CUBA

Weathering the Storm:

Lessons in Risk Reduction from Cuba

An Oxfam America Report

Oxfam America

Acknowledgements

Many people put their effort, time and enthusiasm into this report. Michael Delaney at Oxfam America had the original vision of drawing out lessons from the Cuban experience for organizations in Central America. In Cuba, Oxfam Joint Program representatives Marc Englebrecht and Karen Bernard helped out in many ways, including initial discussions, travel to affected areas and reviews of different drafts. Ruben Ramos from the Ministry of Foreign Investment and Cooperation and José Llanes from National Civil Defense (DCN) gave essential support along the way, including feedback on the drafts. Esther Pérez did an excellent job of translation and was always patient with the demands of our timetable. We are indebted to the program department of the National Association of Small Producers (ANAP), the mass organization representatives in Havana and the provinces, José Castro from the DCN in Cienfuegos and all those we interviewed who weathered hurricanes Michelle, Isidore and Lily. Oscar Andrade and Rene Ramos, Oxfam America staff in Central America, gave freely of their time to discuss and refine the report. Luis Romano and Amado Ordoñez gave their insights on drafts of the document. In Boston, Jennifer Ungemach patiently shepherded this report through all of the stages of production, taking on a multitude of tasks with enthusiasm. Bernadette Orr gave invaluable help with her editing and Jasiel Fernandez provided notable support in the 101 necessary steps to bring this to print. Lastly, the Ford Foundation provided the funding to make the initial vision of this report a reality.

Photo credits: Jennifer Ungemach, Minor Sinclair and Oxfam America archives.
Map courtesy of Latin America Bureau.
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EXECUTIVE SUMMARY

Cuba's achievements in risk reduction come from an impressive multi-dimensional process. Its foundation is a socio-economic model that reduces vulnerability and invests in social capital through universal access to government services and promotion of social equity. The resulting high levels of literacy, developed infrastructure in rural areas and access to reliable health care and other created capital function as "multiplier effects" for national efforts in disaster mitigation, preparation and response.

At the national level, Cuba's disaster legislation, public education on disasters, meteorological research, early warning system, effective communication system for emergencies, comprehensive emergency plan, and Civil Defense structure are important resources in avoiding disaster. The Civil Defense structure depends on community mobilization at the grassroots level under the leadership of local authorities, widespread participation of the population in disaster preparedness and response mechanisms, and accumulated social capital.

Both the United Nations Development Program (UNDP) and the International Federation of the Red Cross and Red Crescent Societies (IFRC) have repeatedly pointed out Cuba as an example for other countries to emulate in risk reduction. As the number of deaths from weather-related disasters continues to rise worldwide, it is increasingly imperative to protect those populations most vulnerable to hazards. Fundamentally, long term national and international strategies of sustainable development are the necessary basis for achieving comprehensive risk reduction for vulnerable populations. With the current absence of that commitment within national and international structures, it is important to explore successful shorter term strategies and mechanisms for risk reduction that can be implemented with limited financial resources by local governments.

The increasingly popular Community Based Disaster Management (CBDM) approach focuses on strengthening capacity and building skills for risk reduction at the community level. Cuba shows us a rare example of successfully building CBDM into a national risk reduction program. Examining Cuba's experience, Oxfam America argues that strengthening community capacity, strong coordination of local actors and investing in social capital are determinate factors for successful risk reduction.

This report hopes to present a comprehensive overview of the Cuban model of risk reduction in disaster mitigation, preparedness, response and recovery and explore what may be adapted from this model in other countries. This report focuses on specific recommendations for Central America. The final section of this report draws out several mechanisms from the Cuban model that might be adapted to Central America based on that region's rich history of grassroots experience in social organization.

Although the report aims for a complete explanation of the Cuban model, it does not pretend to provide an exhaustive review of risk reduction in Central America. The goal of "Weathering the Storm: Lessons in Risk Reduction from Cuba" is to provide information, offer ideas and provoke discussion to improve strategies of risk reduction at the community level in Central America, contributing to a culture of prevention.

I. INTRODUCTION

A. Why study risk reduction in Cuba?

"Cuba's success in saving lives through timely evacuation when Hurricane Michelle struck in November 2001 gives us a model of effective government-driven disaster preparedness. This is all the more impressive when one considers that Cuba, although possessing a strong central… government, is a poor country. What was the secret of Cuba's success?"

— International Federation of the Red Cross (IFRC) Disasters Report 2002 p.28

"About 700,000 people [in Cuba] were victims of Hurricane Michelle, but only four or five died and just eight were injured. In the case of Isidore, only one person was reported dead…. The Cuban methodology of community mobilization is becoming the standard for the whole of the Caribbean in terms of its community based training program."

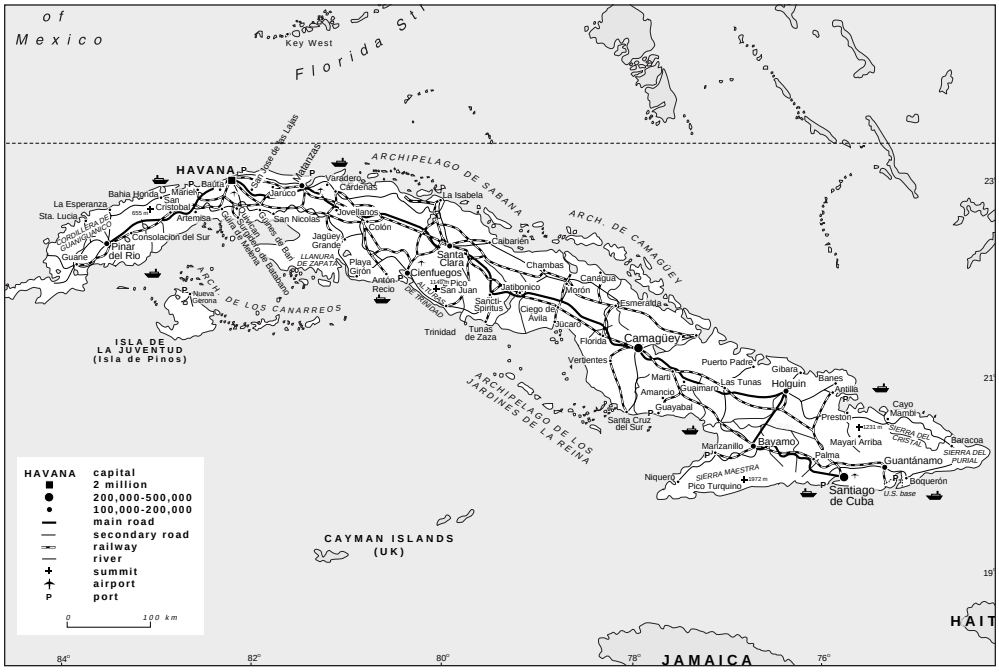
— Xavier Castellanos, Disaster Preparedness delegate at the International Federation of the Red Cross and Red Crescent societies (IFRC), Port-of Spain, Trinidad. April 2003

Cuba is a small and poor country whose geographical location gives it a high and recurrent risk of hurricanes. In the seven years between 1996 and 2002, six major hurricanes have hit Cuba, yet a total of only 16 people have died (see Table 1). By comparison, when Hurricane Isabel hit the mid-Atlantic United States in September 2003, it alone was directly responsible for 22 deaths and indirectly responsible for 6 deaths (AP 2003). The question fairly posed is: What is Cuba doing right in terms of disaster mitigation and preparedness?

There is no "secret" to Cuba's success. Instead, the nation's exceptional dedication of risk reduction incorporation into its structures and risk consciousness can and should be studied for lessons learned and for opportunities to replicate its life-saving strategies. Today, the number of people affected by disasters worldwide is increasing; many of those affected are people from the global south (IFRC 2002, 10). In that light, it is imperative to share strategies and successes in risk reduction among nations whose populations are most affected by these hazards. Cuba's experience is an extremely valuable case from which to extract lessons that can (and have already) reduced the loss of life, even in a world that faces increasingly frequent, violent, and often unpredictable natural disasters.

This report examines the Cuban experience from three angles:

- Analyzing the elements of Cuba's model of risk reduction.
- "Unpacking" the Cuban model to examine its components and their effectiveness.
- Investigating elements that can be cultivated from the Cuban experience and shared with other Southern countries trying to improve disaster preparedness. This report focuses on adapting elements of the Cuban model to Central America, but obviously it is equally possible to adapt elements of the model in many other regions or countries.



Cuba's geographical location makes the country a vulnerable target for disasters. According to the Cuban National Information Agency, between 1985 and 2000, Cuba faced 48 hydro- meteorological phenomenona.

Cuba is affected by several types of hazards: drought, flooding, earthquakes and hurricanes. The National Civil Defense, the DCN by its Spanish acronym, in Cuba has done considerable work on disaster mitigation and preparedness for different types of hazards. However, since hurricanes occur with increasing frequency and severity, affecting hundreds of thousands of people in Cuba each time, the Civil Defense has particularly honed its disaster response to hurricanes. Cuba has a strong well-organized civil defense, an early warning system, well-equipped rescue teams, emergency stockpiles, and other resources (Llanes 2002). One might refer to these as Cuba's "*tangible assets.*"

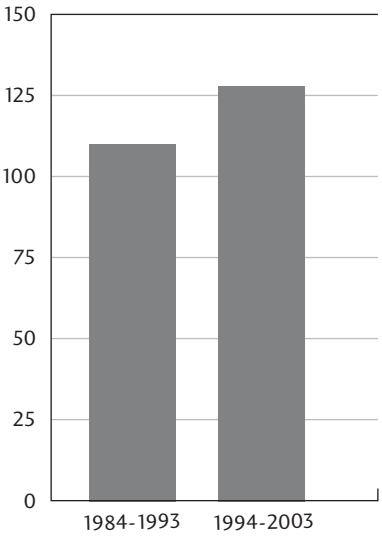
Such tangible assets are impressive, but if they were the only determining factor, then other wealthier countries such as the United States would have lower disaster death tolls. Thus, it is equally important to consider the role played by other "*intangible*" qualities in making the Cuban system work so well. These include community mobilization, solidarity, clear political commitment to safeguard human life, and a population that

is "disaster-aware" and educated in the necessary actions to be taken in event of a disaster. Together, these tangible and intangible elements create a seamless effort that incorporates disaster preparation, response and recovery.

It is common for Cuba's example of risk reduction to be dismissed as unique because of its strong centralized government, with some observers claiming that it cannot be duplicated in other settings. The argument of this paper refutes such claims. Cuba's success can indeed be credited to its government, but also to governance, especially its focus on community mobilization around preparedness. Cuba's efforts, especially in the highly-replicable area of community preparedness, clearly have implications for a wide range of countries and natural disasters.

FIGURE 1
Hurricane distribution in the Atlantic Basin from 1983 to 2003.

Source: National Hurricane Center (NHC)



B. Geography is destiny: Cuba, its Neighbors, and Hurricanes

Hurricane season in the Caribbean officially begins every year on June 1st and ends on November 30th (Acosta 2002). Hurricanes are part of Cuba's geographic destiny; Cuba lies right across the mouth of the Gulf of Mexico, directly in the path of any hurricane aiming toward the Gulf. Hurricanes crossing Central America also often head toward Cuba. Hundreds of deaths have been attributed to hurricanes in Cuba over the years, as recorded in the Cuban national archives (Wisner 2001, 2). According to the National Hurricane Center meteorological records show that hurricanes are occurring increasingly often and with increasing intensity in the Atlantic Basin where Cuba lies. Out of a total of 240 hurricanes from 1983 to 2003 in the basin, 111 occurred between 1984 and 1993 while 129 occurred between 1994 and 2003 (See Figure 1). However, through their development of risk reduction, the Cuban government and people have prevented the recurring hazard of hurricanes from continuing to bring the same disastrous consequences in terms of loss of human life.

TABLE 1
Hurricanes affecting Cuba from 1996-2002[1]

NOTA
*Hurricanes Lili and Isidore passed over the western provinces of Cuba within a period of 10 days. Hurricane damage assessment calculated the two disasters together.

HURRICANE	MONTH / YEAR	CATEGORY	DEATHS	PEOPLE EVACUATED	HOMES DESTROYED	HOMES DAMAGED
Lili	10/2002	2	1	165,830	5,640*	50,855*
Isidore	09/2002	2	0	280,000	5,640*	50,855*
Michelle	11/2001	4	5	712,000	8,700	90,000
Irene	10/1999	1	4	162,664	224	3,000
Georges	10/1998	3-4	6	818,000	2,100	40,000
Lili	09/1996	3	0	200,000	2,922	22,066

Only 16 people have been killed by the six hurricanes that hit Cuba from 1996-2002. These low death rates are especially remarkable when placed into the context of Cuba's

economic crisis, constraints on transportation and other resources, and the almost annual occurrence of a hurricane over the past seven years.

These hurricane mortality rates become even more remarkable when compared with the totals of neighbors in Central America, the Caribbean, and even the United States. 1996 was a record year for hurricanes in the Atlantic Basin as 150 people died throughout the region (NHC 1996). In the same year, at the height of the economic crisis in Cuba, there were no hurricane deaths despite category 3 Hurricane Lili hitting the island in October. When Hurricane Georges hit Cuba in 1998, six people were killed; Georges killed 597 people in the rest of the Caribbean, mainly Haiti and the Dominican Republic (NHC 1998). Table 2 provides a comparison of death rates in Cuba and other countries by hurricane:

TABLE 2
Hurricane mortality rates by country[2]

HURRICANE AND YEAR	CATEGORY WHEN IT HIT CUBA	FATALITIES IN CUBA	CATEGORY WHEN IT HIT ELSEWHERE	FATALITIES ELSEWHERE	TOTAL OF FATALITIES
Lili 2002	2	1	Tropical Storm	Jamaica 4, Haiti 4, St. Vincent 4	13
Isidore 2002	2	0		US 4, Mexico 2	6
Michelle 2000	4	5	Tropical Depression	Honduras 6, Nicaragua 4, Jamaica 2	17
Irene 1999	1	4	1	US 8	12
Georges 1998	3-4	6	3-4	Antigua 2, St. Kitts & Nevis 4, Dom. Rep. 380, Haiti 209, Bahamas 1, US 1	603
Lili 1996	3	0		Honduras 5, Costa Rica 3, Great Britain 6	14
Total of fatalities	15-16	16		649	665

Hurricane Michelle in 2001 is a good example of Cuba's disaster preparedness in action. Hurricane Michelle was one of only seven Category 4 hurricanes of the 240 that have hit the Atlantic basin between 1983 and 2003 (NHC 1983-2003). This was the worst hurricane to affect Cuba since 1944. Hurricane Michelle made landfall with winds of 216 km/hr at the Bay of Pigs on Cuba's southern coast. Traveling north across the island, the storm eventually caused heavy damage to homes (22,400 damaged; 2,800 destroyed), agriculture, industry, and infrastructure in five provinces, including the City of Havana. In all, only five deaths were reported. By contrast, a few days earlier, when Michelle had traveled through Central America as a tropical depression, 36 people were killed or reported missing (Wisner 2001).

