

POPULAR MOBILIZATION AND DISASTER MANAGEMENT IN CUBA

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SUMMARY

Cuba has effectively implemented a system of popular mobilization and education to prepare people for such natural disasters as hurricanes. Compliance with evacuation orders is impressive. Top priority is attached to saving lives. The country's acclaimed programme accounts for the limited toll of Hurricane Michelle in November 2001, which was the most powerful storm since 1944. Five Cubans died in the storm, which wreaked havoc in Jamaica, Honduras, and Nicaragua. This article reviews recent Cuban experience in disaster preparedness, which was achieved despite material scarcity. Since the prestigious Intergovernmental Panel on Climate Change warns of increased susceptibility to disasters in future, Cuba's record deserves wide attention. Copyright © 2002 John Wiley & Sons, Ltd.

INTRODUCTION

Natural disasters have exacted a heavy human toll on nations throughout the Caribbean and central America, but Cuba is largely an exception to the rule. Despite material scarcity, Cuba has a well-informed citizenry and few casualties due to hurricanes, mudslides, earthquakes and other natural disasters. The International Federation of Red Cross and Red Crescent Societies (IFRC) highlighted an 'enormous' contrast between the scale of disasters' tolls on Cuba and its neighbours in central America and the Caribbean (IFRC, 2002, p. 1). How is Cuba able to do so much with its limited resources? Much credit should go to the country's system of popular mobilization and disaster management. This article examines Cuba's structure for disaster assistance, modes of information dissemination and government institutions' role in hurricane preparedness. Apart from published information, the article draws upon a small sample of interviews conducted during February 2002 in Havana and Matanzas. The latter province was hardest hit by the most powerful storm since 1944, Hurricane Michelle, which battered Cuba in early November, 2001.¹

Cuba's success in saving lives amidst natural disasters reflects joint efforts of the civil defence, meteorologists, and public administrators who assign high priority to the value of human life (Cawthorne, 2001; IFRC, p. 1). Jose Rubiera, vice-president of the United Nations World Meteorology Organisation's Hurricane Committee and director of the Cuban Meteorology Institute's National Center of Forecasts, stated that Cuba's forecasting system, civil defence and official support for hurricane preparation have indeed lessened natural disasters' toll. As Rubiera said, 'When an intense hurricane comes, the probability of which is logically increasing with the passage of time, we will be prepared in order to keep the damages at a minimum, and we will try to ensure that not one single Cuban is killed' (Inter Press Service, 2001). Cuba's veteran leader Fidel Castro underscored the point as the island nation faced Hurricane Michelle. 'We will overcome this problem no matter how big the damage. For us victory means having a minimum loss of human life' (Bauza and Cazares, 2001).

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NATURAL DISASTERS' IMPACT AND ENVIRONMENTAL ISSUES

Natural disasters include flooding, earthquakes, droughts, volcanic eruptions, windstorms, and other weather-related phenomena. While many natural disasters are unpredictable, some could be minimized if humans left a lighter footprint on the Earth. Increased carbon dioxide from burning fossil fuels has increased air and water temperatures, resulting in fiercer hurricanes and higher storm surges. The United States is a major culprit for environmental degradation because it is the largest producer of greenhouse gases; also, its president, George W. Bush, rejected the Kyoto Protocol of 1997 that would limit carbon emissions, on grounds that it would restrict US economic growth (Brown, 2001).

The United Nations Disaster Relief Office (UNDRO) defines a natural disaster as a natural occurrence where at least ten people are killed and/or US \$1 million is lost. Using these criteria, Cuba faces about two to three disasters every year, from earthquakes, volcanic eruptions, hurricanes, and torrential rains that cause mudslides and flooding (Lezcano, 1995, p. 399). Natural disasters destroy lives, property, livelihood and the social fabric of the communities. They can devastate economies, especially of those countries which lack capital and adequate infrastructure. Human actions aggravate the consequences of natural disasters and impair nature's self-correcting mechanisms. Increasingly, some environmentalists speak of 'unnatural disasters,' alluding to their human origins. Even the apolitical Red Cross refers to 'natural' disasters (Abramovitz, 2001; IFRC, 2002).

During the 1990s, damage caused by disasters was assessed at \$608 billion, more than the previous four decades combined. Of the 10 million people killed in disasters during the 20th century, over half-a-million died between 1985 and 1999. While there are 500 to 850 'natural' disasters each year, only a few are destructive enough to make headlines. Yet during the past 50 years, 'natural' disasters of a catastrophic level have more than quadrupled (Abramovitz, 2001, p. 116).

While direct effects are visible on people and infrastructure, indirect effects are felt in terms of loss of revenue and productivity in the workforce. Countries later face multiplied effects including reduced government monetary reserves, higher inflation and increased public expenditures. The wealthiest countries suffered 57% of the disaster-related economic losses from 1985 to 1999 but the figure represented only 2.5% of their gross domestic product (GDP). The poorest countries that sustained 24% of economic losses from disasters lost 13.4% of their GDP. Only one-fifth of global economic losses were insured, of which 92% were in industrialized countries (Abramovitz, 2001, p. 116).

