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Hurricane 'Tomas' and the April Rainstorm

Donald De Riggs, Rainbow Radio League, St. Vincent and the Grenadines; April 2011.

Vincentians generally have a 'laid back' attitude when it comes to preparing for and managing disasters. Most people think we are 'blessed' and that disaster will not strike us ... far from the truth ... rain falls on the just and unjust.

Hurricane Tomas on the last day of October 2010 and the rainstorm on Tuesday, April 12, 2011 were both 'wake up' calls, especially for those who take nature for granted. During the passage of Hurricane Tomas, the weaker structures were the ones that were either damaged or destroyed and

IN THIS ISSUE ...

From the Editor: Leslie Walling, CCDRMF Coordinator

The global cost of disaster related damage has increased by a factor of four in the last 30 years. Much of this increase has been attributed to economic growth and development and not climate change as some might expect. Why? Because we now have more people and more valuable infrastructure located in harms way. In the near to mid-term, developmental and economic trends are expected to increase the vulnerability of societies around the world and the cost of disaster related damage is projected to increase. The role of spatial planning should, and must, play a more strategic role in disaster risk reduction and climate change adaptation in the Caribbean if national disaster risk management capacities are to avoid being overwhelmed. In this issue's key-note article Dr. Yolanda Alleyne explains the role of physical planning in disaster risk reduction.

The transition of CDERA to CDEMA represents much more than a name change for the Caribbean's regional disaster management agency. It marks the regions commitment to expand disaster management planning and operations from response, recovery and restoration, to include disaster prevention, preparation, and avoidance. As resources begin to shift slowly to support the reduction of disaster risk at the community-level a number of challenges are being encountered. The ability of communities to absorb assistance and participate in self-help disaster risk reduction initiatives is constrained by limited capacity and limited access to technical expertise and resources. Giles Romulus of the GEF Small Grants Programme provides an insightful analysis on how the capacity-development challenge must be addressed if we are to stop "spinning top in mud".



Donald De Riggs Photo

the houses built closest to the Georgetown and Langley Park rivers were either washed away, damaged or flooded.

By and large, the population assumes that the National Emergency Management Organization (NEMO) is charged with the responsibility of fixing anything damaged by a storm or other disaster. This mindset and perception must change. NEMO is the national coordinating agency with responsibility for matters related to the management of disasters. Support agencies like the Red Cross, Rainbow Radio League (RRL), Cadets, Road clearance crews, Electrical restoration crews, Water and sanitation crews, Police Search and Rescue, Coast Guard, Hospital, Traffic police, shelter managers, damage assessment teams, (continued on page 2)

Hurricane “Tomas” ...

(continued from page 1) supplies management and distribution teams among others all have important roles to perform, albeit in a coordinated manner. Each family also has a role to play to ensure that all family members know what to do, when an earthquake strikes, when a hurricane or tsunami is approaching or if someone becomes unconscious following an accident.

Despite the fact that damage was evident island-wide in the aftermath of ‘Tomas’, with many trees being uprooted or broken, and several homes losing their roofs, the telephone service was never affected and power outages were only limited to areas where there was major damage to utility poles or power-lines. Having the use of telephones made it easier for reports of damage to be sent to the Emergency Operations Centre (EOC) located at NEMO Head Quarters. As a result, there was no need to resort to recently upgraded Very High Frequency (VHF) or High Frequency/Single Side Band (HF/SSB) radio network *(see pictures on page 6)*. The exception was the most remote village, of Fancy, which was without telephone and electricity services for three days. *The radio and renewable energy equipment installed by the amateur radio operators (Hams) of the Rainbow Radio League (RRL) in Fancy with funding from CIDA, enabled the lone Ham radio operator and shelter manager for that village, to send daily reports of damage.*

According to officials at the Meteorological Office the rainstorm in April 2011 was associated with a moisture laden upper level trough coming up from South America. Intermittent rains began late Saturday night (April 9th, 2011), and fell all day on Sunday April 10th. Torrential rain began falling in the North East of the island from about 7:00 pm on Monday night right into the morning of Tuesday April 12th. Close to midnight, rivers whose flows had been dammed by logs felled by Hurricane Tomas broke loose. The result was an avalanche of mud, trees, animals, destroying or covering anything in its destructive path to the sea.