As the number of people affected by disasters worldwide increases with the majority of those affected from the global south, it is imperative to share strategies and successes in risk reduction among the populations increasingly most affected by hazards. Cuba's experience thus becomes a valuable case from which to extract lessons.

GUIDE TO THE SAFFIR SIMPSON HURRICANE INTENSITY SCALE FOR CLASSIFYING HURRICANE CATEGORIES

Category One - *A Minimal Hurricane*

Winds 74-95 mph (119-153 km/h)
Storm surge 3-5 ft (1.0-1.7 m).
Damage primarily to shrubbery, trees, foliage, and unanchored homes. No real damage to other structures. Low-lying coastal roads inundated, minor pier damage, some small craft in exposed anchorage torn from moorin.
Example: Hurricane Jerry (1989)

Category Two - *A Moderate Hurricane*

Winds 96-110 mph (154-177 km/h)
Storm surge 6-8 ft (1.8-2.6 m).
Considerable damage to shrubbery and tree foliage; some trees blown down. Major damage to exposed mobile homes. Some damage to roofing materials of buildings; some window and door damage. No major damage to buildings. Coast roads and low-lying escape routes inland cut by rising water 2 to 4 hours before arrival of hurricane center. Considerable damage to piers. Marinas flooded. Small craft in unprotected anchorages torn from moorings. Evacuation of some shoreline homes and low-lying areas required.
Example: Hurricane Bob (1991)

Category Three - *An Extensive Hurricane*

Winds 111-130 mph (178-209 km/h)
Storm surge 9-12 ft (2.7-3.8 m).
Foliage torn from trees; large trees blown down. Some damage to roofing materials of buildings; some window and door damage. Some structural damage to small buildings. Mobile homes destroyed. Serious flooding at coast and many smaller structures near coast destroyed; larger structures near coast damaged by battering waves and floating debris. Low-lying escape routes inland cut by rising water 3 to 5 hours before hurricane center arrives. Flat terrain 5 feet of less above sea level flooded inland 8 miles or more. Evacuation of low-lying homes within several blocks of shoreline possibly required.
Example: Hurricane Gloria (1985)

Category Four - *An Extreme Hurricane*

Winds 131-155 mph (210-249 km/h)
Minimum surface pressure: 944-920 mbar
Storm surge 13-18 ft (3.9-5.6 m)
Shrubs and trees blown down; all signs down. Extensive damage to roofing materials, windows and doors. Complete failures of roofs on many small residences. Complete destruction of mobile homes. Flat terrain 10 feet or less above sea level flooded inland as far as 6 miles. Major damage to lower floors of structures near shore due to flooding and battering by waves and floating debris. Low-lying escape routes inland cut by rising water 3 to 5 hours before hurricane center arrives. Major erosion of beaches. Massive evacuation of all residences within 500 yards of shore possibly required, and of single story residences within 2 miles of shore.
Example: Hurricane Andrew (1992)

Category Five - *A Catastrophic Hurricane*

Winds greater than 155 mph (249 km/h+)
Minimum surface pressure lower than 920 mbar
Storm surge higher than 18 ft (5.6 m)
Shrubs and trees blown down; considerable damage to roofs of buildings; all signs down. Very severe and extensive damage to windows and doors. Complete failure of roofs on many residences and industrial buildings. Extensive shattering of glass in windows and doors. Some complete building failures. Small buildings overturned or blown away. Complete destruction of mobile homes. Major damage to lower floors of all structures less than 15 feet above sea level within 500 yards of shore. Low-lying escape routes inland cut by rising water 3 to 5 hours before hurricane center arrives. Massive evacuation of residential areas on low ground within 5 to 10 miles of shore possibly required.
Example: Hurricane Camille (1969)

http://www.nhc.noaa.gov/aboutsshs.shtml

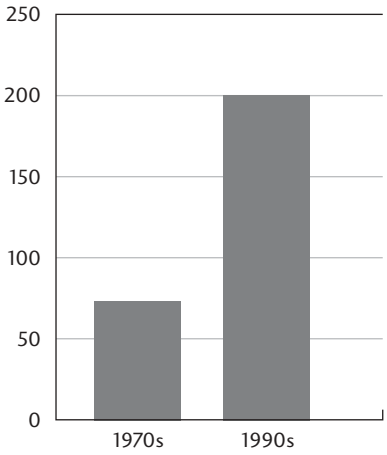
II. THE EQUATION FOR DISASTER

A. The Rising Cost of Disaster

It is not inevitable that hazards become disasters. A formula for disasters, popularized by the International Federation of the Red Cross, posits that only when the population exposed to the hazard is vulnerable is there a risk of disaster. The formula, *risk = hazard x vulnerability*, indicates that just as risk rises with vulnerability, so it can be reduced as hazard or vulnerability are also reduced. Risk reduction is becoming urgently important as both disasters and their generated losses rise rapidly. The average annual number of people affected by disasters during the 1970s was 74 million. That figure rose to an annual average of 200 million per year in the 1990s (See Figure 2), an increase of 65% (IFRC 2002, 9).

FIGURE 2
Average annual number of people affected by disasters. Figures in millions.

Source: IFRC 2002, 9.



B. Hazards and the Risk Equation

1. Increasing Hazards, Climate Change and Extreme Weather

Statistics show that extreme weather -- floods, droughts, earthquakes, cyclones, and abnormal temperature fluctuations -- is on the increase world-wide, creating a corresponding increase in the number of hazards.[3] While flawed development has a hand in increasing disasters (see below), climate change has the potential for a far more drastic effect. Most scientists attribute the climate change that causes extreme weather events to global warming, which they believe to be caused by carbon dioxide released into the atmosphere through fossil fuels combustion. Environmental advocacy groups such as Greenpeace and Friends of the Earth have sounded the warning on global warming for several years. These advocacy organizations were joined in 2003 by a number of key scientific groups including the United Nations Intergovernmental Panel on Climate Change, the World Meteorological Organization (WMO), and the World Water Council, all of which have now linked extreme weather to climate change.[4]

2. Who is Most Vulnerable?

Sadly, those who are most affected by the rising hazards of our time are those least able to cope with them. As Didier Cherpitat, General Secretary of the IFRC has claimed,

"Disasters are first and foremost a major threat to development and specifically a threat to the development of the poorest and most marginalized people in the world. Disasters seek out the poor and ensure that they remain poor."

Who are those most deeply affected and most at risk from hazards? They fall into three categories:

Those geographically located in the global south

There are a substantially higher number of extreme weather events occurring in southern countries, which by virtue of their relative poverty are ill-equipped to respond.[5] In 2001,

the Intergovernmental Panel on Climate Change, a UN agency representing more than 2,000 scientists from around the world, stressed that poor countries in Africa, Asia and Latin America are most vulnerable to the devastating droughts, floods, heat waves, violent storms, and spread of infectious diseases that mark the early stages of global warming.

Populations of poorer countries

Typically, poorer countries have weak infrastructures, limited resources for recovery, and little economic strength. Subsequently they are significantly more vulnerable to hazards and run a higher risk that a hazard becomes a disaster than wealthier countries. Their capacity for recovery is also much less than that of wealthier countries, undermining their efforts for economic and social development. Disasters impact foreign exchange earnings just when that income is most needed; loss of life affects the available human resources. For example, the President of Honduras Carlos Flores estimated that Hurricane Mitch, which killed thousands in 1998, put Honduras' economic development back 20 years (IFRC 2002, 10).

Effects of natural disasters most affect the world's most vulnerable populations. Cuban farmers assess the damage to their farm after Hurricane Lilly swept through the island in 2002.

The most marginalized populations of poorer countries

A given population's vulnerability to hazard usually directly correlates to their social and economic status. Obviously, the poor urban dweller whose house is made of zinc-coated tin sheeting will be more vulnerable to the ravages of a hurricane than the owner of a poured-concrete house. The poor are more likely to be living in marginal areas, such as the edge of flood plains. They have reduced access to services, and often have neither the economic resources to protect their livelihoods from disaster, nor the political resources to access what economic aid for recovery becomes available. Although disasters affect all, it is glaringly obvious that the most vulnerable population continues to be the most marginalized populations of poorer countries (PAHO 1998, 76). Extreme weather makes that vulnerability all the more deadly.

3. Mitigating Hazards

Despite their poverty, countries at risk from a range of hazards are not entirely without options for mitigating or preventing hazards. Experts consider that there are four primary ways to address the weather-related hazard side of the risk equation: physical construction, improved prediction of events, methods to counter climate change, and efforts to counter environmental degradation. While many countries in the south have made concerted efforts in the first two, they have much less control over the last two areas.

Physical construction

Physical or structural elements, such as the building of dams and levees and the construction of mangrove swamps, are lines of defense against disaster. For example, Vietnam's cultivation of mangrove swamps along their shoreline to protect a 3,000 sea dyke system "can reduce 1.5m typhoon waves to centimeter high ripples" (IFRC 2002, 95).

Improved Prediction, Tracking, and Information

Technological progress, international agreements, and regional cooperation in meteorology have made information on hazards more accessible to countries that have few resources for their own national meteorological centers. However, governments must have political will and agree to dedicate resources if they wish to make effective use of this technology. Experience shows it can be done. In Bangladesh, the government, the national Red Cross, and the International Society of the Red Cross have instituted an extremely effective cyclone preparedness program that uses radio networks, battery-powered megaphones, and hand-operated sirens to inform the population about impending cyclones (IFRC 2002, 16).

Methods to Counter Climate Change

While research, studies, and methodology proposals for counteracting climate change are increasingly public knowledge (witness the reports mentioned previously), the political pressure and will to enact those methods are still missing from the equation (Gelbspan 2002).

Countering Environmental Degradation

A country's ability to affect environmental degradation is limited by a complex series of internal factors such as land distribution, land-use regulation, and the role of private industry. Increasingly, government ability to counter environmental degradation is also limited by external factors. These include international financial insitutions' regulations and international trade agreements which reduce countries' ability to regulate the environmental practices of international businesses operating within their borders. Poorer countries are at an economic disadvantage when trying to regulate outside investment.

C. Development and its Impact

Traditionally there was a sharp distinction in the discipline between "natural" and "man-made disasters." That distinction is now blurred as scientists begin to better understand the cumulative increase of impact of people's actions and behavior on the environment. "Natural disasters" are increasingly shown to have some human hand in the composition of both elements of the equation: the hazard itself and population vulnerable to it.

1. The Role of Flawed Development

There is now significant evidence to show that flawed development actually increases "natural disasters" (Von Oelrich 2002). Lack of building regulations and physical planning codes, widespread lack of compliance with them, and/or uncontrolled market forces as the only arbitrator of economic development can all contribute to, exacerbate, or actually cause disasters.

Flawed development can take many forms. For example, unregulated economic development that contributes to or causes deforestation can be said to be fundamentally flawed. This occurs both directly, in the case of logging companies cutting down the Brazilian rainforests for lumber, or as a secondary effect as found in Guatemala, where repatriated refugees relocated to the Ixcan burn down the jungle to clear agricultural land (Trujillo 2000, 61).

Similarly, but less immediately apparent, rapid migration from rural to urban areas and overpopulation can create dangerous overcrowding of more vulnerable areas. Lack of or non-enforcement of building codes often permits construction companies to build houses below safety codes. Scarcity of available, secure, low cost housing or available land leads the poor to build homes on dangerous ravines for lack of better solutions.

Privatization of state resources is another example of how the particular development model chosen affects a state's capacity to provide risk reduction. Once assets are privatized, the state's access to them in order to provide services in times of emergencies is limited by its purchasing ability. When the state no longer possesses the assets, it does not have the "elbow room" to maximize their use for maintenance and mitigation. When state public works departments own their own machines, for example, they can use them for maintenance in less busy periods, since they are already paying salaries and have the equipment available (see box below). Privatization erodes these margins that contribute in less visible but important elements of risk reduction.

AN EXAMPLE OF PRIVATIZATION FROM EL SALVADOR

El Salvador's rainy season makes hundreds of areas in the country vulnerable to landslides and flooding due to poor environmental practices and regulation. In March 2001, the government "reformed" the Ministry of Public Works, downsizing 6,624 employees and selling off all of its heavy machinery to the private sector. It took this action even though the rainy season had regularly demanded a major response by the Ministry. The Ministry is now coordinating an accounting agency to oversee private contracts for all maintenance and public works, for which it has to pay the private sector. This means that the Ministry of Public Work's response to hazards is governed by its budget for contracting machinery (Wisner 2001, 262).

2. How the Cuba Development Model Reduces Risk and Vulnerability

Cuba is unusual in that its socio-economic development model and its disaster response policies combine to substantially reduce its population's vulnerability to hazards. Over the past 40 years, Cuba's socialist government has emphasized social and economic development, prioritizing an equitable distribution of resources, universal access to social services, and a narrower urban-rural development gap (Uriarte 2003, 6). The government is the sole provider of social services, plans and directs the economy, employs the majority, and controls the market. It is a one-party political system. Cubans are

highly educated, with a strongly developed sense of solidarity and social cohesion, extensive experience in mobilization and highly organized through mass organizations, professional groups, and political structures.

Cuba suffered a major economic crisis when the Soviet Union collapsed, losing its principal trade and aid partners and entering a period characterized by scarce resources, lack of hard currency, and limited foreign aid. Today, the country is pulling out of that crisis and the economy shows signs of recovery, but while the population has the basics it needs to survive, there is little excess.

It is remarkable that Cuba's economic crisis has not noticeably increased its people's vulnerability to hazards. While this paper does not pretend to present a thorough analysis of Cuba's socio-economic development model, the following qualities emerge as significant and proven risk reduction measures:

- Universal access to services.[6] Cubans have better access to education, health, and physical infrastructure than the majority of populations in the rest of Latin America. This access reduces the vulnerability of the population as a whole.
- Policies to reduce social and economic disparities. Government efforts to redress socio-economic inequities inevitably reduce vulnerability.
- Considerable investment in human development. 40 years of investment in human capital provides the country with a wealth of trained and available professionals.
- Government investment in infrastructure. These investments in both urban and rural areas minimize the occurrence of uneven development, providing the country with a range of resources for development that can be used in disaster mitigation, preparedness and response.
- Social and economic organization. Cuba's particular forms of social organization promote solidarity, cohesion and cooperation, creating social capital that can be applied to risk reduction.

