reconstruction. Investments that bolster the resilience of buildings, infrastructure and other critical areas are more cost-effective -- by a two-to-one ratio – than expenditures in post-disaster relief and recovery.

Technical plans that anticipate and lower the risks of hurricanes, flooding and other events have been in-place for sometime. These range from increasing hazard mapping and aligning the results of forecasting with better land management and zoning practices; adopting flood management plans that are part and parcel with overall river basin and watershed catchments management plans; adopting relevant building standards and construction codes covering both public buildings such as hospitals, schools, government building, universities, ports and transmissions lines, as well as private housing standards, and crucially, ensuring that those codes are effectively enforced through a range of good governance practices. Indeed, good governance is a key aspect to integrating risk mitigation policies.

PAST EFFORTS

For several years, most donor agencies – including the World Bank, Inter-American Development Bank, the Caribbean Development Bank and others – have supported risk mitigation projects and programs. For example, since 2002, the Caribbean Hazard Mitigation Capacity Building Program (CHAMP) – a CIDA funded project, implemented by CDERA with support from the OAS – has been assisting countries in the region with the development of national-hazard mitigation policies, the creation of appropriate policy implementation programs through a comprehensive hazard mitigation planning framework and the development and implementation of safer building training and certificate programs.

More recently, an OAS-supported FEMCIDI project geared to improve the dissemination of building codes and their enforcement has helped leverage additional funds through the World Bank's International Finance Corporation.

The challenge is to scale-up existing mitigation projects and policies. The technical merits of this challenge are clearly known. The obstacle to scaling-up projects supported by CIDA and other donors is not technical. Rather, it is political. More precisely, it is a failure of key economic decision-makers to recognize the need to increase disaster-mitigation investments as a core economic and development policy priority.

CURRENT EFFORTS

To address this policy challenge, in February 2005, H.E. Ambassador Gordon Shirley, Ambassador of Jamaica to the United States and Permanent Mission to the OAS, conveyed an Ad Hoc Working Group on Natural Disaster Mitigation. Ambassador Shirley requested the OAS Office for Sustainable Development and Environment to coordinate the preparation of a study which quantifies the cost-benefit relationship

between disaster mitigation expenditures and avoided losses in the Caribbean countries.

This report brings together for the first time four international agencies involved in disaster mitigation in the Americas: the Inter-American Development Bank (IDB), International Monetary Fund (IMF), Organization of American States (OAS) and the World Bank.

CONCLUSIONS

The key conclusion of the report is that natural hazard risk management must be integrated into the economic development process and broad economic policy. Mitigation options need to include programs and projects that reduce the vulnerability of priority groups, particularly the poor. Addressing the issue of improving the resilience of critical local infrastructure and production systems essential to national development plans are critical in the context of strengthening democracy, transparency and good governance. Overall, the report makes a compelling economic and developmental argument that investments intended to mitigate the impacts of hurricanes, flooding and other disasters before they occur through resilience-related technical activities are more cost effective than relying solely on post-disaster relief efforts.

The International Monetary Fund concludes that government policy in the Caribbean countries plays an important role in mitigating the impact of natural hazard events through prudent fiscal stimuli within the overall fiscal constraints, the implementation of precautionary mitigation measures and structural reforms in the labor markets and the financial sector. The undertaking of precautionary measures by national authorities could be supported by grants and concessional loans from donors and international financial institutions in this direction. Another key conclusion of the report is that regional programs in a number of areas, including technical standards, the sharing of information, as well as regional insurance polling programs, are timely and merit support of donors.

KEY FINDINGS

1. Natural Hazard Information:
As part of the concept of the public good, there is a need for collaboration and coordination between national government agencies, regional and international development assistance agencies, the private sector, professional associations and the research community in preparing and distributing necessary natural hazard information based on shared hazard type and geographical location priorities. *Implementation Action Example*: In consultation with each economic and social sector, national planning authorities should identify specific priority geographical locations, hazard types and infrastructure types for which natural hazard information will be prepared in a coordinated manner using national, regional and international inputs.

2. Governance and the Support of Technical Norms and Standards:
Develop and implement technical norms and standards for capital projects that define acceptable levels of risk to natural hazard events. This must become an integral part of the development process. *Implementation Action Example*: Under the coordination and responsibility of the public sector, design and implement, with private sector participation, effective enforcement of building design and construction norms and standards, including the detailed articulation of the mechanisms for checking that the appropriate norms and standards are being achieved at the concept stage, the preliminary design stage, the detailed design stage and the construction stage.

3. Housing:
Using existing information, knowledge and expertise, invest in mitigating the vulnerability of existing communities. *Implementation Action Example*: With priority given to poorer communities, and redirecting, as necessary, international public and private community development assistance together with regional research and technical contributions, appropriate entities will identify and carry out pilot projects for small scale community relocation using

"The mistaken belief that Government can do it all results in a high burden on government that is often unfulfilled. Business and community organizations should continually evaluate how capable their governments are to fulfill the important responsibility of facilitating readiness and planning to respond to a catastrophic event. Failure to evaluate this capability and to motivate a 'lagging' government has resulted in needless deaths and very high losses. Blaming an unprepared government after a disaster comforts only the political 'opposition', while leaving victims to fend for themselves[1].

[1]Oliver Davidson, May 31, 2005 speaking ahead of the Caribbean media Exchange on Sustainable Tourism's CMExPress workshop held in Antigua on June 14, 2005.

approaches developed through a regional design competition for community sites of 30-100 houses.

4. Education and Health:
As part of the concept of the public good, assign priority to investment in school and health facility mitigation at all levels by the public and private sector alike. *Implementation Action Example*: Building on pilot experiences and on growing support from the international community, appropriate national entities will complete and/or update infrastructure vulnerability audits of sector infrastructure and prepare retrofit programs for implementation through national and community-based public and private sector projects with international support.

5. Energy, Transportation, Telecommunications and Water and Sanitation Infrastructure:
Place authority and responsibility for investing in mitigation on the owners and operators of vulnerable infrastructure. *Implementation Action Example*: On a sector basis, working through regional intergovernmental organizations supported by IFIs, development assistance agencies and professional organizations, responsible national entities will create and implement, at the appropriate level (authority, company, concession), a program for infrastructure vulnerability assessment, local capacity building, skills training and investing in cost-effective mitigation measures.

6. Agriculture and Tourism:
Support the private sector owners in complementing existing actions on emergency preparedness with support in creating and implementing vulnerability reduction actions for protecting investments and employment. *Implementation Action Example*: On a sector basis, working through regional and national government and sector organizations supported by international specialized development assistance agencies and professional organizations, appropriate national sector entities will coordinate the preparation and dissemination of mitigation guidelines and offer technical assistance to individual entities for their investment programs and business operations.

Office for Sustainable Development & Environment

Organization of American States
1889 F St., N.W.
Washington, D.C. 20006
Fax: (202) 458-3560
http://www.oas.org/osde/
NaturalHazardsProject@oas.org

Inter-American Development | **International Monetary Fund** | **Organization of American States** | **World Bank**

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