Hurricanes Gilbert and Joan: Implications for the Caribbean Housing Sector

The extensive damage caused by Hurricanes Joan and Gilbert to houses and other buildings in Jamaica, parts of Mexico and Nicaragua in 1988 could have come as no surprise to well-informed members of the housing sector. Hurricanes Joan and Gilbert merely re-emphasized existing weaknesses in building codes and standards, construction practices, building regulation systems, building maintenance, disaster mitigation policies and emergency repair/recovery programmes shared by most of the Caribbean States.

Already, after the “near miss” of Hurricane Allen in Jamaica, in 1980, a study funded by the United States Office of Foreign Disaster Assistance (OFDA) had pointed out the vulnerability of much of the housing stock, including the probable loss of roofs, in the event of a severe hurricane.

The report also stressed the need to prepare an institutional response to the temporary housing “gap” or lack of housing accommodation which would inevitably follow if a severe hurricane made landfall on Jamaica.

The extent to which the housing authorities in Jamaica and other Caribbean States take into account in their planning the regular and predictable housing losses from hurricane and earthquake risk in the region is worthy of close examination and reflection by the housing agencies and the funding agencies involved in the housing sector as well as by the householders occupying vulnerable units.

One of the major issues to be resolved would seem to be the matter of building standards. Damage in recent hurricanes indicates that many of the architects, engineers and builders practicing in the region are unaware of the construction methods which can impart greater hurricane resistance to new construction. “Traditional” designs on older buildings particularly hip roofs have consistently (Dominica 1979, Jamaica 1988) survived with limited damage when more modern and exotic roof designs have failed. Hurricane straps seem to have been forgotten in several Caribbean States and the building inspection and regulation system is weak (or non-existent) in other states.

A number of disturbing features of the recent hurricane and tropical storm damage in the region have been observed:

In Barbados and St. Vincent, for instance, a number of roofs failed to withstand below hurricane force winds when tropical storm Emily hit the islands in 1987. This implies either a serious decline in the quality

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of construction or lack of maintenance of buildings after construction.

Public buildings and critical facilities (such as schools and clinics) which would normally provide shelter or a vital service to the community also failed. It is clear that a combination of factors influence the way in which these buildings stand up to the forces of nature. Disaster management officials are, however, becoming concerned at the consistency with which the roofs of recently-constructed school buildings in several Eastern Caribbean islands fail to withstand winds just above tropical storm strength. The policy in Belize, where the schools are designed to perform as shelters, is to be commended and should be followed in other hurricane-prone Caribbean States.

Damage assessment procedures are slow and mobilization of repair and replacement resources even slower. Few Caribbean housing authorities appear to be able to respond to the damage created by windstorm with pre-arranged packages of information or assistance. The Pan Caribbean Disaster Preparedness and Prevention Project (PCDPPP) is not aware of any ministry concerned with housing in the region which has a shelter and housing disaster recovery plan. Housing agencies need to be more tightly integrated into the natural disaster planning systems now being developed in the region.

The generally rapid post-disaster response of the informal housing sector indicates that many of the people in the Caribbean know what to do and how to do it if the materials and land are available. The challenge to the experts in the formal building sector is to guide and direct this informal sector towards safer locations and in the use of more wind and earthquake resistant methods of construction and better quality construction material.

A final point to be considered is that the formal sector has yet to implement disaster mitigation measures. The Regional Caribbean Uniform Building Code (CUBIC) exists on paper but is still far from becoming a legal instrument in most of the region’s states. The next hurricane should not find the region unprepared.

**CONTRIBUTIONS FOR IDNDR**

The Government of France, the Federal Republic of Germany and Italy are contributing well over half a million dollars to the preparation of the International Decade for Natural Disaster Reduction (IDNDR), due to be held in the 1990s under United Nations auspices.

These contributions - US $40,000 from France, DM.150,000 from West Germany and US$450,000 from Italy follow an earlier donation by the Government of Japan, which is being used to finance a series of meetings of experts appointed by the Secretary-General to assist in drawing up a framework for the decade.