The shoreline at Mt. Bentick Bay was strewn with thousands of logs packed so closely that they formed a temporary ‘board walk’. It is hoped that these logs will be cut up and made into coals, generating some form of income for the enterprising.

(continued on page 6)

The Suriname Red Cross Spreads the Word - training the trainers.

The Disaster Management Team of The Suriname Red Cross Society (SRCS) improved their project proposal writing skills in a two-day proposal-writing workshop for the training of trainers.

In 2009 the SRCS partnered with the community of Wageningen to submit a flood risk reduction proposal to the CCDRM Fund. The project received grant support and was successfully completed in January 2010. The SRCS is using the experience gained on this



project to work with more vulnerable communities to reduce disaster risk.

The two day workshop was designed to prepare members of the SRCS Disaster Management Team to assist community groups to prepare successful proposals.

The application form for the Canada Caribbean Disaster Risk Management (CCDRM) Fund small-grant facility was used as the training guide for preparing disaster risk reduction proposals.

The workshop participants worked in groups to identify community disaster risk reduction (DRR) projects. Proposals were then developed using the CCDRM Fund application form. The working groups then brainstormed on a logical framework for each project to determine whether the project’s goals, objectives, activities, and results, were consistent with the SRCS’ overall disaster management programming.

Elinor King, the SRCS’ Disaster Management Coordinator, said that the skills developed from the training exercise would be used to prepare a disaster risk reduction project proposal for the vulnerable community of Kroonenburg.

Physical Planning and Disaster Risk Reduction

Yolanda Alleyne, Ecoisle Consulting, Barbados. April 29, 2011.

No other region is more exposed than the Caribbean to the known natural hazards. Recognizing the impact that disasters have on economic development and human well-being, CARICOM Member States have been working together for over a decade to develop and improve a comprehensive disaster management strategy for the region. This strategy is an important mechanism for pro-actively addressing disaster reduction issues within the context of development planning. At the core of the strategy is the goal of sustainable development in the Caribbean.

Development and development activity must take place in a physical space. It follows then that the various elements of sustainable development have to be represented on the land in an ordered, structured, integrated and connected manner.

Physical planning is a mechanism for implementing government policies for social and economic development on the ground and forming that bridge which links economic and social activities and environmental management.

To the extent that the physical planning process is development focused, is multi-sectoral, integrative, and anticipatory, it provides a potentially efficient vehicle for mainstreaming disaster risk management and climate change adaptation into the national development process. In general, the physical planning systems of CARICOM states have identified within their legislation three key components of management: *a system of physical development planning*, *a development control system*, and an *enforcement system*.

The physical **development plan** process attempts to spatially identify and quantify future land use requirements based on demographic and economic projections within the context a natural resource base and within a specified time horizon. It is an assessment of an area's or country's past, present and future aspirations, and therefore sets the scene for the subsequent processes of development control and enforcement. **The comprehensive development plan is a multi-faceted graphical tool, and planners seek to accommodate multi-user needs through consultation with the public, technicians and professionals from other specialties in the preparation stages.** Physical development plans should represent a fusion of economic plans, sectoral plans, social strategies, environmental management strategies and contain overall integrated strategies for physical development as well as the areas for no development. Whilst physical development plans allocate land for various purposes, they do not

give permission to carry out development activities. **Development control** is an integral aspect of the planning system which in tandem with the development plan, seeks to ensure orderly and progressive development. **It is the process whereby planning permission may be granted or refused for proposed development on a particular site.** This determination is based on the assessment of a wide range of site, environmental and socio-economic factors. The planning system is intended to ensure that individual and social priorities are balanced when it comes to the use of land since a person's use of land can create negative external consequences for the wider society. In decision-making for land use, societal interests are important in the areas of public health and safety, convenience, economic efficiency, environmental management, conservation of natural beauty, built heritage and amenity. Ideally, as a continuation of the approval process, development actions should be monitored to ensure that the development has been undertaken in accordance with what was approved, through a purposeful **enforcement system**.