These last three elements of the development model all produce "multiplier effects" that enhance risk reduction in a variety of ways. To illustrate, consider the following facts: 95.9% of the population is literate and able to access educational materials about disasters; all children go to school until grade 9, meaning they are exposed to school curricula as a key vehicle for education about disasters; there is an adequate road system all over the country, which facilitates speedy evacuation; building codes are enforced, reducing the element of highly-vulnerable new construction. In addition, 95% of the households in the country have electricity, so people can receive information about disasters from television or radio (Reinmuller 2002, 2).

Just as "flawed development" increases vulnerability, these aspects of the Cuban development model reduce vulnerability and multiply risk reduction efforts.

D. Returning to the Equation: Mitigating Vulnerability

Clearly, climate change is the runaway driver of weather-related disasters in the world today. The attempts to slow or impact the growing severity of weather hazards are complex, and mired in political struggles (as witnessed in the political maneuvers in the Kyoto Accords.) Ross Gelbspan, the author of *The Heat is On: the Climate Crisis, the Cover Up, the Prescription*, is realistic on how long it will take to slow down, let alone reverse, climate change:

> *"Long term efforts to slow down climate change are related to countries and industries making a dramatic switch to using energy from sources other than fossil fuels. This requires enormous transformations in social and economic global systems. At best, this change will take several decades, at worst it will not happen fast or comprehensively enough to slow down the increasing occurrence of extreme weather events (2003, 6)."*

While the extreme weather that causes hazards is increasing, short term intervention to mitigate hazards has a limited effect. Returning to the "disaster equation," *risk = hazard x vulnerability*, it is clear that reducing risk in the short and medium term in today's world means reducing the vulnerability of that population (CRID Biolides 1999, 11).

The Secretary General of the World Meteorological Organization (WMO), Prof. G.O.P. Obasi focused on this point in his address to the World Climate Change Conference on Sept 29, 2003, in which he urged countries to "increase their resilience to the extreme events that put citizens in jeopardy and destroy years of economic growth." The 14th WMO Congress in May 2003 initiated a new cross-cutting program that emphasized prevention and management of risk rather than disaster recovery.

It is precisely in the areas of prevention and risk management that the Cuban experience has the most to offer. The next section of this report will examine the Cuban risk reduction model in detail.

III. THE MULTI-DIMENSIONAL NATURE OF RISK REDUCTION IN CUBA

A. Introduction

Cuba's risk reduction model is multidimensional in nature, with a wide scope and multiplicity of complementary elements. These range from disaster mitigation legislation to the development of a culture of safety to community mobilization. All these components work extremely well together to reduce risk. The Cuba risk reduction model incorporates all of the areas of the risk reduction cluster as outlined by the International Federation of Red Cross and Red Crescent Societies, the IFRC. [7]

- Social and Economic Development
- Climate Change Adaptation
- Disaster Mitigation
- Disaster Preparedness
- Disaster Response
- Disaster Recovery

Cuba's experience shows that working on these six areas simultaneously adds up to more than the sum of the whole, as the actions in each area overlaps to enhance the end result, which is to optimize the level of risk reduction for the population in an emergency. This experience is true for any government or governing entity.

It is worth unpacking the Cuban model to look at its elements to see which can be combined in other configurations in different contexts. The Cubans have consistently built up their social capital to strengthen risk reduction, and have done this in times of rigorous economic scarcity. Their example raises the distinct possibility that life-line structures (concrete, practical measures to save lives) might ultimately depend more on the intangibles of relationship, training, and education than on high cost procedures and resources, a possibility that holds great hope for other poor countries facing high risks of disaster. Although this paper is about risk reduction in Cuba, especially in response to hurricanes, it also examines which components or combination thereof can be abstracted and adapted in other situations for other emergencies. At the end of the International Decade for Natural Disaster Reduction, there was global consensus on the crucial importance of orienting disaster prevention and mitigation work towards multiple hazards, not just one type of event (Wisner 2001, 255).

1. Tangible Assets in Risk Reduction: National Structures and Community Resources

The Cuban government has developed a series of assets for risk reduction at the national level: research institutions, the Cuban Institute of Meteorology, (the Spanish acronym is ICM) the National Civil Defense (DCN), disaster legislation and media. José Llanes of the DCN explains that these assets, along with other resources, provide a tangible framework for risk reduction. The flesh on the skeleton of this national-level framework is the impressive organization and mobilization around disasters at the community level in Cuba. The Cuban civil defense system is as much a *concept of organization* as it is a system of measures and procedures. It builds on the existing assets of political and institutional leadership to mobilize the grassroots, assigning roles in risk reduction to people in all sectors of community.[8]

In addition to specific assets for work on disasters, there is a political commitment at all levels of government to allocate all resources at hand for the preservation of life in emergencies. This allows the Cubans to make use of any and all available resources, such as using local schools as evacuation shelters, securing boats and buses for evacuation purposes, or tapping the ham radio association as a communications network. This combination of creating tangible assets and making the most of resources at hand increases the assets that the government brings to risk reduction efforts.

As already mentioned however, tangible assets alone do not automatically reduce the vulnerability of a population. It is essential that people have guaranteed access to those assets in times of hazard. Cuba's overall model, which seeks to promote equity through universal access to services and government support systems, is especially effective at maximizing its assets to reduce vulnerability.

2. The Importance of Governance

Governance, whether it is national or municipal, plays a determining factor in terms of building risk reduction; a clear political commitment by public authorities to safeguard human lives is absolutely fundamental to success. All other efforts, such as mobilization of resources, creation of structures and legislation, and education of the population about risk are secondary to the most basic commitment of saving lives.

Dr. Ben Wisner, a specialist in risk reduction, has shown special interest in how different forms of governance affect risk reduction and disaster preparedness. After Hurricane Michelle's devastating sweep through Cuba in 2000 resulted in only five fatalities, Wisner emphasized the need for a more systematic study of governance's role in enhancing risk reduction.[9] He drew up the so-called "golden dozen"- twelve key features of good governance in risk reduction (see box) including both tangible and intangible assets, all stemming from public authorities' fundamental political commitment to safeguard human life (Wisner 2001). This argues that good governance for risk reduction is also an approach or political mindset that is fundamental to making the rest happen.

"GOLDEN DOZEN"

- social cohesion and solidarity (self-help and citizen-based social protection at the neighborhood level)
- trust between authorities and civil society
- political commitment to risk reduction
- good coordination, information-sharing, and cooperation among institutions involved in risk reduction
- attention to the most vulnerable population
- attention to lifeline structures (concrete procedures to save lives, evacuation plans, and so on)
- investment in human development
- an effective risk communication system and institutionalized historical memory of disasters, laws, regulations, and directives to support all of the above
- investments in economic development that explicitly take potential consequences for risk reduction or increase into account
- investment in social capital
- investment in institutional capital (e.g. capable, accountable, and transparent government institutions for mitigating disasters)

3. Intangible Assets, Building Social Capital

Good governance for risk reduction produces intangibles (social capital) that can range from cooperation among provincial and municipal entities to the development of community solidarity and cohesion. Tangible assets can be compared to the physical structure of a machine. The machine needs oil to work well and run at maximum efficiency. That oil is the social capital which brings the national structures and community organization at the grassroots to work together. Governmental investment in building people's skills and organizational abilities, fostering of cooperation and solidarity, rewarding discipline and responsibility, and emphasizing building cooperative working relationships may be hard to quantify. However, its worth is amply demonstrated when 700,000 people are safely and speedily evacuated in the space of 48 hours in a country with very limited financial resources (See article quoted on page 43).

The remainder of this chapter examines four central elements of risk reduction: disaster mitigation, disaster preparedness, disaster response and recovery. Each sub-section looks at Cuba's experience in terms of national structures, community organization, and tangible assets, along with the relevant aspects of governance for risk reduction and the social capital or intangible assets that make it all flow.

"More effective prevention strategies would save not only tens of billions of dollars, but tens of thousands of lives. Funds currently spent on intervention and relief could be devoted to enhancing equitable and sustainable development instead, which would further reduce the risk of war and disaster. Building a culture of prevention is not easy. While the costs of prevention have to be paid in the present, their benefits lie in a distant future. Moreover, the benefits are not tangible; they are the disasters that did not happen."

Kofi Annan,
Secretary General of the United Nations.
1999 Annual Report on the Work of the Organization of the United Nations

B. Disaster Mitigation

1. National Level Resources for Disaster Mitigation

The Cuban government has put a number of national institutions and mechanisms in place for disaster mitigation in the case of any emergency. These institutions and mechanisms are quite comprehensive and not limited to mitigating hurricanes. Several entities that contribute to disaster mitigation, such as the Institute for Physical Planning, are also part of the vision of sustainable development in the country. Their efforts correspond to several important aspects of good governance for risk reduction cited in the "golden dozen." The most fundamental of these is the political commitment on the part of the government to safeguard human lives, but other key aspects of good governance demonstrated in disaster mitigation in Cuba are:

- The laws, regulations and directives that specifically address disaster mitigation, preparedness and response.
- Investments in economic development that explicitly take potential consequences for risk reduction or increase into account. To be effective, the commitment to regulate and enforce planning for physical vulnerability has to extend to economic development.
- Investment in institutional capital (e.g. capable, accountable, and transparent government institutions for mitigating disasters). Land use regulations, building codes and hazard-proof infrastructure are key to disaster mitigation. Once they are on the books, they are only effective if there is government commitment to their enforcement.
- Investment in human development and institutional capacity for research on hazards and research reduction is critical.

a. Legal Framework

Cuba's legal framework is one of its key assets in risk reduction. The country's disaster mitigation, preparedness, response, and recovery measures and structures are enshrined in law, and those laws are enforced. The most important legislation approved the formation and organization of the Cuban National Civil Defense (DCN) in 1966. A 1976 mandate requires that all adult citizens receive civil defense training. More recently (in 1994), National Defense law 75 was passed. In 1997, Legal Decree 170 was passed to complement the important 1976 law. Legal Decree 170 specifically describes the goal of protecting the population, the economy, and the environment from the destructive effects of natural disasters and other types of catastrophes through a combination of prevention, preparedness, response, and recuperation.

In sum, the legal framework sets up a blueprint for prevention, mitigation, preparation and action in times of emergency. The High Command of the Cuban National Civil Defense is charged by law with overseeing Cuba's compliance with measures of civil defense and all relationships with international aid and cooperation in times of disasters. The laws, particularly legal decree 170, detail the role of the ministries, social

organizations, and all public entities in case of emergency, including the use of their resources. The law also defines the four phases of emergency mobilization: information, alert, alarm, and recovery.

Finally, the laws define a centralized decision-making structure during the emergency: the High Command of the National Civil Defense in consultation with the President of the Republic through the Minister of the Armed Forces. These laws also lay out decision-making (the enactment of different phases and measures) by local authorities when circumstances so require.

ALPHABET SOUP	
DCN *	National Civil Defense
IPF *	Physical Planning Institute
INV *	National Housing Institute
ICM *	Cuban Meteorological Institute
IFRC	International Federation of Red Cross and Red Crescent Societies
UNITAR	United Nations Institute for Training and Research
NHC	National Hurricane Center
UNDP	United Nations Development Program
UNEP	United Nations Environmental Program
WMO	World Meteorological Organization
MINVEC *	Ministry of Foreign Investment and Cooperation
FMC *	Federation of Cuban Women
ANAP *	National Association of Small Producers
PADRU	Pan American Disaster Response Unit

* Acronyms according to name in Spanish

"Legislating Protection"

1966
Legislation passed to organize the Cuban National Civil Defense.

1976
Mandate requires all adult citizens to receive civil defense training.

1994
National Defense law 75 is approved.

1997
Legal Decree 170 is passed.
Legal Decree 170 specifically describes the goal of protecting the population, the economy, and the environment from the destructive effects of natural disasters and other types of catastrophes through a combination of prevention, preparedness, response and recuperation.

b. Physical Planning and Land Use Regulations

Physical planning and land use regulations have been created in the Cuban legal system and are firmly embedded in governmental structures. The Institute of Physical Planning (IPF) and the National Housing Institute (INV) are two government institutes in the Ministry of Planning whose work addresses hazard resistant planning and reducing physical vulnerability in all construction and physical planning projects in the country.

The Institute of Physical Planning (IPF) The IPF is in charge of formulating, implementing, and monitoring physical planning policies as well as creating the corresponding regulations and measures. The goal of IPF's physical planning policies and regulations is to reduce the technical vulnerability of physical structures. Any national or international individual or entity planning to build anything – be it a store or a dam– needs IPF approval before construction begins. The plans must fulfill the Institute's cri-

Infrastructure planning is critical for risk reduction. Today, Cubans use more retractable greenhouses (bottom photo) than permanent structures (top photo) to prevent hurricane damage. Hurricane Michelle passed over all of these structures; the retractable greenhouses survived as they took hurricane risk into consideration.

teria for reduction of technical vulnerability. Once the IPF approves a project, it is also responsible for monitoring its development. In addition, the IPF designates the levels of risk for settlement of coastal areas, riversides, hillsides, etc., which determine whether or not populations may occupy them (Gaviria 2003, 13). A clear priority for human safety is placed over unbridled economic development.

A special physical planning commission within the IPF is designated to manage land use, natural resources, and economic and environmental transformations in areas of high vulnerability. The commission's work led to a 1995 agreement to decrease the vulnerability of high risk areas in Havana by protecting aging structures and raising new construction above sea level (Jorge 2003).

National Institute of Housing (INV) The INV leads housing construction in the country. Once a disaster hits, the INV coordinates with the provincial and municipal authorities, the Civil Defense, and the Ministry of Economy and Planning to evaluate residential damages. The Institute decides which houses need to be rebuilt, which should be structurally strengthened, and which repaired (Gaviria 2003, 14). INV municipal and provincial employees design a working plan for every house affected, allocating the distribution of the scarce resources. Unfortunately, the scarcity of building materials severely limits initiatives by the Institute and other authorities to improve structures.

c. Measures to Prevent Overpopulation of High Risk Areas

The global south's rapid urbanization in the past few decades translates into large numbers of poor people living in high-risk areas (PAHO 1998, 7). Cuba has historically addressed this issue by developing rural areas and making services accessible enough to slow the population from migrating and overwhelming the cities. Government commitment to rural development was a fundamental objective of revolutionary policy in 1959, and development in the countryside has dramatically improved over the past forty years (Sinclair and Thompson 2000, 15). Government policy also seeks to create

SAVING HISTORIC BUILDINGS

"Old Havana's beautiful 16th to 19th century buildings draws many tourists and is a source of pride for local residents. However, many of these architectural gems also suffer from age and neglect. While there is an excellent restoration program transforming these old buildings, the task is enormous and painstaking, and it is difficult to keep pace with the passage of time. In every tropical storm, several buildings or part of those buildings in Old Havana collapse, and their inhabitants are relocated to municipal shelters. On good days, an average of two buildings suffers from some degree of crumbling.