Preparations for the IDNDR are being made under the direction of a Steering Committee, established by the Secretary-General, with the Director General for Development and International Economic Co-operation as Chairman, and the United Nations Disaster Relief Co-ordinator as Vice Chairman. A temporary Secretariat, working in close cooperation with the Office of the United Nations Disaster Relief Co-ordinator (UNDRO), is being set up in Geneva to provide support services for the decade.

The new contributions should now make it possible for the preparatory work for the IDNDR to proceed rapidly and effectively.

(UNDRO, Geneva)
ANTIGUA - PLANE CRASH

On Saturday 21st January, 1989 a small single-engined plane crash-landed short of the runway at V.C. Bird Airport. The pilot, who was the only person on board, was unharmed but the airplane was wrecked. The pilot was flying from St. Maarten to Antigua and apparently ran out of fuel.

BRITISH VIRGIN ISLANDS - OIL SPILL INCIDENTS

On 15th February, 1989 a storm front passed through the Caribbean and caught many skippers off-guard. A Bahamian tanker loaded with kerosene, gasoline and diesel lost its steering power and went aground on a coral reef off Virgin Gorda, British Virgin Islands. 42 barrels of diesel fuel were spilled (8020 liters). On the same day a barge from the Dominican Republic went aground on a coral reef, 100 meters off shore. The barge was loaded with bunker C type fuel.

For more information contact:
Galan McEachin, IMO Regional Consultant, c/o Puerto Rico Environmental Quality Board, P.O. Box 11488, Santurce, Puerto Rico 00910.

DOMINICA - DROWNING

Two fishermen lost their lives off the eastern coast of Dominica in December of 1988. One of the men who survived the tragedy by swimming through the rough sea, reported that their boat sank while trying to make their way to shore. The sea, which was said to have been tumultuous for the entire week eventually claimed two more lives. One of the bodies was later found on the beach at Rosalie, the other victim is yet to be found. The small fishing boat and motor were also destroyed.

DOMINICAN REPUBLIC - EARTHQUAKE

An earthquake of magnitude 5.5 occurred at a depth of 124 km below the Dominican Republic on the morning of Thursday 2nd March, 1989. The earthquake was felt in both the Dominican Republic and Puerto Rico but no damage was reported.

VOLCANIC ACTIVITY IN ST. KITTS

The earthquake swarm at Mt. Liamuiga, also known as Mt. Misery, in St. Kitts, began in October 1988 peaking on the 26th and then rapidly declined, intensifying slightly in January 1989. As of 22nd January, 15 local earthquakes had been registered for that month with 4 being felt on the 18th January.

Records from the seismographs installed in October confirmed that these events originated at depths of 305 km directly beneath and slightly west of the crater. Keith Rowley of the Seismic Research Unit in Trinidad, inspected the crater on 19th January but there were no significant changes. An additional seismograph station was established at Mt. Pleasant, 3 km north of the crater on 20th January.

For more information, contact John Shepherd/Keith Rowley, Seismic Research Unit, UWI, ST. Augustine, Trinidad.

HAITI

The final death toll from Hurricane Gilbert in Haiti is officially fifty (50) making Haiti the Caribbean State with the highest loss of life because of Gilbert.

EL SALVADOR

The torrential rains associated with Hurricane Gilbert forced thousands of persons in eastern El Salvador to leave their homes as they experienced severe flooding on September 15th. The dislocation and damage caused by these floods was said to be a greater economic calamity than the 1986 El Salvador earthquake, washing away or damaging crops in the field as well as homes, pumps, houses, irrigation systems, storage sheds and out buildings.

In the case of both Haiti and El Salvador the damage associated with Gilbert attracted little international or regional attention. Most of the relief assistance was focussed on Jamaica and did not, it appears, take into account other affected countries in our region.
A series of seminars will be held in April, with the assistance of LRCS Component/PCDPPP, to upgrade instructors.