Jose Carlos Lezcano of Cuba's Institute of Meteorology has written extensively on natural disasters, their causes and ways to mitigate their effects. Lezcano noted several reasons for increased vulnerability to natural disasters. First, urbanization causes and reflects population growth in concentrated urban areas, especially in less developed countries. The poverty and poor quality infrastructure associated with urban sprawl leaves people more susceptible to natural disasters. Residential and commercial areas are often situated dangerously close to risk zones such as rivers and oceans.

Second, the global environment is deteriorating, and only a small but vocal number of sceptics with easy access to communication channels (e.g., Lomborg, 2001) would disagree with the prestigious Intergovernmental Panel on Climate Change (IPCC) that increased global levels of greenhouse gases have led to warmer water and air temperatures that develop into tropical storms and hurricanes. Damming of rivers, deforestation and draining and development of wetlands—all contribute to destabilization of the climate. According to the IPCC, sea levels will rise by 9–88 cm and temperatures will increase by 1.4–5.8°C over the next 100 years (Abramovitz, 2001, p. 117), causing coastal flooding and more destructive hurricanes that will severely impact countries like Cuba. As a student of hurricanes observed, 'not for nothing is the Spanish word for storm *la tormenta*' (Davies, 2001, p. 202).

Third, political support to offset natural disasters is lacking. The World Bank and the US Geological Survey maintain that the cost of natural disasters could be reduced by \$280 billion if one-seventh of that amount was invested in sustainable development and disaster preparedness. Disaster mitigation would cost considerably less than bills for relief and recovery (Abramovitz, 2001, p. 117), but many political leaders find the former difficult to sell. Fourth, planning or prevention mechanisms to counter natural disasters and environmental problems are lacking. Fifth, industrial and civil infrastructure is often crudely built and maintained. Finally, the economies of many

less developed countries are not diversified and are therefore volatile. When an industry or critical agricultural product is damaged, there may be little money to spend on basic needs (Lezcano, 1995, p. 399).

HURRICANE CATEGORIZATION

The Saffir-Simpson hurricane scale has one to five ratings based on hurricane intensity. It is used to estimate potential coastal property damage and flooding expected from a hurricane landfall. Wind speed is the principal factor in the scale. Storm surge statistics are determined primarily by the slope of the continental shelf where hurricanes land. A category-one hurricane is characterized by winds of 119–153 km/hr winds and storm surges up to 1.5 m above normal with superficial damage primarily to unanchored mobile homes, poorly constructed signs, piers, shrubbery, and trees. Some coastal roads may be flooded. Category-two storms feature 154–177 km/hr winds and storm surges 1.8–2.4 m above normal, with moderate damage to roofs and buildings and considerable damage to mobile homes, signs, water craft and piers. Trees and shrubbery may be knocked down. Coastal and low-lying escape routes may be inundated up to four hours prior to the eye of the storm.

In category-three hurricane, winds reach 178–209 km/hr with storm surges 2.7–3.7 m above normal. Small buildings may suffer structural damage. Mobile homes and signs are destroyed. Hurricanes of this magnitude and higher will have low-lying evacuation routes flooded several hours before the hurricane centre's arrival. Flooding may occur in areas lower than 1.5 m above sea level and up to 13 km from the coastline. Residences near the shoreline may need to be evacuated.

Category-four hurricanes are marked by 210–249 km/hr winds with storm surges 4–5.5 m above normal. Homes, industrial buildings and infrastructure face damage, and shrubs, trees and signs are blown away. Lower floors of coastal structures are subject to extensive damage, flooding is likely in terrain less than 3 m above sea level and evacuation of residents may be required as far inland as 10 km.

Hurricanes in category five are highlighted by winds stronger than 249 km/hr and storm surges up to 5.5 m above normal. Many roofs cave in and smaller buildings may collapse or blow away, especially structures within 450 m of the shoreline. Evacuation of low-lying residential areas within 8–16 km of the shoreline is recommended. Hurricane Mitch of 1998 was a category-five hurricane at peak intensity over the western Caribbean. Hurricane Gilbert of 1988 was a category-five hurricane at peak intensity and is the strongest Atlantic tropical cyclone in record (US National Hurricane Center, 2002). Davies nevertheless called it 'mystifying' that 'people are still routinely surprised by what a hurricane can do. The first crucial point to be recognized is that even a minor storm can generate a major disaster' (Davies, 2001, p. 239).

DISASTER MANAGEMENT AND MITIGATION

Planning for hurricanes entails many steps. Planners must understand how hurricanes form, where they travel, and their potential for damage. They should assess the exposure of risk areas in terms of lost lives, buildings and services. Planning should include logistical information, emergency plans, a method for financing the plans, diagnoses of different disasters and legal information regarding governmental assistance. Prevention should provide technical evaluations, long-term programmes, construction norms and applied research results (Lezcano, 1995, p. 400). Disaster hazard mitigation includes advance action taken to reduce the long-term risk to human life and property from hurricanes, floods, earthquakes and landslides (Schapley and Schwartz, 2001, p. 704). Actions may include adoption of strict building codes and design standards, land-use restrictions, flood and erosion-control devices, relocation structures for shelter and educational programmes for officials and the public in general. Mitigation may benefit states by saving lives, reducing injuries, preventing or reducing property damage, protecting facilities and reducing economic losses, and social displacement and minimizing legal liability of public officials.