Old Havana is one of the most physically vulnerable areas of the high risk area of Havana. If it were to suffer a major hurricane, the damage to the physical structures and the resulting social impact on the densely populated area would be devastating. As it is the nerve center of tourism in Havana, the economic losses would be equally devastating.

In order to monitor this situation more closely and avoid loss of human life, the municipal government, in coordination with the United Nations Development Program (UNDP), has developed an impressive Geographic Information System (GIS) to evaluate and monitor the vulnerabilities in the area. Completed in 2002, it has proved to be quite useful to monitoring events in Old Havana. Thanks to the map, the municipal government can systematically update any changes that take place in the community. The maps can demonstrate multiple variables simultaneously, e.g., the number of single-mother households with more than three children housed in questionable structures. All changes, structural collapses, and degradations from weather are immediately recorded in the GIS.

A risk-reduction initiative linked with the GIS project has opened and staffs an emergency response office in the heart of Old Havana. It serves as the Civil Defense headquarters there and is equipped to respond to emergencies 24 hours a day."

Interview with Jorge Jorge and members of the municipal government of Old Havana in April 2003.

employment opportunities for professionals in the countryside so that sons and daughters of rural farmers who gain education and professional degrees have the possibility of obtaining professional employment in their home areas.

The government closely monitors high risk areas in the country with existing population. Levels of risk in these areas are periodically measured and evaluated. According to the High Command of the National Defense, 2,137,000 of 11 million people in Cuba are classified as "vulnerable population living in high risk areas," as shown below in Table 3 (Acosta 2002, 2).

TABLE 3
Vulnerable Population in Cuba.

NUMBER OF PEOPLE	HAZARD TO WHICH THEY ARE VULNERABLE
902,000	Dams or reservoirs breaking or overflowing
650,000	Partial or total collapse of residence/building
540,000	Flooding
45,000	Mudslides
Total: 2,137,000	

With the constant threat of hurricanes, the National Civil Defense pays particular attention to communities that are classified as vulnerable to costal flooding. Special attention is given to those situated less than one meter above sea level or within 1000 meters of the sea.

d. Research and Work on Climate Change

Cuba began work on climate change in 1991, when the government formed the Cuban National Commission on Climate Change to do a preliminary assessment of potential climate change impact in Cuba. The UNDP initially supported the development and presentation of the subsequent Cuban report on climate change to the Inter-Governmental Panel on Climate Change. The original commission evolved into the National Group on Climate Change organized by the Cuban Institute of Meteorology. The group includes representatives from various ministries. Along with the UNDP, the United Nations Environmental Program (UNEP) has also supported Cuba's work in research risk management and adaptation to climate change. In 1994, Cuba ratified the United Nations Framework Convention on Climate Change (INSMET 2001).

The Cuban Institute of Meteorology (ICM) The Ministry of Science, Technology and the Environment's ICM monitors, detects, investigates, tracks and disseminates information about developing meteorological change, including hurricanes and sea conditions (Rubiera 2000). As part of the World Meteorological Organization's (WMO) Region IV, the staff at the Cuban Institute for Meteorology work on hurricane issues with the Region IV's central office, the U.S. National Hurricane Center in Miami, as hurricanes that threaten Cuba are often on their way to the United States (Sims and

Vogelman 2002, 396). The ICM also researches the phenomena of climate change and extreme weather.

Apart from its national work on hazards, the ICM also plays an important regional role through the Caribbean Risk Reduction Network. In 2001, the UNDP supported the formation of the Caribbean Risk Reduction Network through the Havana Initiative.[10] The network provides "a collaborative framework to increase the capacities of the region in the area of risk management and to mobilize resources for initiatives that help reduce the vulnerabilities of the countries in the Caribbean region to the serious risks and effects of climate change, climate variability and natural hazards (CRMN 2001)." The ICM has been designated by the United Nations Institute for Training and Research (UNITAR) as its regional associate to build training and research capacity in the region (INSMET 2001).

National Civil Defense Research Program Cuba has a range of research centers, many whose work impacts disaster mitigation for a wide range of hazards. The Scientific Technical Special Program of the Civil Defense managed by the Ministry of Science, Technology and Environment conducts specific research on improving protection measures for the economy and the population from natural and technological dangers. Its work mapping risk and vulnerability related to hurricanes includes risk and vulnerability assessment for coastal flooding using Geographic Information Systems (GIS). The DCN Special Technical program works with many of the main research institutes in the country, and with government entities at national and local levels (Gaviria 2003, 14).

2. Disaster Mitigation at the Community Level

a. Developing a Culture of Safety

Interviewees for this report ranged from topic experts to everyday citizens. Regardless of their role, everyone was clearly aware of what measures and procedures they needed to follow in case of a hurricane. They knew the stages of emergency warning, where to get information, how to secure their house, and where they would go for shelter if they needed to evacuate. A belief that the government would prioritize people's safety prevailed. The Cuban population clearly has developed a "culture of safety." Many Cubans with whom we spoke saw themselves as actors with important roles to play in preparation and response. Education and training, a culture of mobilization and social organization, and a basic trust in the government to prioritize human life in an emergency situation promote this vision.

"Any child in school can give you an explanation:, how you prepare, what you do. Students, they know what to do, they know the phases, what to do in each phase…how to gather things in the house and put them away… shut off the water and electricity. All students, workers and campesinos get this training."

Mr. José Castro, Secretary of the Commission of Evacuation and Students in the Civil Defense of Cienfuegos, Interview March 2003.

The major keystone for risk reduction, political commitment to the preservation of human life, provides a basis for creating a level of trust between the government and the population in times of emergency. Beyond that basic level of trust, the population has to have confidence that essential systems do function, and necessary resources (such as an emergency warning system, transport for evacuation, shelters, and medical care) do exist. For a population to work on reducing their own hazard to risk, they need to be aware of what those systems are and how to access them (Villegas Mejia 2002, 7). These are major elements in building a culture of safety.

Cubans start learning about disaster preparedness at a very early age. School children receive instructions on what to do in case of a disaster.

b. Education

Cuba has invested a great deal in raising people's awareness of disaster preparedness and response. Disaster preparedness, prevention and response are part of all school curricula, and in many disciplines are included in university curricula (Llanes Guerra 2003). Since all Cuban children attend school through the ninth grade by law, the schools play a major role in mass education on risk reduction. Teaching materials, such as the excellent Cuban Red Cross resources, can be easily accessed. Outside of the education system, there is routine training on risk reduction in institutions and workplaces. The media runs programs and broadcast messages about risk reduction, disaster mitigation and disaster preparedness. Family doctors[11] teach practical risk reduction in disaster-related health issues as part of a prevention-oriented grassroots approach to public health. The annual meteorological exercise and updates of emergency plans (explained in the next chapter) are important education and training tools for raising people's awareness and helping to build a culture of safety (Union Radio 2003).

c. Community Organization and Social Capital

Cuba is a society with an impressive degree of social mobilization and social organization. People may have membership in several mass organizations, such as the Federation of Cuban Women (FMC), student organizations or their local Committee for the Defense of the Revolution (CDR).[12] In any given month, different configurations of neighbors will have meetings with the family doctor, the CDR, the FMC or their representative from local government. Neighborhood issues and problems are raised and discussed, information is passed and neighborhood actions are organized in these meetings, such as the monthly CDR-organized neighborhood clean-up sessions (Uriarte 2002, 18).

Cuba's community cooperation and leadership draws on human resources such as family doctors and local school directors whose presence is a result of Cuban socio-economic model's investment in human development. Concurrently, Cuba's disaster mitigation is strongly reinforced by the social capital of its closely knit social organization.

This social organization builds knowledge and creates cohesion among different groups and actors at the neighborhood level that in turn weaves a net of relationships. Just as in the example on the following page from Mozambique, the relationships formed in the daily functioning of the Cuban system build networks of knowledge and familiarity which strongly enhance cooperation in times of emergencies.

C. Disaster Preparedness[14]

It would be hard to be taken by surprise by a hurricane in Cuba. When a hurricane blows out of the Eastern Caribbean towards the island, suddenly it becomes the currency of everyday conversation. People are tuned in to the radio or the television. They are informed, aware, and knowledgeable about the role they need to assume if there is an emergency. Clearly this level of disaster preparedness among the population has a solid foundation in the disaster mitigation strategies outlined in the previous section.

The same elements— good governance for risk reduction, national structures, community organization, and the construction of the intangible assets of social capital are all present in Cuba's disaster preparedness, but they are configured differently, as shall be examined more closely below.

BUILDING ON COMMUNITY ORGANIZATION AND SOCIAL CAPITAL MAKES A DIFFERENCE

A case study from the IFRC's 2002 Disasters Report, "Reducing Risk," studies the intangible results of using a *"livelihoods approach"*[13] in Maputo, Mozambique when the city suffered devastating floods in 2000. An existing project using the livelihoods approach already had been implemented in the same area, and according to interviews quoted in the report achieved the following:

"This project was focused on reducing poverty, by building links between the local residents, municipality, private sector, government, university and NGOs. These links effectively created social and political assets, and were instrumental in the setting up of mechanisms within the municipality to coordinate development support for poor neighborhoods. Significantly, during a recent review, municipal officials, the district administrator, and residents said that the relationships built up during the livelihoods project also strengthened their ability to respond to the disaster...Within this approach, disaster mitigation is, in effect, the act of building up tangible and non-tangible assets to reduce vulnerability (IFRC 2002, 32)."

1. National Structures

a. The National Civil Defense (DCN): Reliance on Local Government Leaders

As already discussed, the Cuba's National Civil Defense is unique in its combination of national structure and grassroots organization. While the DCN is clearly a national institution with personnel and infrastructure, it is also a system of measures and procedures, a concept of organization in which the entire population participates. Both are enshrined in law as the national, comprehensive structure to mobilize the entire country in case of threat, including national disasters, emergencies or invasions (Llanes Guerra 2003).

The DCN's High Command of the Civil Defense directs the institution and implements all risk reduction measures and procedures in case of hazards. When there is an impending hazard, the Joint Command of the DCN advises the President of the Republic through the Minister of the Armed Forces when to announce the phases and what measures to implement. Once the hazard is imminent, the Joint Command of the Civil Defense constitutes the National Control Center in Times of Emergency, relying on its structural base, personnel, and the participation of specialists from various organizations to put in place the necessary measures throughout the emergency. The Civil Defense uses information obtained from the Cuban Institute of Meteorology and other professional bodies to initiate the early warning system. The DCN oversees the media's continual broadcast of storm warnings, evacuation messages, measures to be taken and other emergency bulletins for all the population (Castro 1994).

Many countries have a national civil defense institution. What makes the Cuban structure so unusual is its organizational concept: it builds on the provincial and municipal leadership and administrative structures already in place. By law, all the heads of provincial assemblies and municipal governments are the provincial and municipal Civil Defense directors in charge of organizing, coordinating, and monitoring all the work related to prevention, mitigation, emergency response and reconstruction in their area. Their centers of operation are the provincial, municipal, and zonal centers for the Civil Defense (Castro 1994). This creates both a centralized decision-making process, which is key for emergency situations, alongside a decentralized implementation process, providing the agility and adaptation equally necessary for effective emergency preparedness and response.

In practice, the head of the Civil Defense in any given province or municipality is someone closely familiar with how government works in that province. It also means that local groups are taking orders from someone familiar to them, not a stranger brought in for the duration of an emergency. In the event of an emergency, all heads of workplaces, hospitals, schools or businesses assume their responsibilities to direct their staff in carrying out civil defense measures. For example, in a soft drink factory in Havana, the director of the factory is responsible for the civil defense. In an emergency, he oversees the implementation of civil defense measures within the factory and coordinates with the head of civil defense of his industrial zone. In Cuba, the structures that run everyday life are the structures also used for implementing civil defense measures.

b. Early Warning and Communication

Cuban law charges the ICM with the responsibility of providing the Civil Defense with meteorological information. With a source of scientifically reliable information, Cuba has developed an effective communication system for disaster preparedness that emphasizes the following:

- a clear structure to decide which actions in disaster preparedness and response actions should be taken
- political will to act on and disseminate that information to the general population through designated public communication channels[15]
- a clear, consistent, easily-understood packaging of information on the progress of the hazard and measures to take to safeguard life
- alternative systems of communication if the power lines are affected by the hazard

Packaging information about the emergency in a clear, easily recognized format is a simple but important aspect of disaster preparedness in Cuba. For each of the four stages in a national emergency (information, alert, alarm, and recovery), there are clearly specified instructions about what measures to take and what to expect. The whole structure of disaster response is consistently packaged in these four stages. Because of this consistent, systematic framing of the emergency message, everyone from the provincial head of Civil Defense to a school child on a rural cooperative knows those four stages of an emergency. Better yet, they know what to do in each case.

2. Bringing disaster preparedness to life in the community

In Cuba's disaster preparedness work, there is even more emphasis on critical activities at the community level than nationally. The Cuban model of risk reduction is heavily weighted on strengthening the grassroots understanding of and participation in the procedures and measures of civil defense in times of emergency (Llanes Guerra 2002, 3). This reliance on local leadership optimizes knowledge, strengthens social cohesion, and enhances participation at the community level. In order to make this local leadership effective in risk reduction, the government invests in the development of skills in disaster preparedness. One of the most effective methods of cultivating those skills in the population has been promoting their participation in emergency planning, risk mapping, and simulation exercises at the neighborhood level and in the workplace.

As already discussed, the Cuban population is educated in disaster preparedness through media messages, the Cuban Red Cross and formal education in school all of which form part of the national effort to create a "culture of safety." In addition to these efforts, there are three community-level exercises in which there is widespread popular participation, involving a significant number of the population in direct practice and training for emergency preparedness. These three educational exercises are: community risk mapping, annual updating of the emergency plan, and the national simulation exercise.

a. Community Risk Mapping

Risk mapping in Cuba is done at every governmental level, as well as at the community level, and it is done by people who live in the neighborhood, such as the family doctor or the representatives for the mass organization. Risk mapping ranges from the mega-projects mentioned above (e.g., assessing the vulnerability of populations living in high risk areas) to the GIS mapping of high-risk buildings in Old Havana. However, it is the meticulous, on-going risk mapping at the community level by community members that functions as the mortar in Cuba's wall of risk reduction.