Unfortunately, the planning systems in many of the CARICOM states remain inadequate to deal with the demands of urban sprawl, housing, infrastructure and poverty and so forth. In the region, a significant amount of the observed vulnerability to natural hazards may be ascribed to under-sourced planning systems and short-term political judgment in decision-making. This is witnessed by the significant number, and poor design of structures in coastal and flood zones, drainage reserves and on hill-sides. Also, limited resources, land ownership, and tenure patterns can drive the poor to settle in hazard-prone areas.

Recovery from disaster events can be extremely difficult for the most vulnerable elements of the population – the poor, elderly, and single female heads of households. At the same time, it is increasingly being recognized that the development control and review process could better encourage and promote development choices and design that limit or reduce vulnerability to natural hazards and climate change where the planning system integrates data from hazard maps, vulnerability assessments and environmental impact assessments with enhanced natural hazard risk components.

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Planning in Disaster Risk Reduction

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However, there are a number of factors that constrain the physical planning process. These often include insufficient information on risk and vulnerabilities within communities, poor enforcement of land use zoning guidelines and building codes, poor integration of hazard data and climate change vulnerability scenarios into decision-making processes, lack of information sharing systems across sectors, outdated or non-existent national, regional and local level physical development plans, limited human and financial resources.

This situation raises the question of whether disaster risk reduction or climate change adaptation interventions will deliver sustainable benefits in a development environment where the planning framework is inadequate. Yet any initiative to strengthen the national planning frameworks across the region to enhance national and regional development and facilitate the mainstreaming of disaster risk reduction and climate change adaptation would be expensive.

In CARICOM states, comprehensive, integrative legislation, policies and frameworks need to be established if

Planning and Disaster Risk: The encroachment of informal development on river courses and flood plains creates disaster risks that seem obvious and avoidable in retrospect (below). Does the location of critical infrastructure close to the sea represent a disaster waiting to happen? (top right). What role can building standards play in protecting homes and households? (bottom right).



Above: In 2001 the community of Bybrook, Portland, Jamaica experienced two weeks of torrential rain. The Mabeese River swallowed homes, cattle and the coffee crop for which the community is noted (Rafi Ahmed Photo).

national planning systems are to be effective in mainstreaming disaster risk reduction and climate change adaptation. In the meantime, there is a strong onus at the community level for individuals to be more aware of their own vulnerability and seek to reduce it, by making wise personal decisions about where and how to build.



Giles Romulus, GEF Small-Grants Program, Barbados. May 2011.

For several decades, Governments and donors in the sub-region have attempted to build the capacity of Community Based Organisations (CBOs) and Non-Governmental Organisations (NGOs), with little to moderate success. Significant investments have been made by governments and donors, where paid officers have the job of teaching, coaching and transferring skills. With such significant financial and human investment, one would expect that countries and communities in the Eastern Caribbean would have strong and vibrant development oriented organisations, but today, the contrary is true. The majority of CBOs and NGOs are weak, unable to design and implement projects successfully and the net result has been a deficit of funding to meet community and national needs. Low capacity has also contributed to an under-developed governance structure in groups, with minimum membership, which in certain cases affects their credibility.

We at the Global Environment Facility Small Grants Programme (GEF SGP) for Barbados and the Organisation of Eastern Caribbean States (OECS), have observed and documented the struggles of CBOs and NGOs in designing and implementing projects. Many groups start with high enthusiasm only to enter the doldrums and sometimes to give up, unless support is offered throughout the project cycle. Groups have complained of lack of funding, the decline in volunteerism within a context of decreasing economic stability of families, and weak human capacity to address the challenges of sustainable development. Groups also complain that donor expectations are too high and ongoing guidance and assistance to address capacity deficiencies are not easy to find. Meanwhile, interventions to develop capacity continue to either fail or have moderate success in the long run, because they are predicated on:

- capacity development as an end and not a process;
- project time periods which are driven by the constraints of agendas and funding cycles;
- activities which do not adequately consider the existing situation of communities and groups;
- the existence of an effective support system for communities and groups;

- the availability of well trained professionals with the right skills set, attitude and approach; and
- continuous and critical self-reflection and corrective action by groups.