Coastal municipalities need residents trained to respond to disasters and to facilitate evacuation. Emergency managers must plan for inexperienced evacuees (Norris, Riad, and Waugh, 2001, p. 309). Evacuation is particularly challenging where farmers have no option but to cultivate land in high-risk zones. A dispersed rural population may live with poor infrastructure, inadequate transportation and no effective warning system. Bangladesh is a

case in point. A cyclone that passed over it in 1970 killed over 300,000 people; in 1991, flooding claimed 139,000 lives (Schapley and Schwartz, 2001, p. 319).

Effective evacuation policies should: (1) assess disaster risk, (2) communicate dangers to residents, (3) assure that residents pack appropriately and secure their homes and businesses, and (4) provide guidance and support for an orderly evacuation to shelters along safe routes. Many governments invest far too little in emergency management planning, including evacuation planning, restricting development in vulnerable areas and in improved infrastructure and public works. Power lines should go underground. Cuba's many above-ground power lines serve as barometers of electric supplies' vulnerability to storms. Finally, emergency plans need to anticipate the maximum number of residents and visitors and assume that they have limited knowledge of hazards ((Norris, Riad, Waugh, 2001, pp. 322–323).

Norris, Riad, and Waugh (2001) proposed several recommendations for an effective evacuation policy. Public administrators must ensure that people do not fear evacuation and address such factors as looting, protection of property, shelter safety, supply of provisions and re-entry to communities. This can be done through education and public awareness campaigns through television, radio and town meetings with carefully selected speakers. Programmes should extend to schools and work places. Public administrators must help the public understand risks associated with hurricanes and the benefits of compliance with evacuation orders. People should be aware of evacuation procedures, securing their homes, and packing emergency supplies. Attention should be given to people with special needs such as people with disabilities.

CRISIS AND EMERGENCY MANAGEMENT EXAMPLES

Three illustrative examples of disaster management are provided below, to highlight possible advantages of centralized decision-making systems, the role of helpers in mobilization, the importance of national unity and pride, and the collaboration of scientists, public administrators, and communities. Bitter experience with a category-four Hurricane Andrew in Florida, USA, during 1992 showed the need to reform the US Federal Emergency Management Agency (FEMA).

Crisis management literature suggests that centralized decision-making structures help mitigate the effects of natural disasters because local emergency units lack a holistic picture and may focus on aiding their own locality. They lack the information available to officials at higher decision-making levels and are unaware of larger political or social issues and constraints. Also important are emergency managers or the civil defence. They operate as key actors at different levels to provide command and control systems and facilitate damage assessment (Farazmand, 2001, p. 5).

The absence of such emergency managers compounds destruction caused by disasters. While Cuban Civil Defence officials play a widely recognized role amidst crisis and can levy fines for failure to comply with evacuation orders, Dade County managers had no way to enforce cooperation with their directives. Minority groups such as blacks, Hispanics and immigrant workers suffered the most from Hurricane Andrew. Their suffering was aggravated by long-term effects of enduring unemployment, homelessness, hunger, ill health and socially and economically driven problems such as crime and drug abuse (Farazmand, 2001, p. 5).

According to Farazmand (2001), an example of effective response to natural disaster was the Iranian government's mobilization following a huge earthquake in 1989, which killed about 50,000 people and destroyed two cities. A national command and control system reminiscent of the structure employed during Iran's war against Iraq helped prepare the country for the disastrous earthquake. The central government's emergency forces were matched in many localities by popular forces. Political and organizational coordination was aided by a post-revolutionary spirit of national unity (Farazmand, 2001, p. 5).

Due to the integration of public administration, science and community action, disaster was averted in Qinglong County, China, during the great Tangshan earthquake. On July 28, 1976, the 470,000 residents of Qinglong County evacuated their homes hours before an earthquake of 7.8 magnitude hit. Over 180,000 buildings were destroyed. No one in the county was killed by the disaster while a quarter of a million people perished and 600,000 were injured in surrounding counties. Factors facilitating positive results included a scientific but citizen-based monitoring system, excellent administrative procedures and a spirit of cooperation. Qinglong County had

established an earthquake office, organized procedures for preparation and response, trained officials and activated plans to enhance citizen safety (Col and Chu, 2001, p. 581).

In sum, collaboration and coordination of public administrators, citizens and scientists can mitigate the effects of disasters. Administrators had formulated sound public policy and followed guidelines. Well-informed citizens were empowered to act. Scientists collected, shared and disseminated multi-disciplinary information to public officials and residents, which facilitated preparedness. Mobilizing people was easy because every sector of society participated (Col and Chu, 2001, p. 585).