The programme, Children in Focus, a programme funded by the Japanese Auto Focus Association in Europe, has identified Jamaica Red Cross as a recipient for a grant of 10,000 AFR. This grant is aimed specifically at the training and establishment of Emergency Disaster Teams comprising both youth and adults. The need for such teams was underscored during the recent Hurricane Gilbert Disaster Operations. Jamaica is one of six recipients of the Children in Focus grant.

HAITI RED CROSS

A fisherman’s cooperative of 102 fishermen located in the town of La Savanne aux Cayes, will receive assistance from the Haitian Red Cross. Fishermen from this cooperative lost their boats and nets during Hurricane Gilbert last September. Funds are being provided through an appeal made by the League Secretariat, Geneva, to purchase 4 boats and cord to make 10 nets.

The Haitian Red Cross has a task force of 100 volunteers assisting with the distribution of basic food items for 10,000 families who lost their means of livelihood when Hurricane Gilbert struck Haiti.

GUYANA: SERVICES ON A SHOESTRING

"The Guyana Red Cross is a small and financially strapped society that is doing an excellent job with no resources; it deserves our support," says Jurig Vittani, who as head of the League’s Americas Department visited the society early February 1989. Vittani reports that the Society runs a daily “meal on wheels” service for 60 people...without any wheels. Unable to afford its own vehicle, it delivers the meals by taxi. It also trains first-aiders and maintains an “excellent” convalescent, home for children.
ROLE OF THE HEALTH SECTOR AND NGOs IN THE IDNDR

The extent to which natural hazards become disasters depends on how they affect human lives. Without a human impact, there is no disaster. The greatest human impact is measured in terms of health, death and injuries.

Latin America and the Caribbean, as is the case in many other developing countries, have paid a heavy toll in terms of human lives and suffering due to natural disasters such as earthquakes, volcanic eruptions and hurricanes.

To effectively pursue the commendable and inspiring goals and objectives of the International Decade for Natural Disaster Reduction (IDNDR) the health sector must actively participate in the early planning stage and in the subsequent implementation of the decade's priority activities.

For this purpose, representatives from major North American non-governmental organizations who are active in the health field in Latin America and the Caribbean met in New York on January 24 and 25, 1989, together with delegates from official health sector and civil defense institutions of selected disaster-prone countries in the Americas, to discuss the role and contribution of the health NGOs and the health sector to the IDNDR.

The general objectives which the IDNDR promotes were supported, i.e., to reduce the vulnerability of disaster-prone countries and to increase their capacity to meet their own emergency needs. It was proposed that these objectives should be pursued on three levels:

1. material/physical
2. social/organizational
3. motivational/attitudinal

It was felt that planners of the IDNDR should fully appreciate and make appropriate use of the enormous potential of the community-level network of primary health care workers. Not only does the health sector represent a valuable means by which the goals and objectives of IDNDR can be accomplished, it also should be a main target for implementing prevention and preparedness activities aimed at increasing the ability of health facilities to withstand the impact of natural disasters.

New technologies and scientific advances developed during the forthcoming Decade will undoubtedly contribute to reducing this vulnerability. However, during the formulation of priorities and the work plan of the IDNDR, special attention should be paid to the actual adoption and implementation of existing, proven low-cost mitigation measures as well as to adequate training and preparedness of health personnel who are essential players in time of crisis.

Non-governmental organizations that deal with health and social development are key partners of national health authorities. As such, they should have their particular role identified and negotiated in the early stages of discussion of priority activities and proposed work plan of the IDNDR. Health NGOs cooperating closely with the Ministries of Health and the WHO/PAHO may offer the following contributions to the IDNDR.

* Special ties between NGOs and the most underprivileged communities where many health NGOs have ongoing community organization/motivation projects in cooperation with local health services.
* Valuable links with and the ability to sensitize the private sector and the general public, resulting in the mobilization of complementary material aid and technical assistance.
* Flexible and rapid response capacity which is particularly valuable in contributing to the development of pilot projects (low technology early warning systems; community analysis of risks; public education and awareness; etc.)