We at the GEF SGP sub-regional office are convinced that we need a different paradigm of support for CBOs and NGOs. This paradigm should borrow from Adult Literacy, and must move away from what Paulo Freire in his *Pedagogy of the Oppressed* called the “banking system” of education, which creates chronic dependence. Writing in the Brazilian context, Freire believed that the approach to education must move away from one in which the teacher deposits knowledge in the brain of the students, to one which empowers and acknowledges that the student has experiences and knowledge which are integral to learning. **The paradigm shift we need therefore, is to move to one based on trust, respect, experiential learning, and a teacher student dynamic in which the teacher is a facilitator, a coach, a guide, a mentor, empowers the student to learn and to keep on learning, and becomes a learner too.**

This approach must also consider the ecological principle that we are all linked to *each other through an inescapable mutuality and destiny brought about by the immutable law of interdependence of the biosphere*. Within that context, the biblical injunction that to “whom much is given, much is expected” must also be considered a realistic condition for equitable and peaceful progress of humankind. It is within that context we should consider introducing a mentorship program which is based on principles and guidelines that are enabling and builds capacity within communities, which is in contradistinction to other approaches which dis-empower and create chronic dependence. With this paradigm in mind, we can generally define **mentorship** as *a deliberate developmental relationship between a more experienced person or group and a less experienced person or group*, and define community mentorship as one in which individuals and/or groups are available to CBOs and NGOs, *who select them because of their skills, reputation and credibility, to take them through a process of self discovery and capacity development in which they are empowered to think, act, reflect and learn in an iterative manner, to create positive results*. (continued on page 7)

Hurricane "Tomas" ...

(continued from page 2)

Several small wooden houses were either destroyed or moved from their foundation in Georgetown and Langley park, while walled structures in close proximity were flooded and 'mudded' out.

The bridge at Langley Park was blocked with debris over 12 feet high causing water to "back up"., flooding houses in the immediate vicinity, and seriously eroding sections of the Windward Highway (see picture on front cover). In order to avoid casualties in the future people living in these high risk areas should be relocated. Fortunately, no one died as a result of the April Rains, but a few persons were hurt fleeing from the rapidly approaching flood. These persons were hospitalized and discharged after a period of observation.

The most important lessons learnt were: (a) build strong structures using established building codes to avoid hurricane damage and (b) do NOT restrict the flow of flood waters and associated debris by building in flood plains.

Flooding could have been avoided if the bridges on the three rivers were high enough to allow the debris to flow unhindered to the sea.. **Our engineers and city planners now need to use these two events to plan to overcome these problems in the future by making the flood plains of all major rivers prohibited areas for the building of houses.** The magnitude and intensity with which nature unleashes its energy in recent times makes it necessary for all to be concerned about personal safety and by extension the safety of the communities in which we live.

On the occasions of Hurricane Tomas and the April rains, RRL damage assessment teams were on the ground within hours to send reports of the location and extent of damage. On both occasions the telephone service was operational island wide, so there was no real need to use two way radios, except between damage assessment teams on the ground. In the case of community of Fancy, which had no water, phones or electricity for three days, high frequency/single side-band (HF/SSB) radio was the only means of communication from that village following the passage of 'Tomas'. All systems retrofitted through funding from CIDA, including Fancy worked flawlessly and only three wind turbines were destroyed by 'Tomas'.



Rainbow Radio League members sign documents committing to maintaining radio equipment received in good condition at all times (De Riggs Photo).



(Top) RRL members proudly display VHF/UHF radios received under the CIDA project.

(Middle) A-team preparing to erect VHF/UHF antenna.

(Right) RRL Project Director installing antenna at Rose Hall.

(De Riggs Photos)



"It is not unusual these days, for unusual weather to be usual" - "J39GH/SK", a Grenadian ham known for his witty sayings.