TORMENTAS IN THREE SETTINGS

Countries' response to natural disasters may be more related to their social and organizational systems than to wealth or regime type. Countries with strong economies and democratic forms of government have not necessarily weathered hurricanes well. Nations with highly organized government structures, public enforcement powers, a media that informs citizens of the weather or likelihood of an earthquake, and an educated citizenry with access to media channels via televisions and radios seem to be the most prepared to face disasters with minimal loss of life. Three responses to Hurricanes Georges and Mitch in 1998 are briefly noted in the ensuing section. Cuban experiences with Georges and 2001's devastating Michelle are discussed in more detail later.

Puerto Rico

Puerto Rico is a colony of the United States with a measure of self-government.² Its 3.9 million residents have 2.7 million radios and one million televisions, which helped prepare people for Hurricane Georges in 1998. Television stations updated viewers on the hurricane's status, showed footage of previous hurricanes and their effects and gave advice on food and water storage. People were advised to remain indoors and to secure hurricane shutters on windows (Rohter, 1998, p. 6). A former resident of the island observed that Puerto Ricans' preparedness for hurricanes had risen in tandem with storms' apparent greater severity in recent decades.³ Once Georges passed, repair crews restored utilities and public works and FEMA crews assessed damage and sent money to affected areas.

Puerto Rico has one of the strongest economies in the Caribbean, partly due to past exemptions from US income tax for US-owned enterprises located on the island. Low-cost labour and a diversified industrial sector and tourism have strengthened the economy, although globalization may make such advantages fleeting. One index of development is Puerto Rico's literacy rate of 89% and its life expectancy rate at birth of 75.7 years. The GDP per capita (purchasing parity) is US \$10,000 (World Factbook, 2001).

Dominican Republic

People in the poor, democratic Dominican Republic were not as prepared for Hurricane Georges. The population of 8.6 million had 1.4 million radios and 770,000 televisions, but media outlets continued broadcasting normally scheduled programmes until the last minute (World Factbook, 2001). News journals criticized Civil Defence Chief Elpidio Baez for allegedly failing to warn people of the impending hurricane for fear of creating widespread panic. Some people seeking refuge found hurricane shelters closed and were turned away by soldiers. Officials reportedly opened a dam that was about to burst without warning residents downstream. Some of them drowned in the ensuing flood (Rohter, 1998, p. 6).

The country's economy is characterized by great inequality, since the poorest half of the population receives less than 20% of the gross national product while the richest 10% enjoy 40%. The literacy rate is 82% and the life expectancy rate at birth is 73.4 years. The GDP per capita is US \$5700.

Nicaragua

In November 1998, Hurricane Mitch ravaged central America, obliterating the countryside and leaving 10,000 dead in a 'complex political emergency' compounding effects of a storm, conflict and structural adjustment (Chris-

²Professor Jose Cruz of the State University of New York at Albany explained on June 20, 2002, that Puerto Ricans living on the island cannot vote in U.S. presidential elections, nor do they have representation in the US Congress as a state.

³Discussion with Jose Martinez-Fabre, doctoral candidate in Political Science at the State University of New York, Albany, on April 13, 2002.

toplos, 2000). In the impoverished fledgling democracy of Nicaragua, government officials bickered over the recovery effort. Nicaragua's civil war between the Sandanista National Liberation Front and American-backed contras fostered a polarized political climate mined by petty differences that made disaster relief ineffective. The state was divided on how to delegate authority for the relief effort. The conservative government and the Sandanistas disagreed over whether the effects of Hurricane Mitch should be labeled a 'national disaster' or a 'state of emergency' (Rohter, 1998, p. 6).

Partisan squabbling left its mark on the city of Posoltega. The government's negligence in warning citizens of hurricane-related hazards led to 1500 deaths due to mudslides. Opposing groups subsequently tried to take credit for distribution of food and medicine and other disaster relief. Only popular discontent led politicians to lay aside their political differences. Belatedly, President Arnaldo Aleman authorized supervision of relief activities by the Roman Catholic Church and opposition party Sandanista General Joaquin Cuadra called for national unity. Nicaragua is one of the poorest nations in Latin America along with Haiti. It has a low per capita income, large external debt, and lagging socio-economic indicators. Its literacy rate is 65.7% and life expectancy at birth is 69 years. The GDP per capita is US \$2700. There are 1.2 million radios and 320,000 televisions for the population of 4.9 million (World Factbook, 2001). But in sharp contrast to Cuba, disaster preparedness has failed to engage policy makers' attention. As Christophlos (2001) observed, in Nicaragua, 'development is said to be the solution for everything, so why pay specific attention to risk?'

BACKGROUND ON CUBA AND ITS ECONOMY

Cuba covers 110,920 sq. km and is the largest of the Greater Antilles, a 1600 island archipelago located in the Caribbean Sea with over 6000 km of coastline. The literacy rate of those aged 15 years and above is 95.7%. The GDP per capita rate (purchasing power parity) is US \$1700. Life expectancy at birth is 76.4 years. There are 3.9 million radios and 2.64 million televisions for a population of 11 million (World Factbook, 2001).