A discussion with a neighborhood representative from the Cuban Women's Federation (FMC) in a district of Havana demonstrates the effectiveness of this strategy.

> *"I am responsible for this part of the neighborhood,"* she explained briskly. *"If a hurricane hits, I know that inside one multi-family unit is an old woman in a wheelchair, who is going to need help to leave. I have 11 single mothers on second and third floors of apartment buildings with children under two who will need more support to evacuate and special needs in the shelters. I have two pregnant women, one on that block and one on this one, who will need special attention."* [16]

Her testimony also demonstrates how the FMC guarantees that vulnerable women's special concerns are identified and addressed in community work around disaster preparedness and response.

This is risk mapping for vulnerabilities at its most basic level. It is not complicated, rather, it is a simple census of who would need additional help for evacuation and who could be assigned to provide that help, enhanced by the fact that the FMC delegate

PREVENTING DISASTERS

- COMMUNITY RISK MAPPING
- UPDATING EMERGENCY PLANS
- NATIONAL SIMULATION EXERCISE

Single mothers are assisted in the evacuation process.

knows those people as neighbors. Building this community knowledge into the planning system for emergency preparedness makes the system extremely effective.

Attentive neighbors listen to instructions from Civil Defense. Community cooperation with government policies is a key factor in reducing risk for vulnerable populations.

As part of their everyday responsibilities neighborhood organizations and actors track the population in the neighborhood. The CDR keeps a running tally of the households in the neighborhood as part of their community census; it includes which houses are vulnerable to hurricane damage and which can act as shelter. The FMC representative keeps track of the women in the neighborhood, including those who are vulnerable or need special assistance, the family doctor keeps track of people who are ill or have special physical or psychological needs. When the time comes to update the emergency plan, the CDR collates this information from the relevant actors and puts it into the emergency plan. When a hurricane or disaster is imminent, the community risk mapping is revisited by the same people and brought up to date.[17]

b. Updating the Emergency Plan

All the information gathered in risk mapping, from the national to the community level, is used to update Cuba's emergency plans every year. The emergency plan, revised and updated every year at all levels of government, in every workplace and in every sector of the population, is a practical document with concrete procedures to be followed at all stages. There is a national plan, as well as individual plans for each province, ministry, institution, business, and organization down into the neighborhoods. Each institution and organization participates in updating the plan every year by rectifying mistakes, addressing problems, proposing solutions and recommending improved practices.

EMERGENCY PLANNING FROM THE BOTTOM UP

In a detailed interview in March 2003, the current Secretary of the Commission of Evacuation and Students, José Castro explained his experience in the development and use of emergency plans. Castro has worked in Civil Defense in Cienfuegos since its creation.

"Each year on December 1, as soon as hurricane season ends, Cuban authorities at every level begin to update the Emergency Plan and finish it in March or April.

We look at what happened in the year, particularly if there has been a hurricane…what worked, what didn't and make adjustments. We look at the provincial maps, at the areas vulnerable to flood, the weak houses, etc...

Beginning at the CDR level, authorities update the plan in their neighborhoods. The CDR members write down the houses that may be vulnerable in their census, including the name of the family and number of children. They note who goes where during an evacuation, who will need extra help, etc. and then all the CDRs then send their plan to the zone director (with five or six CDRs comprising a zone). Then the zone leader compiles all the information for his zone into the emergency plan and feeds it up to the municipality. In my zone for example, I have 50 vulnerable houses.

Now here this March, in Cienfuegos, we are three quarters of the way through this process. We have done the census, and the plan is currently at the provincial level. We then take it to Havana. All of the organizations and ministries do the same thing. Public Health has to re-do its plan if they have new clinics or consulting rooms. By May, all of the organizations and ministries have completed the same task in order to be ready for the official beginning of hurricane season in Cuba."

The community mapping information just described creates the emergency plan. Based on that information, the plan can be updated on particulars such as evacuation of vulnerable populations. The people at risk in each area are assigned a designated nearby shelter in case of evacuation. The mapping provides up to date information on which structures can be used for community shelters, how many people are assigned to them, the subsequent amount of resources needed to feed them, what transport will be needed and other logistical information.

The government institutions, ministries and the social organizations map not only risks but also their assets as part of disaster preparedness. Down through the municipal level, ministries and institutions tally up the resources they can proportion to emergency plans. As part of the emergency planning process, they commit these resources to meet the needs that emerge from risk mapping. The Cuban system insures the inter-institutional cooperation in pooling and distributing resources in response to the needs evidenced through risk mapping and emergency plan revisions.

As Sr. Castro explains, the plan is collated at each respective level of government in ever more complex form and sent up to the next level, ultimately forming the sum of the national plan. This plan also serves as institutional memory for the Civil Defense as a whole.

While the whole preparation process of the emergency plan is impressive, equally so was the clear sense from everyone interviewed for this report, that the plan is truly a working tool. In every interview with the population in Pinar del Rio and Isla de Juventud in 2002 after Hurricanes Isidore and Lili had hit, people referred to the emergency plan as a matter of course, as in the notes excerpted in the box "A Snapshot of Disaster Preparation and Response."

c. The National Simulation Exercise

The community risk mapping and the emergency plan, both popular educational tools for training the grassroots in disaster preparedness, are reinforced by the annual national simulation exercise. Once a year, at the end of May, the whole country, in their

THE "METEORO"

"We have exercises, known as the Meteoro, every year before the hurricane season [in May] at the national, provincial, municipal, and community level. We do an enactment of a hurricane occurring, keeping in mind that we are awaiting a serious hurricane. In this exercise we try out everything.

We give people simulation exercises to do…For example, with the electric company here in Cienfuegos, the head of the Civil Defense will give the electrical company's director a situation: "So many lines are down, so many generators are affected, and here is your main problem…" And he will be asked, "How will you confront this situation?" He has to respond based on his emergency plan outline. On the first day, everyone engages in these exercises, responding to hypothetical situations. On the second day, they carry out all the physical preparation measures in the community."

José Castro, Civil Defense-Cienfuegos, March 2003

respective ministries, schools, hospitals, and factories participates in a two-day training exercise in risk reduction for hurricanes. The purpose is to refresh everyone's memory of their role and to practice any changes from the previous year. The first day consists of simulation exercises to rehearse disaster response strategies and procedures. The second day is spent in concrete preparatory actions: cutting down tree branches which might fall on houses in a hurricane, checking reservoir walls or dams for weak points, cleaning wells, identifying places to evacuate animals and so forth.

D. Disaster Response

The national DCN puts the whole system of disaster response into motion when a hazard is imminent which the DCN announces to the local and national media. The High Command of the DCN takes up position in the National Control Center for Disasters to direct the emergency measures for the country. This national structure meshes with the community organization through the leadership of local government.

The following is a "snapshot" of how disaster response looks in actual practice at the community level. The stories are excerpts from several interviews conducted on a visit to different communities in Isla de la Juventud, shortly after they were hit by the second of two hurricanes within 11 days in the fall of 2002. Hurricanes Isidore and Lili hit hard, leaving a total of 18,000 homes damaged or destroyed in Pinar de Rio and the Isla de Juventud. However there were no fatalities as a result of Hurricane Lili and only one caused by Hurricane Isidore. The remainder of this section walks through the four critical phases of disaster response to illustrate exactly happens on the ground when disaster strikes.

A SNAPSHOT OF DISASTER PREPARATION AND RESPONSE

Interview Notes from Oxfam Visit to Isla de Juventud in October 2002

"First we go into the information phase," explains a member of the Conrado Benitez cooperative. "When we move into the alert phase, we put the animals onto higher ground and evacuate the women and children. When the storm arrives, we are in the alarm phase…Once the hurricane is over, we are in the recovery stage," the cooperative member continues. "We form teams to assess the damage and begin to clean up."

Community members in the José Martí cooperative on the Isla de la Juventud explained what they did in the alert phase. All the secondary students were sent home from their boarding schools, and all those who lived in areas of risk were evacuated. Everyone had already been designated a place of refuge in the emergency plan, long before the storm hits. To maximize resources, as many people as feasible were assigned to a nearby neighbor or family members' house as long was it is solidly built to withstand hurricanes and no danger of flooding. Those who could not go to a designated neighbor's house were transported to an evacuation center, usually a school, by government workers.

The cooperative directorate explained how the cooperative successfully evacuated 1,300 animals to higher ground, losing only a total of two despite the two hurricanes back to back. The cooperative leaders evac-

uated their members, driving across flooding creeks to rescue people stranded by quickly rising water.

For purposes of this interview, in Nueva Gerona, the principal city of Isla de la Juventud , the head of municipal government for the island gathered the local representatives of the Ministries of Education, and Health, Hydraulic Resources (which controls water quality and distribution), and the local heads of the mass organizations to explain their roles in disaster preparedness and response. For example, the Ministry of Health manages the shelters, provides medical care and supplies, the police provide the shelters with security. The municipal bakeries provide the shelters with food. The population has a clear understanding of the importance of evacuation and shelter protocol facilitates the close inter-ministerial cooperation.

In September and October of 2002, both Hurricanes Isidore and Lili interrupted electricity in Isla del Juventud and cut off television transmission. But the municipal government created a connection with a phone line and a ham radio so that information could be relayed between the ICM, the civil defense workers and the volunteers working in the communities and the population who phoned in.

Although it may sound overly simplistic, this "snapshot" demonstrates that the single most important thing about disaster response in Cuba is that people cooperate en masse. The combination of good governance, which has educated and involved the population with effective, functioning systems, results in large numbers of people who have developed the trust and awareness to use these structures and have the training or resources to put them into practice.

1. Emergency Phases

a. Phase 1, Information: 72 Hours Before the Hurricane

During this phase, when it seems likely that a hurricane will strike Cuba, most Cubans are never far from earshot of a radio or television. The Civil Defense structure is put on alert, and the media plays a major role in systematically keeping the population updated about the approaching hurricane. The governance strategy of reliance on local leadership goes into play as the heads of the provincial and municipal assemblies assume their roles as local heads of the Civil Defense; they organize their command centers and activate their organizational structures. They also call coordination meetings, review emergency plans, and take initial measures to prepare the people in that area, assigning transportation and equipment where it may be needed, and designating responsibilities and tasks. At the community level, the CDRs, mass organizations, family doctors, school directors, and heads of institutions all review their responsibilities, updating the lists of vulnerable members of the community, reviewing emergency plans and evacuation, and checking evacuation procedures, destinations and supplies.

It is worth recalling that an effective communication system is one of the "golden dozen" of good governance. An older farm worker in Pinar del Rio contrasted the situation today to his childhood in an Oxfam interview in October 2002. "Back then, you didn't know anything about a hurricane coming, except from the weather signs, even if you had a radio, you never knew until it was on top of you, trying to blow your roof off."

A Cuban farmer collects radishes before a storm. The island's vulnerability to hurricanes and other natural disasters leads Cuban farmers to adopt a culture of preparedness and safety.

These days, under the direction of the DCN, the media informs people how the storm is progressing, what phase the country is in, what measures need to be implemented, where resources are, how the rest of the country is faring, and transmits announcements. All of this information is clearly packaged in disaster preparedness and response language familiar to all Cubans. Cuban Ham Radio Association members, incorporated into the Civil Defense structure, prepare in case the electricity fails during this or any of the proceeding phases.

Cooperative leaders, shown here, are key actors in disaster management efforts. Cuban cooperatives can prepare to evacuate members when facing danger.

b. Phase 2, Alert: 48 Hours Before the Hurricane

As the risk of the hurricane increases, all organizations, institutions, and entities go into full mobilization. The DCN center in each province, municipality and zone becomes the focus of all coordination and information for the immediate area it serves. The DCN center is the locus of coordination meetings as the staff there deals with problems, creates solutions, directs the distribution of resources as needs occur and maintains information with the level of government immediately above them. The centers direct the emergency implementation plan through the decentralized structure of local government down into the neighborhoods.

People begin to prepare in earnest for a hurricane. All students are sent home from schools, particularly the boarding schools. If the DCN, in coordination with the agricultural sector and the local authorities, judges that there is time, volunteers harvest what crops they can and lead animals to higher grounds. When the High Command of the DCN orders evacuation, the evacuation of the high-risk population begins according to the plan. The DCN head of evacuation for the area mobilizes the transportation as outlined in the emergency plan. People secure their homes as much as possible (Castro 2003).

GETTING EVERYONE READY

"We were living in Havana in 1996 when Hurricane Georges was about to hit Cuba. As we were foreigners, people assumed we didn't know what to do so we had a steady stream of neighbors in and out of our apartment, counseling us to fill the bathtub with water, tape the windows, unplug all electrical items, get batteries or candles, and put the car in the garage. Everyone in the apartment building was out helping to tape up the windows in the entry way. The neighborhood representative from the Federation of Cuban Women was out checking with her "vulnerable population" to see how they were doing. The community doctor was checking on patients in the neighborhood, determining if anyone needed to be moved to a hospital as a precautionary measure. People were stocking up on their rations, counting candles, filling receptacles with water, and cooking food. Everyone, even the children, knew what to do."

Interview with international aid worker living in Havana in 1996

Lifeline Structures

As a hurricane nears, Cuba's two key tangible assets for lifeline structures are mobilized through local leadership and community organization: timely massive evacuation and a

well organized, secure and resourced system of shelters. Different sectors of the government cooperate together to make the evacuation process and the shelter system function smoothly.

Evacuation

Recognizing that people often are reluctant to leave their homes and to minimize the burden of the shelters, the evacuation plan in Cuba is based on three options. If a family has a house certified as safe for hurricanes and they are not in danger of flooding, they can remain in their home and take in neighbors from homes certified as vulnerable to the storm. If a person's house has a roof of tile, fiber-cement, or thatch, they must move to a house of poured concrete. If those options have already been assigned in the neighborhood, the family is assigned to a group shelter and transport is provided. Everything from cars to trucks to horse carts is mobilized for transport by the heads of civil defense in a particular area. The heads coordinate information, pool transportation resources and direct those people from different institutions who have previously been designated to carry out the evacuation. In order to evacuate people in high risk areas, all necessary means of transport, such as helicopters and boats, are put at the service of the Civil Defense rescue teams for this purpose.

How does Cuba save lives?

"The most important factor seems to be timely evacuation. Roughly 700,000 people were evacuated out of Cuba's 11 million population [during Hurricane Michelle]. This is quite a feat given Cuba's dilapidated fleet of vehicles, fuel shortage and poor road system."