MENTORSHIP

(continued from page 5)

The approach we are promoting is one in which mentorship becomes not only an approach, but a strategy for sustainable development in SIDS. For this to happen, governments, organisations, communities, individuals and donors, must think strategically and create a structure with appropriate incentives, checks and balances, monitoring and evaluation mechanisms, and with learning as a constant and dynamic principle. In other words, we are recommending a concerted effort to establish permanent structures of support, which will build confidence and lead to a significant inflow of development grants at the community level, for many more projects which can address complex problems like the environment. These credibility enhancing structures will also build capacity for sustainable action over time, while creating new income streams and employment. We need an agenda for action and an alliance among all persons to create these structures. Let us work together to establish a national mentorship programme in each island in the Caribbean, for the future of our communities and our world make it a strategic, practical and urgent imperative.

A Partnership for Disaster Risk Reduction

Leslie Walling, CCDRM Fund Coordinator. June 2011

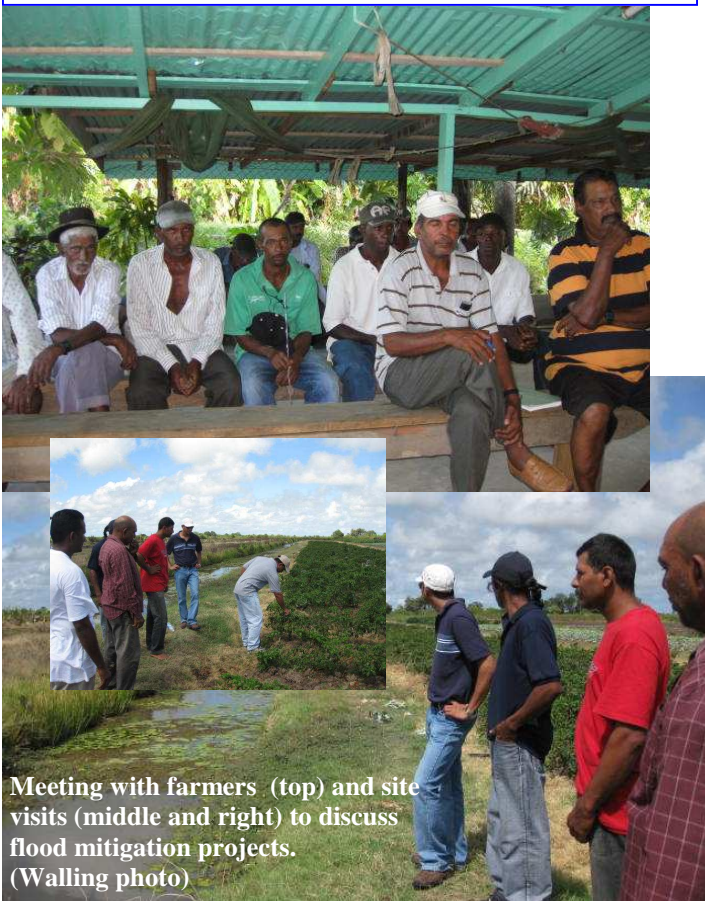
Earlier this year two farming communities in Guyana launched flood-risk reduction projects designed to reduce flood damage to crops and increase farm productivity. The Central Corentyne Farmer's Group (CCFG) and the Bushlot No. 43 Village Development Group (BL43VDG) had each applied the CCDRM Fund for grants to improve on-farm drainage systems and raise farm plots above normal flood levels. Both projects were recommended for funding by the CCDRM Fund's Project Steering Committee (PSC), on the condition that a way was found to strengthen the project management capacity of each farmer's organisation.

With the help of the CIDA Guyana Office a number of management-assistance options were reviewed. The quickest way to strengthen project management capacity was to identify an experienced group or organization willing to partner with the farmer's groups and form a project management team. Ideally the project partner would have experience working with farming communities and would work along side and "mentor" the two farmer's groups rather than taking over the two projects.

The CIDA Guyana Office considered the Canadian Hunger Foundation (CHF) to be the ideal choice. At the time CHF-Guyana was the executing agency for the *Small Farmers Livelihood Program (SFLP)*, jointly funded by the Inter American Development Bank (IDB) and the Canadian International Development Agency (CIDA).

Through the SFLP the CHF had been working closely with over one hundred farming communities across Guyana, including the CCFG and the BL43VDG. The CHF was approached by the CCDRM Fund and asked to take on the role of implementing partner guiding the participatory management and supervision of the flood risk reduction projects (see *Mentorship* article on page 5).