During the 1960s to 1980s, Cuba depended heavily on the Soviet Union for trade, mainly markets for the island's sugar, subsidies and other forms of economic aid. The Soviets purchased Cuban sugar above the world market rate, and annual assistance provided through subsidies ranged from US \$4–6 billion (World Factbook, 2001). When the Soviet Union collapsed, Cuba lost 40% of its aid and trade from the Soviet Union and its allies, which led to severe recession. Cuba can no longer rely on sugar as its primary source of income and has turned to tourism as its major source of hard currency, approximately US \$2 billion a year (The Associated Press, 1999).

Cuba has a long history of natural disasters, especially hurricanes. On November 9, 1932, a hurricane struck Cuba and left more than 3500 people dead. While Hurricane Michelle was the most intense storm to hit Cuba in nearly half-a-century, it was not the most devastating in terms of human life. Only five lives were lost. Unfortunately, the risk of hurricanes is expected to rise with increased cyclonic activity along the equator in the Atlantic Ocean. Rubiera called 1995–2000 the most intense period of weather in the 20th century, part of a 25-year cycle of high and low hurricane levels. The level of storm activity is directly related to current and temperature in the Atlantic and periods of drought and rainfall in Africa's Sahel, or sub-Saharan savannah. Scientific observation indicates that for every dozen storms that move west across the Atlantic, three or four mature into hurricanes (Inter Press Service, 2001).

Cuba's humid tropical climate subjects it to hurricanes and heavy rains. About 1 million (9–10%) of Cubans live along the coast at an elevation of 0–5 m (Lezcano, 1995, p. 400). This low-lying region would be the first impacted by a hurricane. Hazards to Cubans are compounded by poor housing because dwellings generally cannot withstand heavy rains and winds associated with hurricanes. Of the 556,000 housing structures in Havana, only 50% were rated as adequate to normal, but housing in rural regions is in greater disrepair and vulnerable during heavy rains, let alone a major hurricane (Lezcano, 1995, p. 404).

Drainage systems are very important in urban areas around Cuba. Havana's drains and sewers often are clogged because solid waste is not removed and pipes are narrow, old, and insufficient to service a large population with buildings situated close together. About half of Havana relies on a sewer system constructed in the 19th century; perhaps 90% of it is in poor condition. The structure was originally designed to accommodate a population of 400,000. With a population hovering around two million, Havana is ill equipped to provide for its residents' basic needs.

CUBAN DISASTER PREPAREDNESS

While Cuba's socialist government creates some disincentives regarding the protection of national resources, its disaster mitigation system has many strengths. The Institute of Meteorology tracks storms and informs the government of impending danger. The government has good communication and evacuation plans implemented by the Civil Defence and Red Cross. Disaster management is facilitated by legislation and strong national leadership, and government institutions aid recovery and reconstruction.

The Institute of Meteorology, a unit of the Ministry of Science, Technology and Environment, monitors and predicts weather, hurricanes and sea conditions. Storm warnings help publicize dangerous conditions but since the agency has limited funds and old equipment including poor radars and satellites, it sometimes responds slowly to imminent storms and forecasts inclement weather haphazardly. Public information also is provided by the National Forecast Centre, whose early warning systems are broadcast over television and radio. The path and intensity of hurricanes as well as possible hazards are described (Rubiera, 2000).

Because hurricanes know no borders and are oblivious to diplomatic relations, they threaten both the US and Cuba, distant neighbours located just 90 miles apart. Hurricane preparedness can be enhanced by information exchange. Meteorologists from the US National Hurricane Center in Miami and the Cuban Meteorology Center in Havana have corresponded for years. A P-3 Hurricane Hunter plane operated by the US Department of Commerce which also enforces the country's economic embargo against Cuba, regularly flies into Cuban airspace to relay information about storms (CNN, Worldview 1999).

The Cuban government has a four-phase programme for natural disaster reduction. First, the informative phase is implemented two days before the hurricane arrives. Through radio and television, the public is told that a hurricane is likely to hit. The second alert phase goes into effect a day later, warning citizens that the hurricane will probably hit and to prepare for possible evacuations. Several hours later, the third phase, alarm, is called, to notify the public when the hurricane has struck. The fourth phase immediately takes effect. All vehicles in the province, including buses, taxis, and farm trucks, prepare to take people to higher ground. This is no mean feat in Cuba. State-owned vehicles are easily accessible, but auto parts and fuel are scarce and rural roads often are in poor condition (Snow, 1998).

Government intervention and popular participation are critical elements of Cuban disaster mitigation and public health policy (Chomsky, 2000). The Constitution enjoins the state to save lives and resources during natural disasters (Concurso de Buenas Practicas, 1996). The Ministry of Public Health is responsible for providing health care during disasters and participates in hurricane simulation exercises of the Civil Defence. The latter body was established in 1966 as a division of the Ministry of Armed Forces, to promote public safety and economic recovery from disasters or war. The presidents of Provincial Assemblies and Popular Municipalities sit at the head of the Civil Defence in territories scattered across the nation. Public safety is achieved by warning of impending danger, preserving infrastructure, evacuating risk areas and monitoring possible chemical, radioactive and biological contamination, in collaboration with the Red Cross (Ministerio de las Fuerzas Armadas Revolucionarias, 2001).