Dr. Ben Wisner
"Socialism and Storms"
The Guardian, November 4, 2001

EVACUATION SAVES LIVES

"In the alert phase they immediately remove families from all high risk areas, coastal areas, etc.," said Sr. Castro when interviewed by Oxfam. *"A category 4 or 5 hurricane can destroy a building of five or six floors. We take people out of all the high buildings at the edge of town. They recall all students. The Civil Defense alerts the schools and organizes the transport to pick up the students and bring them home. Once the students are home, I need to evacuate the population. Families are much calmer when they are together."* [18]

Shelters

As community shelters are often schools or other municipal buildings, they need to be prepared in advance. In the beginning of the alarm stage they receive stocks of water, medicines and supplies from the local government emergency supply. The cooperation of different ministries and institutions is immediately apparent in the shelters. Epidemiology inspects them, the state bakeries prepare food for them, and they are staffed by a director, a deputy director, a doctor, a nurse, police and a representative of the Red Cross (Cuban Red Cross 2003).

These two lifeline structures, evacuation procedures and shelters, save lives because people cooperate with them. Individuals can be trained as evacuation teams and shelters can be established, but if people are not educated for evacuation, if they don't trust the government, if they do not know which shelter to go to, they will not cooperate and lives will be lost. The successful implementation of Cuba's lifeline structure demonstrates the importance of building up social capital to make the best use of tangible assets.

The Pigs and All

The civil defense is very conscientious about carrying out evacuation. The José Martí Cooperative members cited a case where a farmer evacuated his family but decided to stay and protect his pigs from the hurricane. The civil defense team came back to get him as there were warnings about flooding but he refused to leave. It began flooding, sending the campesino to the top of a table with his pigs. Then he had to get on the roof with his pigs. Civil Defense sent a boat to evacuate the stubborn farmer. He told the rescue team that he would not leave unless they evacuated the pigs as well. He insisted that they take each pig out one by one into the boat before he finally got in.

THE ROLE OF THE HEALTH SECTOR IN THE COMMUNITY

The example of the Ministry of Public Health illustrates how the emergency plan is also organized and closely coordinated across ministries according to their role and specific responsibilities. This horizontal as well as vertical coordination makes optimum use of people and resources and strengthens the linkages between people's work and their role in emergency response. The Ministry of Public Health will coordinate with the DCN and Cuban Red Cross to assure a multi-disciplinary approach for prevention of disease, assurance of hygiene and epidemiological measures, and clear direction for the hospitals during the emergency and provision of clinical care.

As soon as the alert phase is announced, every doctor reports to his or her assigned post. The different hospitals serve as the headquarters for their neighborhoods with family doctors assigned to specific neighborhoods. During this time, the doctors assigned to shelters inspect them to stock medical supplies and verify conditions there. Family doctors are sent to their neighborhoods to check on patients in homes and assist in evacuation in coordination with the FMC delegates and the evacuation committee of the CDR under the local DCN. At the same time, hospitals are organizing emergency stocks and power supplies and guaranteeing their staff coverage. Chlorine tablets are distributed to the affected population through the Ministry of Public Health in order to assure the availability of potable water during the hurricane.

Interview with local government in Isla de la Juventud, October 2002

c. Phase 3, Alarm: The Duration of the Hurricane

Once the hurricane is in national territory and its effects are being felt, the country goes into alarm phase, and the full measure of disaster response goes into effect. The media continue to broadcast information and orientation and the DCN centers do their utmost to keep lines of communication up and running. All people are compelled to remain under shelter during the duration of the storm.

During the duration of the storm, all local, municipal, provincial and institutional directors of civil defense delegates remain at their posts and act as needed, maintaining contact with the provincial and national Civil Defense command posts through ham radio if necessary.

d. Phase 4, Recovery After the Storm

Two weeks after Hurricane Lili, the streets of Gerona were clean of debris, and the municipal government assured us that the medical staff and the epidemiology department had disease control well in hand. By then most residents had access to potable water, which was trucked out to their communities. Although many people were still in shelters because their homes were not yet habitable, people were working everywhere, drying mattresses, salvaging reconstruction materials and working to rebuild the island's infrastructure.[19]

Once the storm has left national territory, the recovery phase is announced and the local and provincial government leaders, in their role as Civil Defense directors, begin to mobilize teams for clean up, focusing on any structure or installation that could cause harm or further damage. Immediate attention is turned to the availability of safe drinking water including purification, distribution and restoration of services. Before people in shelters are allowed to return home, the Civil Defense first surveys the buildings for structural integrity.

Local authorities undertake a census of damages to each building and residence in their areas. This census is built up from the municipality to the province and then nationwide, and is used as the basis to prioritize repairs and rehabilitation. Another concurrent census is taken to calculate economic losses, agricultural damages, and other damage indicators. The Civil Defense coordinates with the Ministry of Foreign Investment and Cooperation (MINVEC) on all matters that pertain to international cooperation and aid for hurricane damage (Castro 1994).

Members of the Science, Technology and Environment Ministry provincial delegation show a map used to assess and better address damages left by a hurricane.

When the areas are cleaned up and services are restored, this final emergency phase winds down. The High Command of the DCN proposes the deactivation of the emergency system to the President. Once approved, the DCN announces the end of the emergency and the country returns to normal decision-making processes upon approval by the President. Wherever possible, the provincial, municipal, and local authorities focus on their daily administrative duties, incorporating the longer term recovery measures into national structures.

A LESSON THE UNITED STATES CAN LEARN FROM CUBA

In the United States, it is arguable that timely, massive and organized evacuation would save more lives. According to the Mortality and Morbidity Weekly Report, May 5, 2000 from the U.S. Center for Disease Control, 45 of the 52 deaths reported from Hurricane Floyd in 1999, and 18 of the 24 deaths reported from Hurricane Isabel in 2003 were caused by one of the following three problems:

- people sought shelter in inadequate structures (trailers) that were subsequently destroyed or damaged in the hurricane
- people drowned, many in cars
- people were killed in traffic accidents amid traffic chaos caused by late evacuation

These deaths could arguably have been prevented. However, in the U.S., municipalities are not compelled to respond to a national decision-making center about evacuation; each municipality has the authority to make their own decision about evacuation (Kim 2002, 3). Once that decision is made, there is no enforcement capacity at the municipal level. In Cuba, by contrast, massive evacuation of vulnerable areas begins in the Alert Phase once the DCN has indicated it. Local government has the training and the authority to direct the evacuation based on the emergency plan which they have helped write. Public education on the importance of lifeline structures and community participation in preparedness activities are important factors in people's compliance with emergency measures.

"Fidel said that we would build all these houses again and we did. These houses all have electricity and bathrooms and were good solid houses. Each community had an act of granting ownership for the houses. We repaired and rebuilt 33,000 houses, [all those destroyed or damaged by destroyed by Hurricane Michelle in 2001]. The materials were a problem. The different business sent workers to pitch in and send what resources were available to them through the state. Families' workplaces helped out with volunteers and material transportation. Some workplaces paid their members and freed them to work on their homes."

Civil Defense delegate,
Cienfuegos March 2003

E. Disaster Recovery

As in any country, disaster recovery in Cuba is long-term and complex. It is especially difficult in Cuba due to the combined effects of the economic crisis and the U.S. embargo which affect acquisition of materials from chlorine to nails and create delays in procuring and transporting resources to Cuba.[20] The following is not a step by step outline of Cuba's disaster recovery but a reflection on key elements in the Cuban system that facilitate recovery, reduce inequity of impact on the vulnerable and there are other facets of its system that significantly facilitate reconstruction.

1. Universal access to government services

As discussed earlier in the paper, Cuba's system of universal access to services substantially reduces both people's vulnerability and the scale of inequity of vulnerability in the population. This gives those affected less of a handicap in trying to recover from the effects of the hurricane. Dr. Miren Uriarte in her report, "*Cuba: Social Policy at the Crossroads, Maintaining Priorities, Maintaining Practice*," classifies the Cuba social safety net as "tattered but holding." Essentially, that means that while service provision is affected by the overall scarcity of resources, Cubans rarely fall through the cracks, since they are in a system which offers universal access to services and is rich in human resources. People do not enter the service system when they were affected by a hazard; they were already part of the system. Anyone adversely affected is a known entity in the system and their case is followed up accordingly. This is true for services ranging from health and education to crop insurance for disasters.

2. Government commitment to reconstruction and recovery

Unlike the all-too-common experience of people recovering from disaster, social cohesion in Cuba tends to be reinforced rather than damaged by hurricanes. There is a demonstrated commitment and capacity to restoring services and structures, based on the availability of materials. People basically expect this commitment on the part of the government. During the 1990's the economic crisis caused substantial delays in reconstruction work on damaged property. Among the population who lost their homes, those who were not able to live with family and friends were assigned to live in government shelters until their homes were repaired. After Hurricane Michelle, the government basically designated all in-country production of building materials to supply reconstruction of damaged housing until every house was repaired.

3. Social Capital

"There is a lot of experience here and a lot of solidarity. People really help out, and that makes the big difference. There is massive participation. After Michelle, everyone lent a hand in the clean-up, and the trucks carried everything away. In four or five days, the clean-up was done in the city. Everyone threw themselves into repair and reconstruction...We are educated to think of other people, and we think of everybody. This is what protects people. Solidarity is the key to all of this. But this is not perfect; we need to be improving in it."
Local government delegate Cienfuegos, March 2003

a. Solidarity

The Cuban population, laboring under continual material shortages, shows great solidarity in disasters. Immediately after a hurricane, neighborhoods begin to collect clothing for those affected. In October 2002, when Hurricanes Lili and Isidore destroyed thousands of tobacco houses, electrical installations, and residences in the Pinar del Rio region, hundreds of carpenters and electrician volunteers came from other regions of the island to help the province. They helped to rebuild the tobacco houses and reinstall electric service. While the volunteers were helping the provinces hit by the hurricanes, their work at their own places of employment was divided among colleagues. In Pinar del Rio, the provincial government fed and housed the volunteers. This type of solidarity maximizes the human resources in the country, allows people who cannot directly travel to the affected sites to contribute, and creates bonds between people from different areas.

Citizen participation in recovery efforts is a central concept of the Cuban model.

b. Mobilization

Cubans' experience and expertise in mobilizing for community tasks is immediately obvious in the recovery phase as community clean-up and reconstruction tasks take place. In Cuba, as the government is the major employer as well as in charge of recovery; it can assign employees from diverse workplaces to leave their work and carry out tasks for disaster recovery, such as neighborhood clean-up. Losses in production are borne by the government, not by a private employer. Although these losses directly impinge on the government's ability to provide employment, services and benefits to the population at large, there is at least one small advantage: these losses are distributed more or less equally throughout the entire population, rather than compounding the situation of just those physically impacted by the storm.

The above reflections on how the Cuban system enhances their capacity for recovery brings us back to the correlation between equity and vulnerability explained in the first section on the Cuban development model. The goal of the Cuban development model is to provide the population with universal access to services for basic needs. This is key to reducing the typical inequities that prove so costly during disasters: the inequity of vulnerability and subsequently, the inequity of access to recovery assistance. The Cuban experience demonstrates that a concerted policy on reducing inequity is a fundamental step towards short-circuiting the downward spiral that usually ensues when disaster hits the poor and marginalized.

IV. REPLICATING THE CUBAN EXPERIENCE

A. Introduction

Is it possible to replicate or adapt Cuba's risk reduction experience in other countries? Does the neo-liberal model in Central America, as opposed to the socialist one in Cuba, make the realities too dissimilar to extract lessons from Cuba's risk reduction? Returning to the factors that strengthen Cuba's risk reduction (outlined at the beginning of Section III), it is obvious that Central America's lack of strong national structures for disaster mitigation and preparedness is a prime disadvantage. There is a decided contrast between political will and demonstrated commitment of some governments in Central America and Cuba to prioritize the preservation of human life, arguably the keystone of good governance for risk reduction.

However, if that political commitment is not explicit at the national level, it can and frequently does exist at the local level of government. The decentralized model of neo-liberal reform, so prevalent in Central America, does offer an opportunity for vulnerable communities to build commitment to risk reduction at the municipal or provincial levels.

Extracting lessons from Cuba and adapting them to other countries at the level of local government or community organizations is an attempt to find concrete measures that reduce the vulnerability of populations at risk and to save more lives.

BUILDING TRUST BETWEEN AUTHORITIES AND CIVIL SOCIETY: TWO DIFFERENT RESPONSES TO HURRICANE MICHELLE

The storm called Michelle hit Honduras as a tropical depression in November 2001, killing 12 people, and forcing 115,000 people from their homes (only 4,000 were evacuated). Five Honduras departments (the equivalent of a province or state) declared emergencies due to flooding. President Carlos Flores toured by helicopter, flying over the northern region affected by the storm. Flores appealed to the international community for relief funds; people in the affected provinces say they are still waiting for help promised by the government from Hurricane Mitch.

By the time Michelle hit Cuba, it had become a category 4 hurricane. More than 700,000 Cubans were evacuated, and five people died, most killed by buildings collapses. President Castro immediately went to visit the victims of the storm and assess damage in the three provinces worst hit: Matanzas, Cienfuegos, and Villa Clara. He met with tourists who had been evacuated to Varadero and was in Cienfuegos the next day. He promised help from national reserves for the Cubans and addressed the nation on television, assuring them that Cuba would survive the storm, "We are very well prepared, very disciplined, very organized," he said. "For us, victory means having a minimum loss of life (SCFC 2002)."

Rather than seek to extrapolate elements for adaptation in the abstract, the next section of the paper is an exercise to reflect on what elements of the Cuban experience in risk reduction can be adapted to the Central American reality. Hurricane Mitch hit Central America in 1998 and thousands of people died, a severe lesson in widespread failure on the part of national governments to safeguard human lives. Central America's experience provokes us to explore if the Cuban model can be adapted for use in countries that lack equity in services, national political will, or the strong national structures for risk reduction.

International and regional organizations like the IFRC and the Asian Disaster Reduction Center have promoted and supported community based disaster management (CBDM) as an important strategy in risk reduction. Some NGOs in Central America have already used this approach in their work on disaster preparedness. Cuba offers them a comprehensive example of how to do CBDM on a national scale.

Central American civil society actors have expressed interest in understanding the Cuban model so as to decide if aspects are relevant to their experience in disaster preparation, not only for hurricanes but also for other weather-related hazards. This section of the paper does not pretend to be an adequate overview of risk reduction in Central America, but rather seeks to be the basis of an initial reflection on how the Cuban experience could be best adapted in the circumstances outlined above.