The agreement by the CHF to partner with the CCFG and BL43VDG has added value to the original flood mitigation projects. One area of added value will be the ability to quantify the impact of flood risk reduction in terms of improved farm productivity and income. Under the SFLP the CHF has established farm productivity baselines for farms throughout Guyana. This baseline (continued on page 8)



Meeting with farmers (top) and site visits (middle and right) to discuss flood mitigation projects. (Walling photo)

(continued from page 7)

information will enable the farmers to quantify the impact of the two flood risk reduction project on crop productivity.

Flood Risk in Guyana

Floods may be the single most significant natural hazard that Guyana faces. Around 90% of Guyana's population lives in the 16 kilometer (almost 10 miles) wide coastal belt that borders its Atlantic coast line. The coastal belt lies at mean sea-level. This is significant for special planning and the management of drainage issues, because at high tide the coastal belt is below sea level. At these times water can not drain into the sea under the force of gravity. It must be pumped. Twice a month, at the full and new-moon (spring tides) the coastal belt may be 1.4 meters (4.5 feet) below sea-level. In situations where there are heavy rains, water can only drain off of the land by gravity at certain times of the day.

Inland of the coastal belt are a number of conservancies (lakes) designed to hold irrigation water for the farmlands in the coastal belt. The conservancies are also used to store excess water to prevent flooding. If water levels in the conservancies become high enough to "over-top" or



Above: In March of this year Guyana was on emergency flood alert. The community of "Little Baiboo" on the Mahaica River was experiencing flooding, but worse was to come. This picture was taken before the water from the conservancy was released into the Mahaica River (Stabroek News picture).

damage the walls (dykes) of the conservancy, water must be released into the coastal belt and adjacent rivers.

Between December 26th 2004 and January 18th 2005 Guyana experienced the worst flooding in over 100 years with the country receiving over three times the monthly average rainfall of 7.3 inches. Between the night of January 14th and the following morning over 10 inches of rainfall was recorded. The conservancies were filled beyond capacity. All outlets were opened but factors including tidal considerations caused flood waters to back up and over-top the conservancies causing widespread flooding.

Flood waters ranged in depth from 0.3 meters (1 foot) in West Coast Demarara to between 0.9 and 1.5 meters (3 and 5 feet) in West Berbice (continued on page 9).



Top Left: L. Walling (right) meets with members of the Bushlot Farm No. 43 Development Group executive (L to R) Quincy Henry (Secretary), Ramnarine Ramsew (Chairman), Bottom: agricultural area proposed for project.

(continued from page 8). It was estimated that half of Guyana's population of 750,000 was affected. Three weeks after the peak of the emergency an estimated 92,000 persons still had water in their homes.

Flooding in Guyana is not confined to the northern coastal belt. Like its neighbor, Suriname, the communities in the interior to the south are affected by the rivers that drain the Amazon. In June 2011 continuous heavy rainfall in Region 9 and in the Roraima State of Brazil resulted in the Rio Branco, Ireng and Takuta Rivers overflowing their banks. As a result the community of Lethem (see map below) and its environs were inundated with flood waters which rose to their highest levels since 1973. Sixty-one (61) Amerindian communities were impacted.

A total of 2143 farms were reported to have been affected. Roads in the region were flooded and bridges were damaged. The Guyana Power and Light (GPL) power plant was unable to operate, and all primary schools were closed because of the flooding.

In the next issue of the CAT5 newsletter we will take a further look at Guyana's high level vulnerability to flood risk, examining root-causes and risk reduction options. We will also consider how climate change will change the character of the flood hazard in Guyana.



CDEMA - Hurricane Preparedness Tips for the Home.

BEFORE

- **Know your Emergency Shelters** Contact the National Disaster Office for the closest shelters.
- **Have disaster supplies on hand:** flashlight and extra batteries, portable, battery-operated radio and extra batteries, first aid kit, non-perishable (canned food) and water, non-electric can opener, essential medicines, cash and credit cards, sturdy shoes.
- **Protect your windows:** A lower-cost approach is to put up plywood panels. Use 1/2 inch plywood--marine plywood is best--cut to fit each window. Remember to mark which board fits which window. Pre-drill holes every 18 inches for screws. Do this long before the storm.
- **Trim back branches from trees**
- **Check into your Home and Auto Insurance**
- **Make arrangements for pets and livestock:** Contact your local humane society for information on animal shelters.