A documented hurricane plan including directions from the central administration of the states is to be carried out at the regional level by the Defence Committees of the Revolution (CDR). It is to be coordinated by many people from national government units, provincial leaders and heads of municipalities. The Civil Defence conducts research to measure the effectiveness of popular instruction on natural disaster preparedness (Juventud Rebelde, 2001).

A senior Education Ministry official noted schools' important role in disaster preparedness. 'From first to fourth grade, students are familiarized with their environment; beginning in fourth or sixth grade, students learn how to prepare for hurricanes,' said Lisardo Garcia Ramis. Schools show videos on disaster preparedness and non-formal education utilizes television to reach all elements of society, to ensure citizens' preparedness. In addition, the state media analyses environmental issues, such as climate change, and has helped promote protection of coastlines threatened by careless visitors.⁴

Citizens serve on civil defence committees at the community, neighbourhood and block level. They visit each shelter to ensure adequate water, food, blankets and other provisions. Civil defence workers are accountable for

⁴Interview in Matanzas with Lisardo Garcia Ramis of the Education Ministry in Havana, 15 February, 2002.

others in their block and check the safety of all households. Civil defence services are administered on a local level by leaders of the Committees for the Defence of the Revolution, who act as a watch group over their communities (Snow, 1998). While they may be regarded as political busybodies during normal times, many citizens appreciate their concern during a crisis.

According to one knowledgeable observer, however, local leaders actually exercise little control over emergency management. Most major decisions are made at the provincial and state levels. Duties of the CDR and local leaders are not clearly outlined. This is one area where Cuba does not adhere to guidelines established by the disaster relief organization of the United Nations (Lezcano, 1995, p. 402).

Castro's evident concern about disaster management is a factor in hurricanes' minimal toll in Cuba. He is often seen surveying damage, encouraging people and making televised appearances following hurricanes. He has personally overseen the evacuation and recovery of several hurricane-stricken areas. Even a man rankled by Castro's economic policies admired his courage and leadership amidst adversity, and said that his appreciation was widely shared. 'Castro courted danger by travelling to a bridge near Matanzas at the height of Michelle's devastation,' he said. 'He inspired people by telling them, "Don't worry, we'll build better houses; take shelter, we have food, blankets and medical care to keep you comfortable while the storm passes."'⁵

The fall of bureaucratic authoritarian regimes in Latin America and the rise of democratic political systems in eastern and central Europe have curtailed the number of world leaders in army drab (Randall and Theobald, 1998). The long-embattled Castro speaks of hurricanes as enemies to be vanquished. Georges was a 'destructive force' amounting to 'a kind of invasion.' Experience with Georges and Michelle is briefly considered, to highlight communication strategies and actions taken by policy authorities and citizens.

GEORGES' 1998 VISIT TO CUBA

Communication

As a hurricane warning for Georges took effect, Castro alerted his Cabinet and reassured citizens that the armed forces would assist in transporting food, medicine, and other supplies to the victims of hurricane. No one would be abandoned. Construction materials would be made available to those left homeless by Georges. Cubans were encouraged to monitor official radio reports and Castro expressed confidence in the strategies of local government to counter hurricanes.

Castro offered to send doctors and medical supplies to other countries affected by the hurricane. A speech on his neighbours' high infant mortality rates noted 'a hurricane' that Castro said caused 'terrible human damage.' Explaining his medical diplomacy Castro said, 'if a country of such limited material and economic resources can do something . . . the industrialized world can do infinitely more.' He referred to a programme that sent Cuban doctors to other hurricane-ravaged countries on humanitarian missions. In the aftermath of Georges and Mitch, 45 medical brigades of 900 Cuban doctors assisted the sick and wounded in 13 hurricane-ravaged countries (Garcia Gomez, 2000). Castro's plan received some financial support from Latin American and European nations but not from the United States. He said if that country contributed one dollar for every \$1250 spent on defence, it could save 50,000 lives (Rice, 1998).

After Georges' passage, Castro congratulated Cubans for showing 'revolutionary discipline' to 'combat' the hurricane (Rohter, 1998, p. 6) and praised their civil defence system for saving many lives. Five people died in Cuba as a result of the hurricane, compared with 300 killed on the island of Hispaniola, which comprises Haiti and the Dominican Republic.

Actions taken

In eastern Cuban Civil Defence workers evacuated a record-setting 818,000 people and 750,000 animals from flood-prone areas in 72 hours with 10,000 vehicles and no traffic accidents. Cuban Vice-President Raul Castro, brother of Fidel Castro and head of the armed forces, oversaw the evacuation efforts. The Revolutionary Armed Forces made helicopters and amphibious vehicles available to transport people to higher ground. Volunteers were

⁵Interview in Matanzas, 13 February, 2002.

solicited to help farmers harvest coffee and to evacuate 274,000 head of cattle and other livestock from low-lying regions.