B. Disaster Mitigation

1. Weak National Resources

The first crucial difference between Central America and Cuba is that the latter has a list of strong national structures in risk reduction, particularly disaster mitigation, while the former lacks them. The lack of political commitment to risk reduction at the national level is a key issue; its absence leads to politicization of risk reduction because of competing interests and is an obstacle to resource allocation. There are not systematic processes to link existing resources into grassroots (Trujillo 2000, 55). [21]

There is little or no framework around disaster preparedness or response in Central American countries according to research done by the Coordinating Center for the Prevention of Natural Disasters (CEPREDENAC). There are minimal laws on building codes, little on physical planning and in most cases (except for Costa Rica), lack of consistent enforcement of the existing laws.

Many of the Central American countries do have national emergency committees or national civil defense structures, but there is a lack of connection between these organizations at the national level and the grassroots. Often the Civil Defense's links with the military cause a lack of trust in the population.

National emergency plans are usually not comprehensive. Only Costa Rica and El Salvador have emergency plans that are truly national in character and even those are not public knowledge. Only Guatemala and Costa Rica have established legal obligations

to follow emergency plans, although it would be hard to penalize the population for not following plans of which they are unaware.

At the national levels, Central America and Mexico have the same level access to meteorological and seismological information as Cuba, but not the technical and human resources in meteorology, connections with national emergency structures or the political will found in Cuba to use the information consistently in a way that benefits the vulnerable population.[22]

2. Information and Research: Existing National Resources

There are excellent organizations for study and research on disasters and risk reduction in Central America, many of them non-governmental. Due to their efforts, there is a rich body of information and advocacy on risk reduction in the region. Most of the information on natural disasters in Central America and Mexico is available only through conferences, seminars, workshops, websites and documentation (Trujillo 2000, 64). The information is comprehensive and some materials have been developed for use at the grassroots level. The problem is that there is no systematic process of transferring this information to people at risk despite the engagement of different NGOs and national Red Cross societies.

Particularly since Hurricane Mitch, local and international NGOs, membership and constituency-based organizations such as unions or farmers' groups, and community groups in Central America have gained a great deal of experience in advocacy work to pressure national governments to improve risk reduction. They have had most success in gaining access to decision- making structures around allocation of disaster recovery funds. Advocacy work at the national level continues to be an essential tool in Central America for improving risk reduction for the general population.

3. Local and Community Level Resources

Through the lens of the Cuban experience, it is clear that relevant resources for risk reduction do exist in Central America, even despite the lack of tangible national assets. Once identified, these resources can be effectively employed and developed to reduce vulnerability. The key issue is how to configure them in a way that maximizes their efficiency, and insure that they are actually used. It is essential to approach these risk reduction efforts as a means of building upon and enhancing existing social capital, the oil that makes the whole machine run smoothly. As mentioned earlier, the political model of decentralization allows a real space for building risk reduction work with sympathetic local governments, or fostering that interest in local governments which can be held more accountable to the population than the national government.

The following existing social assets in Central America can form the basis for collaboration with local government on risk reduction:

- The large dynamic NGO[23] community with decades of experience and relationships with the grassroots. Although there is not enough overlap between NGOs working

in development per se and groups working in risk reduction, some NGOs are working to relate risk reduction to local development challenges.

- A significant group of grassroots community and representative organizations with rich experience in community organization and mobilization.
- Practical experience in risk reduction projects at the local level. In 2002, there were 130 recently finished or on-going risk reduction projects at the local level in Central America (Lavell 2002, 8).
- Considerable experience in, as well as networks and structures for, coordination and interchange among institutions and organizations working in development, be they local, national or international.

The Cuban experience of using social capital to maximize other assets in risk reduction is particularly appropriate at the community level in Central America, considering the level of community organization in sectors of the population. The concepts of solidarity, participation, community organization, cohesion around issues of central concern and participation are familiar, employed in development work by the non-governmental sector at the community level in a myriad of ways.

4. The Potential for Disaster Mitigation: Focus on Local Government

Cuba's reliance on local government authorities for risk reduction has demonstrated real benefits as a disaster mitigation strategy. Taking into account the differences in political systems, there is potential positive impact in strengthening the role of local government in risk reduction in Central America. The political will so lacking in the national arena often exists at the local level. Promoting local government as a principal actor in disaster preparedness and response builds on the philosophy behind decentralization, which is to make local government more accountable to the population. The combination of training, outside technical expertise, and local government structures can provide a structure for disaster work, decision-making, prioritization and inter-sectoral coordination. To the extent that a transparent relationship exists between people and their local governments, including mechanisms for accountability, there is fertile ground for extending the authority and decision-making powers of local government to disaster mitigation, preparedness, and response. Where a level of trust between the population and local governments exists, this social capital can and should be built upon to ensure people's cooperation with local disaster preparedness and response measures.

C. Disaster Preparedness

Examining the Cuban disaster preparedness model for elements that could be adapted and used at the level of local government in Central America, the following seem most relevant: reliance on local leadership, community mobilization, popular participation in planning, community implementation of lifeline structures and continual emphasis on use of social capital.[24] Consolidating work in preparedness and response at the local

level might make it possible to build upwards from a municipal or provincial base of work in risk reduction.

1. Popular Participation in Preparedness

At the local level, Cuba's practices of mobilizing community participation and creating buy-in by participation builds on methodologies already prevalent in Central America. Three mechanisms that work together to train people, create practical hands on learning, and begin to build trust and community commitment are:

- community risk mapping;
- creating local emergency plans; and
- simulation exercises at the community and/or municipality levels.

Instituting these practices at the community level can be the first step towards strengthening practice in risk reduction in local government and upwards to national structures. At the community level, simulation exercises can spark a great deal of community reflection, discussion, and motivation. Talking through problems and how they should be handled is an excellent way to build community awareness and consensus. Actually rehearsing evacuation measures may be another effective way to educate people on its importance and to motivate them to act in the event of a disaster. Rocha and Christopolis in their article 'Disaster Preparedness and Mitigation in Post Mitch Nicaragua' (2001) cite examples of NGOs in Nicaragua which successfully promoted these practices at the community level. The NGOs trained emergency committees in several communities which later proved very effective in evacuating people when Mitch struck.

a. Community Risk Mapping

There are two challenges to effectively using community risk mapping in Central America: finding a mechanism to share existing information and building in community participation as an integral part.

Information Sharing: While years of development experience have provided NGOs, local governments, and community organizations in Central America with a wealth of information about the vulnerability factors at the community level, this vital information is often held by different people and compartmentalized. In Cuba, the nature of the civil defense system means that many of the major actors in "development" at the provincial, municipal and community level — doctors, community leaders, mayors, housing inspectors, cooperative presidents — all take on dual roles as civil defense in times of crisis. This means key information from the communities is shared and utilized rather than compartmentalized.

Building in Participation: Training community members in simple risk mapping for evacuation or for basic lifeline structures can be an extremely effective method of promoting local participation. Learning by doing reinforces lessons in risk reduction; it taps into local people's store of knowledge and builds social capital for risk reduction as it taps existing community wealth. Dividing the tasks of risk mapping among actors

Risk mapping is Cuba's practical approach to dealing with more susceptible populations. Neighborhood representatives like the women in this picture play a crucial role in assessing vulnerability of other community residents.

with different levels of technical ability and knowledge can allow community participation without major investments in training. Community members and leaders can easily classify houses as safe or unsafe and use that information as the basis to assign vulnerable population to other homes or to shelters. In Cuba, the FMC is responsible to identify and address the needs of women, particularly vulnerable women. In Central America, since there is not a corresponding organizational mechanism built into the system, it is important to have women involved in the community risk mapping exercise to bring their voices to the table.

b. Creating the Local Emergency Plan

Since at present national emergency plans in Central America are not tools for local use, the Cuban experience holds the possibility to build from the ground up, using information blocks from the community level to build the municipal level. Many communities in Central America have considerable experience in community planning processes. This experience can be tapped, as in Cuba, to develop expertise in community risk mapping as an input for emergency planning. Whether or not this is organized through local government or a coordination of NGOs or other actors, disaster experts can lead hands on learning with the population thereby feeding local knowledge directly into the process.

Plans can have different levels of complexity, from focusing on lifeline structures to saving livestock to communications systems. As work in development demonstrates, people's involvement in planning greatly enhances their cooperation and commitment in implementation. When the stakes are high in terms of human lives, it is important to find the most effective means possible to obtain people's commitment to risk reduction. Community planning is also a useful tool to help catalogue existing resources for disaster preparedness and response as well as to discuss their administration in an emergency.

School children take part in the annual two-day exercise before the hurricane season.

c. Simulation Exercises

Rehearsing evacuation measures is another potential effective way to educate people on its importance and to motivate action in the event of a disaster. Cuba's event is national in scope, but it is carried out all over the country at the community and municipal levels, providing a wealth of experience to adapt for use at the local level. Besides reenforcing people's commitment to evacuation and its obvious use as an educational tool, the simulation exercise strengthens a community's or municipality's understanding of realities related to risk reduction in their given situation. The experience of simulation exercises can provide important information to local governments about realistic goals in risk reduction. Priorities become clearer and ways to optimize resources become more apparent. Proper and consistent practice of the simulation exercise can build social capital between the population and the government as they work together in disaster preparedness.

The historical memory of living through a disaster and what went wrong or right lasts much longer in the minds of the victims than those in the national government who were far away. Working on risk mapping, planning and simulation exercises at the community or local level promotes reflection and discussion of those memories. Talk-

ing through problems and how they should be handled is an excellent way to build awareness, consensus and motivation. [25]

2. Mobilization at the local level

a. Resources

Resources for disaster preparedness and response are optimized in Cuba, again, because of the socio-economic model. The government owns the majority of the resources in the country and it puts them at the disposal of the Civil Defense for the preservation of human life of the population in a time of emergency. To date, decentralization in Central America has not resulted in many new resources for municipal offices, although this remains a long term objective.

The relevant lesson from the Cubans here is the social capital or "oil" that facilitates resource sharing can create high levels of compliance even in a resource-poor environment. The social capital involved is threefold: people's understanding of the importance of saving lives; their trust that the resources they contribute will be given for the common good; and the relationships of cooperation that have been built up through the experience of collaboration.

If a local government can build relationships to capitalize on that trust, collaboration can occur with NGOs and community based groups, institutions, and businesses to negotiate how resources from these entities might be put at the service of the community in an emergency. Negotiations could include, for example, transportation for evacuation; a building for a shelter; funds for food in the shelter; a community radio station for communication and so on down a long list of potential needs. With political will, local governments can research possibilities outside of the community, such as the Pan American Disaster Response Unit created by the IFRC in Latin America precisely to support resource poor communities in emergencies.[26]

b. Communications

In the absence of a national governmental decision to act on a communications strategy, local governments may decide to develop their own- enabling at-risk populations access to information about possible hazards. If local governments have access to reliable information and are willing to act on it and inform the population, three simple lessons emerge from Cuba: package information simply, use an easily accessible medium, and build on the communication resources at hand. In many Central American countries, there is a potential wealth of using existing community and rural radio in disaster prevention.

Obviously good work on disaster preparation work overlaps and reinforces itself. Working with the population in risk mapping, emergency planning and education will make them much more amenable to listening to and acting on emergency bulletins.

The Cuban radio system is a useful tool to keep the population informed.

D. Disaster Response

1. Life Line Structures

a. Community Organization in Action in San Vicente, El Salvador

There is a widespread consensus in the development and disaster circles that Hurricane Mitch killed more than 9,000 people in Central America[27] because of the massive failure of the national governments to prepare for or respond to the disaster. Where lives were saved, it was often through the efforts of people in the endangered communities themselves, creating hope that more can be done to build up community resources for disaster response in the future.

One of the most remarkable examples happened in El Salvador. As the rains from Hurricane Mitch caused waters to rise, the government was concerned that the dams would not hold. They opened a series of dams in the Lempa area, flooding dozens of communities. Far from evacuating the population first, the government did not even inform the population that they had opened the dams. The people in the communities learned what was happening when they saw the water rising in their homes. A group of communities on both the Usulutan and San Vicente sides of the river had a history of social organization. They coordinated their resources and built on existing social cohesion using many of the same principles found in the Cuban model. They formed committees for evacuation, shelter, health, and security. They evacuated the vulnerable to high ground and patrolled the river with their own boats to monitor the safety of those who were remaining in their homes with animals. Not one life was lost in these communities, while many died in other villages (Delaney 2004).

What worked in San Vicente and Usulutan, and why?

- Residents had a history and experience in organization that they could turn to in this situation;
- Relationships of cooperation were already in place;
- A developed leadership capacity with initiative already existed;
- The people were mobilized by leaders they knew and trusted;
- They collectively used the resources they had, maximizing their effectiveness;
- They were able to draw upon pre-existing social capital — trust, solidarity, organization and cooperation — to reduce their own vulnerability.[28]

This example of CBDM from El Salvador clearly demonstrates that some of the qualities that make risk reduction work in Cuba, what we have referred to in this report as "the oil for the machinery of risk reduction" (social capital), are the same which Central American communities themselves use to reduce risk. The potential exists to expand this experience to a far wider scale throughout the region. To capitalize on this potential, actors involved in sustainable development and disaster work should cooperate more closely to identify common aspects of their work which mutually reinforce risk reduction.

b. Community Mobilization in Lifeline Structures

Evacuation and Shelters: As already noted in this report, evacuation, quite simply, saves lives. However, massive pre-emptive evacuation is not practiced by any government in Central America. In Nicaragua, for example, the population around Bluefields was not evacuated during Hurricane Cesar in 1996, and lack of any evacuation policy during Hurricane Mitch in 1998 caused thousands of deaths. (Trujillo 2000, 63).

The example from El Salvador in the previous section demonstrates how communities can, even with no outside help, successfully use what they have for an effective lifeline structure. Successful evacuation is a combination of motivation, knowledge and logistics. The first priority is to educate the population about the importance of evacuation in saving lives and give them access to reliable information. Popular participation in preparedness activities, building social capital between local government and the population, building on relationships forged in development work are all cumulative work towards strengthening the population's motivation to evacuate in times of emergency.

In the same way, if successfully practiced, those same activities form the basis for organizing the logistics of evacuation and shelter.[29] In Cuba, the majority of the massive evacuation is done by local leaders. The head of a cooperative directs the evacuation of the member families. The shelter system in Cuba makes the maximum use of available safe homes and local structures. In the Lempa, it was the community leaders who organized the evacuation and the shelters. Strengthening local leadership structures as part of sustainable development work means they will be a resource in disasters as well.

Cuba emphasizes a comprehensive disaster mitigation model that involves all sectors of the population. Even members of the most rural communities are very important actors in disaster management efforts.