Develop an emergency communication plan Make sure that all family members know what to do.

Hurricane Watches and Warnings

A hurricane watch is issued when there is a threat of hurricane conditions within 24-36 hours. A hurricane warning is issued when hurricane conditions (winds of 74 miles per hour or greater, or dangerously high water and rough seas) are expected in 24 hours or less.

DURING A HURRICANE WATCH

- Listen to the radio or television for hurricane progress reports.
- Check emergency supplies.
- Fuel car.
- Bring in outdoor objects such as lawn furniture, toys, and garden tools and anchor objects that cannot be brought inside.
- Secure buildings by closing and boarding up windows.
- Remove outside antennas and satellite dishes.
- Turn refrigerator and freezer to coldest settings. Open only when absolutely necessary and close quickly. Store drinking water in clean jugs, bottles, and cooking utensils.

CDEMA - Hurricane Preparedness Tips for the Home (continued)...

DURING A HURRICANE WARNING

- If you need to evacuate your home, lock up home and go to the nearest shelter.
 - Take blankets and sleeping bags to shelter.
 - Listen constantly to a radio or television for official instructions.
 - Store valuables and personal papers in a waterproof container on the highest level of your home.
 - Stay inside, away from windows, skylights, and glass doors.
 - Keep a supply of flashlights and extra batteries handy. Avoid open flames, such as candles and kerosene lamps, as a source of light.
- If power is lost, turn off major appliances to reduce power "surge" when electricity is restored.

“Disaster risk reduction - one community at a time”

The Canada Caribbean Disaster Risk Management (CCDRM) Fund is a small-grants facility, established to support community disaster risk reduction projects. To qualify for funding projects must be submitted by a community group or by an organization working closely with the community that will benefit from the project. The proposed project must bring about a measurable reduction in a specific disaster risk within the lifetime of the project.

A project must address a disaster risk that has been selected by the community as a priority. If the project is being submitted by a partner organization (e.g. an NGO, service organization, church, government agency) the beneficiary community must be involved in all stages of the project's design, development and implementation.

Some communities may know what needs to be done to reduce their level of natural disaster risk but may not have the technical skills or management experience to develop a proposal or implement the project. These communities may choose to partner with an organization with the necessary technical skills or management experience. A number of successful applications have been submitted by community/NGO partnerships (*see articles in this issue on the Suriname Red Cross and flood risk reduction in Guyana*). In each case the application was successful because there was strong working relationship between of the community and the NGO and the community played a central role in the development of the project concept.

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**HAZARDS ARE INEVITABLE BUT DISASTERS
ARE NOT.**

Be prepared don't become a statistic”

ON-LINE!

Disaster Risk Reduction Handbooks and Guidelines .

The Caribbean Environmental Health Institute (CEHI) has launched a web portal called *“Rainwater Harvesting in the Caribbean”*. It is a gold mine of information on rainwater harvesting:

- Resources: <http://cehi.org.lc/Rain/docs.html>

The Jamaica Red Cross Society (JRCS) as shared the Red Cross *“Construction Handbook: how to rebuild and reinforce your wooden house”* with the CCDRM Fund. The handbook is used by the JRCS on projects to strengthen homes to withstand storm and hurricane winds.

- The handbook can be downloaded using this web address (URL) below:
[http://www.pseau.org/outils/ouvrages/parasismique/croix-rouge-fr-construction-et-rehabilitation/Documents/Documentation technique/Formation sensibilisation/CONSTRUCTION HANDBOOK for builders_JRC.pdf](http://www.pseau.org/outils/ouvrages/parasismique/croix-rouge-fr-construction-et-rehabilitation/Documents/Documentation%20technique/Formation%20sensibilisation/CONSTRUCTION%20HANDBOOK%20for%20builders_JRC.pdf)