Occasionally, Cubans fear leaving their homes due to the possibility of theft. Such was the case of a woman whose story was printed in Guantanamo's weekly newspaper, *Venceremos* ('We Will Be Victorious'). Eneida refused to leave her home for higher ground until a policeman threatened to issue a fine. The next morning, her home was submerged. Had she not left, she might have perished in the flood. Her story is unusual, as Cubans are taught from an early age to quickly mobilize in the event of natural disaster or a military conflict. It may have been printed as a cautionary tale. A young man interviewed about his experience with Hurricane Michelle said that civil defence workers strongly advised his neighbours to evacuate their homes near the Atlantic Ocean, but no one was compelled to do so. Some remained and survived, he said.⁶

The coastal city of Guantanamo is subject to hurricanes and has a Cold War legacy in the form of a US naval base, which holds prisoners taken in Afghanistan. Recurrent tensions with the United States have sparked Cuban fears of a US-led military invasion, and led Defence Councils to prepare for attacks from Nature or a belligerent neighbour. 'We've been living in a war situation so we needed to develop certain practices for defence,' said Jorge Gonzalez Corona, an adviser on international collaboration in the Ministry of Education. 'Damage from Hurricane Flora in the 1960s also taught us that we need a high level of organization in society. Every Cuban, child, adult and elderly, has to defend himself. Defence isn't left to the army; every citizen has a role.'⁷

All instructions are written. Also, we have training programmes every year, with or without hurricanes,' Gonzales said. People are mobilized through mass organizations, unions and professional associations. There are special forces for the elderly and children. We've studied areas in danger of flooding and we know from where people need to be evacuated. We reserve food, medicine and doctors and nurses. In short, the whole country goes on alert and the main objective is to preserve human life.⁸

Cuba's efficient organizational structure led to the evacuation of 47,000 in Guantanamo province, with no lives lost to the hurricane (Snow, 1998). Elsewhere in Cuba, six persons died in the hurricane, but the country's crops were devastated. Long droughts blamed on El Nino were followed by Georges' heavy rains. Crops with short cycles such as squash, cucumbers, and salad greens needed sowing to compensate for lost crops (Snow, 1998). About 42% of crops in five of Cuba's 14 provinces were destroyed. Cuba finished the year with one of the worst harvests since the 1959 revolution. Although workers organized by the local Communist Party tried to save rotting plantains, yucca, yams, and manioc, it was difficult to salvage much of the coffee or sugarcane crop (Snow, 1998).

Rations to eastern Cuba were increased to accommodate four million people. Those below 14 years of age and above 60 years were given extra rations: about an extra kilogram of beans per month, in addition to the rice, peas, bread and cooking oil provided for drought-stricken people. The government provided powdered milk for children below seven years old beyond the almost two litres of milk daily available for each child. In addition to the \$2–3 million donated by the World Food Programme each year, Cuba requested \$20.5 million to purchase rice, beans and canned fish for those affected by the drought (Snow, 1998). With help from international institutions, Cuba fed its people, especially children and the elderly.

HURRICANE MICHELLE'S 2001 VISIT

Before reaching Cuba, Hurricane Michelle wreaked havoc in Jamaica, Honduras, and Nicaragua, leaving 12 persons dead, 26 missing and several thousand homeless. Some 115,000 people were forced to flee. In Cuba, civil defence workers and 24,500 Cuban Red Cross volunteers evacuated about 750,000 people living in low-lying areas in the largest evacuation in Cuban history. The government reported about 70,000 Cubans and 5000 vehicles assisted in the evacuation effort. Before the weather worsened, buses transported people to shelters. As the storm raged, army tanks carried people to secure locations (Bauza, 2001). Over 741,000 livestock were led to higher ground and 52,000

⁶Interview in Matanzas with Yivis Yuniur Barguin Dominguez on 15 February, 2002.

⁷Interview in Matanzas, 16 February, 2002.

⁸Interview in Matanzas, 16 February, 2002.

students were transported to their homes from education camps where they had been harvesting crops. Hundreds of tourists and tourism workers were evacuated from the Varadero resort area off the north coast of Matanzas.

People were advised to tape windows, close holes in their homes with boards and tie down water tanks on their roofs. Residents waited in long queues to stock up on non-perishable items and supplies. People who fished secured boats by bringing them to higher ground, some in town plazas. Those who remained in their homes stored kerosene lamps, coal, batteries, candles and water and cooked enough rice and beans to last a week. 'The hurricane hit so hard we couldn't believe it,' said Silvio Rodriguez, a manager at a Matanzas hotel.