V. CONCLUSION

Adapting the Cuban experience to other countries raises many complex issues. Chapter II of this report discussed the contribution Cuba's social and economic development model makes to reducing vulnerability and inequity through its commitment to universal access to and equity in services. PAHO's annual Director's Report for 1998, which analyzed the tragedy of Hurricane Mitch, shows why this is important. The report concluded that the most common denominator of Mitch's victims was their poverty.

This report reaches a similarly stark conclusion: there is no comprehensive substitute for reducing poverty and promoting social and economic equity as the fundamental long-term strategies to reduce vulnerability to hazards. Giving the whole population access to resources like literacy, roads, and electricity, as is the case in Cuba, multiplies the effect of disaster preparation and response measures. Countries without those levels of social development do not have these multiplying effects for their risk reduction measures. While it is clear that Cuba has a real advantage in this, it would be shortsighted to dismiss a whole system as not adaptable or replicable in other countries when it is clear that that system actually does save lives.

Returning to the disaster equation, *risk = hazard x vulnerability*, discussed earlier in the paper, both the number of people affected by weather-related disasters and the number of those disasters are increasing as climate change continues to cause extreme weather. Not completely coincidentally, the people most vulnerable to these increasing hazards are the marginalized living in the poorest countries of the global south, precisely the geographic area of the world where the hazards are increasing.

Ideally, confronted with this situation, all governments in these countries would be committed to long term sustainable development to reduce risk and to set up national structures for disaster mitigation, preparation, and response in order to safeguard human lives. In an ideal world, concerned governments would adopt Wisner's "golden dozen" of good rules for governance for risk reduction beginning with the political commitment to save lives. Cuba, with its reduced economic circumstances, demonstrates that political commitment to saving lives is the basis from which so much else follows.

In the far from ideal real world of the early 21st century, the absence of political commitment at the national level cannot be allowed to remain the definitive obstacle to addressing risk reduction in countries of the global south, especially given the serious nature of increasing vulnerability. The decentralization of the state, so favored by the neo-liberal model, does make it possible to work in risk reduction at provincial and municipal levels of government, even despite the lack of national commitment. As discussed in the previous section on Central America, working with local governments can provide an opportunity for intervention at a level where the authorities may be more accountable to the population and more agile in their response.

Any attempts to work at the local government level will always have limitations until risk reduction is built into sustainable development, countries adopt good governance for risk

"Those who suffered disproportionately were populations residing in large marginal areas and without access to well-constructed and safe housing, basic health services, education, and information…[these factors are the result of] unequal development that prevails in the region and generates poverty and marginality, which are determining factors of vulnerability, particularly in the face of disasters, either natural or man-made."

Excerpt from PAHO's annual Director's Report for 1998, which analyzed the tragedy of Hurricane Mitch.

reduction and climate change is solidly reversed. It is crucial to continue to work on each of those three long term issues. However, with the number of deaths from weather related disasters rising, it is also imperative to seek shorter term measures to strengthen the ability of communities to reduce their vulnerability by all means possible.

Cuba's impressive work at the national level has created measures, structures and assets that are fundamentally necessary in the long run. However, this analysis of Cuba's risk reduction model also demonstrates that much can be accomplished through a focus on the local level. It is precisely through Cuba's reliance on far more intangible assets such as:

- local leadership;
- community mobilization;
- popular participation in planning;
- community implementation of lifeline structures; and
- the creating and building of social capital

that the nation's tangible assets in risk reduction are enhanced and made far more effective. Indeed, we have argued in this report that, in the absence of these locally-focused measures for popular participation, national level assets would have minimal effectiveness. Cuba's example, therefore, offers rich lessons for work in risk reduction at the local level in other countries even in the absence of national political will or resources.

The five intangible assets listed above all exist to different degrees at the local level in Central America and history shows that they have worked in the past. The example of the communities along the Lempa River demonstrates conclusively that communities in countries other than Cuba can use local resources effectively to reduce risk and save lives. In El Salvador, it was neither national structures nor disaster legislation nor building codes that ultimately saved lives, but local people's organizing ability, local leadership, and the trust, cooperation, and transparent relationships they had built among themselves. There is both a need and a demonstrated capacity for community based disaster management in Central America. CBDM is an increasingly popular approach but it is usually applied sporadically and unevenly. Cuba provides a unique experience in implementing CBDM on a grand scale, linking it to local government. This provides a real intersection for exchange and discussion among those working in risk reduction in Cuba and Central America.

The first step would be an in-depth discussion between Central American NGOs, research institutions and perhaps local government on one hand and the relevant actors in civil defense in Cuba. Together they could analyze which aspects of the Cuban model might be adapted at the local level in different countries in Central America. It would be very useful to include multi-lateral organizations working on risk reduction in the Caribbean basin such as UNDP. A second step would be to look at the instances where CBDM has been successful in Central America and examine it in light of the Cuban model to see what might be further adapted. A third step in Central America would be to develop and promote closer coordination at the local level between organizations

working in sustainable development, those working in disasters and emergency relief and community organizations to identify how they could improve coordination to reduce risk for the most vulnerable populations. This paper is intended to act as both an incentive and invitation for further discussion on how the Cuban model could be adapted for use in other countries to reduce vulnerability of those populations most threatened by increasing hazards. If interest is sparked and new cross-boundary learning begins, this paper has accomplished its goal.

ENDNOTES

1 Figures of evacuated and houses destroyed taken from UN Office for the Coordination of Humanitarian Affairs reports. Figures of evacuated for Hurricane Michelle and mortality figures for all hurricanes were taken from Cuban Civil Defense office in Havana.

2 Figures taken from the National Hurricane Center's Hurricane Season's Tropical Cyclone Reports (1996-2002) and the Cuban Civil Defense.

3 According to the Meteorological Institute of Cuba (ICM), there were 13 extreme weather events from 1950-59, 15 between 1960-69, 29 in 1970-79, 44 in 1980-89, and 72 in 1990-1999.

4 In particular, the 2003 report of the prestigious UN's WMO clearly states that the extreme weather documented world-wide is consistent with the predictions of global warming and means the number and intensity of extreme weather events may increase.

5 In an interview with Oxfam Exchange in the Fall 2003 issue ("A Challenging Climate for Oxfam"), Ross Gelbspan explains why climate change is harder on developing countries: "Climate change impacts hit the world's poor hardest because developing countries cannot afford strong enough infrastructure to withstand increasingly frequent and more disruptive natural disaster."

6 The 1999 Human Development Index, which measures basic dimensions for human development, including life expectancy at birth, adult literacy rate and combined enrollment in school, ranked Cuba 58 out of 174 countries.

7 The mission of the International Federation of the Red Cross and the Red Crescent Societies (IFRC), the world's largest humanitarian organization, is to improve the lives of vulnerable people by mobilizing the power of humanity. Founded in 1919, the international confederation is made up of 178 national Red Cross and Red Crescent societies. Its goals are to promote humanitarian values, disaster response, disaster preparedness, and health and community care. With the sharp increase in natural disasters in the last several years, the IFRC has increased their work in disaster preparedness and risk reduction, publishing an annual disaster report as a resource for disaster-related work. The 2002 Annual Disaster Report, titled "Risk Reduction," takes a look at risk reduction all over the world. The IFRC book argues to build comprehensive risk reduction, work must simultaneously be developed in the listed six overlapping areas.

8 Sims and Vogelma's paper "Popular Mobilization and Disaster Management in Cuba" attributes a great deal of the Cuban model's success to the national structures put in place by the central government. Their thesis is that countries with highly organized government structures, public enforcement powers, good information systems through the media and an educated population with access are the most prepared to confront hazards (393).

9 "Havana is a city of 2 million with a history of deaths due to hurricanes. In 1844, 500 lost their lives in Havana. In 1866 the death toll in the city was 600, and in 1944, there were 330 deaths and 269 collapsed buildings. [In 2001 Hurricane Michelle arrived, the worst storm to hit Cuba since 1944, but only five people died.] But 2001 was not the first [time] that preparations had saved lives. In 1996, some historic buildings were destroyed due to Hurricane Lily, but no one died……Does socialism help?...I don't care whether its called socialism or good governance.…The ideological orientation for the national government may not be the most important factor.…Whatever the reasons, Cuba has lessons for the rest of us."
Dr. Ben Wisner The Guardian, Nov. 14, 2001

10 The network resulted from two UNDP- sponsored regional meetings in 2001. One focused on regional institutions and the other on government officials responsible for adaptation to climate change and natural disasters.

11 The family doctor is the bedrock of the Cuban health system that focuses on prevention and wellness promotion. Family doctors are based in each community in a specially allocated apartment above the neighborhood clinic. That doctor is the front line for health care in the community: screening patients, treating those he or she can, and referring others on to the next level of health care. The family doctor monitors pregnant mothers, infants in their first year of life, and the elderly. The doctor also carries out vaccination and health campaigns and educates the public on health issues.

12 The CDRs are neighborhood committees first formed in the 1960's to defend against military attack. Run by and composed of neighbors, the CDR is a tremendous resource for emergency response work. They can mobilize a block extremely quickly and its leaders are cognizant of vulnerabilities and abilities in each neighborhood.

13 The livelihoods approach is a multi-faceted poverty reduction strategy that addresses how people secure their basic needs and focuses on strengthening their capacity to do so.

14 The information in pages 27-39 is sourced from extensive interviews done by the author and research assistant in Pinar del Rio, Isla de la Juventud, Cienfuegos and Havana in October 2002, March 2003 and April 2003 including: representatives from municipal and provincial government, NGOs, cooperatives, mass organizations, the Cuban Red Cross, the National Civil Defense, health representatives, teachers, UNDP, ministerial representatives and ordinary citizens. Some individual interviews are specifically cited.

15 In some countries a decision to issue a warning is often a highly- politicized process, delaying the decision. In 1998 when Hurricane Mitch hit Central America, the President of Nicaragua, Arnoldo Alemán, refused to declare an emergency for several days even after it was apparent that people were dying from rising floodwaters and exposure.

16 Interview by author in March 2003 in Havana.

17 Interviews by author in Cienfuegos and Havana in March 2003.

18 For example, in Hurricane Irene in 1999, a total of 276, 718 people were evacuated including the students. However, only 21,602 went to community shelters (Llanes Guerra 2003). The remainder of the population were assigned to the houses of family, friends and neighbors; shelters that had been identified and assigned to them before the hurricane. If it is necessary, those homes that also double as local evacuation shelters are assigned support in kind of food, water or supplies. This greatly reduces the load of supporting a large population in community shelters in terms of supplies, energy, and disease control.

19 Notes from October 2002 Oxfam visit to Isla de Juventud.

20 The 1961 US government embargo on trade and aid to Cuba was reinforced in 1992 by the Cuba Democracy Act when subsidiaries of US companies were included in the embargo and all ships docking in Cuban ports were prohibited from docking in US ports until 6 months had passed.

21 This is mentioned in an Oxfam Great Britain report published in 2000, "Risk mapping and Local Capacities, Lessons from Mexico and Central America" by Monica Trujillo, Amado Ordoñez and Carlos Hernandez, which sketches a clear picture of needs in disaster preparation and risk reduction in Central America and Mexico and is the source for all the information in section 1.

22 Although warnings regarding El Niño's advance lasted for weeks and those for Hurricane George for several days, marginal population groups did not receive the information necessary for them to make contingency plans in the face of a certain disaster (PAHO 1998, 76).

23 As part of their work on a risk reduction data base in the Caribbean, the UNDP contracted

a report on the status of risk reduction initiatives in the Caribbean. The report, "Risk Management and Reduction in the Caribbean: Considerations on the State of the Game and on New Challenges for the Future" by Allan Lavell compared risk reduction in Central America and English -speaking Greater Caribbean Basin. He found that the English-speaking Caribbean had important national consensus on risk reduction and national structures but very few practical projects in risk reduction at the community level. Central America, without the strong national consensus, had a rich experience in local interventions.

24 Didier Cherpital, Secretary General of the International Federation of the Red Cross and Red Crescent societies in the 25 and 26 meetings (July 16) of the 2002 Substantive Session of the UN Economic and Social Council drew attention to Cuba's handling of Hurricane Michelle in 2001, underlining the value of the pre-disaster planning and the key role of direct participation of local communities.

25 The idea of building on training communities in disaster preparedness skills as a way of reinforcing risk reduction forms the base of the Community Based Disaster Management approach (CBDM) which aims at reducing vulnerabilities by strengthening people's capacity to cope at the community level. The Asian Disaster Preparedness Center in Bangkok has done significant work on CBDM (Yodmani 2000).

26 The International Federation of Red Cross and Red Crescent Societies created the Pan American Disaster Response Unit (PADRU), to provide coordinated technical and material disaster management support to their member agencies in the Americas. PADRU supports the work of the National Societies during an emergency by offering a wide range of technical services, such as disaster management, supplies, water and sanitation teams, telecommunications, and logistics.

27 The data on Hurricane Mitch mortality is quite varied. This statistic is from the Washington Office on Latin America's report "Responding to Natural Disaster: The role of the Inter-American Development Bank's Lending in Rebuilding Central America after Hurricane Mitch 2001."

28 This is backed up by the findings from the IFRC Disasters Report 2002 which cites numerous examples increasing effectiveness in disaster work by building on relationships of cooperation and trust.

29 The IFRC's Disaster Preparedness Training programs emphasize the important link between building a community's skills and organizational structure and that community's ability to reduce risk.

ANNEX

Terminology for basic terms of disaster risk reduction according to the United Nations International Strategy Disaster Reduction

Hazard
A potentially damaging physical event, phenomenon, or human activity that may cause the loss of life or injury, property damage, social and economic disruption, or environmental degradation.

Risk
The probability of harmful consequences or expected loss (of lives, people injured, property, livelihoods, economic activity, or environment) resulting from interactions between natural or human induced hazards and vulnerable conditions. Conventionally, risk is expressed by the equation: risk = hazard x vulnerability.

Disaster
A serious disruption of the functioning of a community or a society causing widespread human, material, economic, or environmental losses that exceed the ability of the affected community or society to cope, using its own resources.

Disaster Risk Reduction
The systematic development and application of policies, strategies, and practices to minimize vulnerabilities and disaster risks throughout a society.

Mitigation
Structural and non-structural measures undertaken to limit the adverse impact of natural hazards, environmental degradation, and technological hazards.

Preparedness
Activities and measures taken in advance to ensure effective response to the impact of disaster, including the issuance of timely and effective early warnings and the temporary removal of people and property from a threatened location.

Vulnerability
A set of conditions and processes resulting from physical, social, economic and environmental factors that increase the susceptibility of a community to the impact of hazards.

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NOTES

We can work together to build a culture of prevention. Cuba's experience is an important contribution to debating and improving risk reduction at the community level in Central America.

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