Although Matanzas was far from the centre of the hurricane, we felt winds as high as 120 kilometers per hour. In the southern part of the province and centre of the city, winds reached 200 kilometers per hour. Lights went out and water was cut off for a week. Electricity went off with the first winds. All electric cables came down. Children were crying and screaming. Some people prayed, thinking the world was coming to an end. We lived through a horror movie for 12 hours. Although the storm passed in an hour, winds and rain lasted much longer and there was no communication. My household had a small radio. We could keep up with the provincial radio station but batteries went low in three hours. I could hear it only faintly. At last I heard that the hurricane had left Cuba. Still, the wind was very strong and I saw big objects flying everywhere. When we opened windows, we saw havoc. Giant trees up to 200-years-old were uprooted. Telephones were out.⁹

Agriculture was hit hard in Matanzas with 99,000 tons of citrus fruits destroyed and tobacco seed beds swept away by wind. Plantains and bananas, both staple and popular crops, were shaken off trees. Much of the damaged fruit was converted into juice and distributed to hurricane victims. Though crops have been harvested by machine in recent years, subject to availability of fuel, most of the 2001 harvest was done by hand. Despite a food shortage in the wake of hurricane, Rodriguez remembered that 'We shared everything we had. It wasn't much, but we had collective meals. People started helping each other on the spot.'¹⁰

Although Hurricane Michelle missed Havana, it cut a path across the middle of Cuba, resulting in five deaths, for a total of 17 deaths in the Caribbean. Four people died when their buildings collapsed under 20 inches of rain and fierce winds; and the fifth died in storm surges. State television reported that 23 buildings were destroyed and cautioned that more would crumble as they dried. Of the 10,000 homes affected in Matanzas Province, 2000 were destroyed. A Matanzas hotel employee was among those who lost his house by the sea. The civil defence had encouraged his evacuation and assured accommodation in a shelter if his house was badly damaged.

'It wasn't possible to keep living there—I lost my kitchen and washroom,' said Yivis Yuniur Barguin Dominquez. He was gratified that the government provided him a parcel of land about 720 meters square and material for a two-story house, to be repaid in installments over a period of 15 years. The new brick house would be sturdier, with a concrete roof in place of the previous house's Spanish style tile roof.¹¹

Cuba's infrastructure suffered greatly from Michelle's wrath. Flooded roads and weakened bridges left remote areas isolated and people stranded. Thousands of livestock were killed or injured, including one million chickens. Of the 20 sugar mills in Matanzas, which produce 20% of Cuba's annual sugar harvest, 9 were severely damaged. The only industries not greatly affected were petroleum and tourism. Matanzas produces 50% of Cuba's petroleum and its resort areas bring a substantial amount of revenue to the Cuban economy (Losada, 2001). The hurricane came at a time when two key exports—nickel and sugar—drew very low world prices. In November 2001, nickel was listed at half the value it held in May 2000. Tourism declined after the September 11 attacks on the United States (Johnson, 2001).

DISTANT NEIGHBOURS

Michelle's devastation sparked an unprecedented flurry of commercial activity between Cuba and the US. Immediately following Hurricane Michelle, the United States offered disaster relief to Cuba but the offer was declined,

⁹Interview in Matanzas, 15 February, 2002.

¹⁰Interview in Matanzas.

¹¹Interview in Matanzas, 15 February, 2002.

and Cuban leaders asked the US to ease trade sanctions that are part of a 40-year embargo. They promised hard currency for US goods that Cuban vessels would collect from US seaports. US leaders rejected the idea, although some legislators favour reduced restrictions on trade between the two nations because they see Cuba as a potential market. In 2000, Congress allowed US food and agricultural sales to Cuba, as long as the purchases satisfied certain licensing requirements and were not financed by the US government or US financial institutions. After the Commerce Department set the licensing regulations in July 2000, no sales took place, and Cubans blamed US bureaucratic red tape. In November, 2001, the Senate Agriculture Committee agreed to allow private financing of food sales from US to Cuba, although it endorsed continuation of US Cold War era policy towards Cuba (Johnson, 2001).

CONCLUSION

An Education Ministry official offered the US a backhanded compliment by sarcastically thanking it for inspiring Cuba's acclaimed disaster mobilization system. Unfortunately, the threat of disasters cast lengthening shadows on the region's future. Cuba has good forecasting and civil defence systems, communications technology such as radios and televisions, and the support of the government in addressing dangers associated with hurricanes. It is nevertheless unprepared for many of the effects of hurricanes, including spread of diseases accelerated by skewed temperatures borne of climate change (Garrett, 2000).

Cuba's experience in dealing with hurricanes suggests that economic strength and a democratic political system are not the primary factors moderating disasters' toll. Cuba has effectively implemented a system of popular mobilization and education to prepare people for hurricanes, and compliance with evacuation orders is impressive. Public officials widely disseminated scientific technology and active participation by citizens can save lives during disasters that may become increasingly common. The IFRC stressed the need for increased investment in disaster preparedness (IFRC, 2002).

A man who lost his house by the sea to Michelle had another piece of advice. 'Nature is increasingly abused and humans disregard it. It's been 50 years since Cuba experienced a storm like Michelle. Nature is deteriorating; industrial nations should please take care of it.'¹²

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¹²Interview with Yivis Yuniur Barguin Dominguez in Matanzas, 15 February, 2002.

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