* International network of volunteer workers available for grass root motivation and dissemination of the IDNDR objectives.
* Access to public media for advocacy, education of the public, and the establishment of a constituency for disaster prevention and preparedness in the context of the IDNDR.

Key health NGOs which participated in this meeting indicated their interest in participating in the promotion of the IDNDR by:

* seeking and devoting more funds to disaster reduction activities in the health sector with WHO/PAHO technical support and endorsement;
* sharing their management, training and planning skills with national authorities and specialized U.N. agencies for community and other health projects;
* contributing to the assessment of risks and of needs at the community or national level;
* assisting health authorities of disaster-prone countries to prepare proposals to funding agencies for health programmes including disaster reduction components;
* actively participating in the IDNDR committees, including formulation of the work plan for the Decade.
* contributing to the community-level implementation, dissemination and practical acceptance of the activities of the IDNDR.

Considering the above, the participants submitted a number of recommendations based on the contributions offered above for consideration by the U.N. Secretariat, the sponsoring U.N. agencies, the Steering Committee and Ad Hoc Committee of Experts for the IDNDR.

(PAHO, Washington D.C.)
LANDSLIDE HAZARD ASSESSMENT WORKSHOP

Jamaica, like other Caribbean Islands, has a long history of landslide problems and together with floods, this geologic hazard has caused more economic losses and hardships than any other natural hazard. Recent advances in the understanding of slope failures suggest that landslides are perhaps the most amenable to measures directed towards avoidance, prevention or correction. However, landslide related problems have never been properly dealt with in Jamaica. There is no systematic documentation and study of landslides and very little information about this hazard has appeared in technical journals. In order to fill these gaps and to initiate a systematic study of landslides hazard in Jamaica, the Office of Disaster Preparedness (ODP) and the Department of Geology at the University of the West Indies, Mona Campus have formulated a National Landslide Loss Reduction programme for Jamaica. One of the most important objectives of this programme is to provide basic training in landslide investigations, hazard assessment and preparation of hazard zonation maps.

It was with this background that a 10-day (January 4-14, 1989) Workshop on Landslide Hazard Assessment was organized by ODP, UWI and the Organisation of American States (OAS) who provided the course material and sponsored the Workshop lecturer, Mr. Jerome de Graff, a landslide specialist attached to the Forest Service of the U.S. Department of Agriculture.

The Workshop brought together 30 landslide enthusiasts (Jamaica 23, Trinidad and Tobago 3, Barbados 2, Grenada 1, and Puerto Rico 1) whose backgrounds included environmental management, watershed management, agriculture, civil engineering, geology and hazard management. The participants from the Eastern Caribbean were sponsored by UNDRO/PCDPPP.

The Workshop consisted of lectures (36 hours), laboratory courses (14 hours) and fieldwork covering various aspects of landslide investigation and mapping. De Graff’s approach to the subject was methodical and he conducted the Workshop in 20 Course Units which gradually led to the ultimate compilation of a landslide hazard zonation map. Every Course Unit was followed by a test exercise.

The topics covered in the Course Units included slope stability principles, landslide classifications, landslide hazard investigations, significance of landslide activity risk assessment and hazard zonation, factor analysis, geomorphic factors, aerial photo-interpretation, landslide map preparation and interpretation, isopleth mapping, geologic topographic hydrologic factors, map compilation, hazard zonation and interpretation and implementation of zonation results. The diverse backgrounds of the participants contributed to lively discussions which were an integral part of the Workshop. Practically every aspect of landslide study cropped up during the discussions which allowed participants to understand the complexities of landslide processes.

Prof. G.C. Lalor, Pro-Vice-Chancellor Research, UWI, presented the participants with a Certificate of Attendance at the Workshop. The Certificate was awarded by the Faculty of Natural Science to individuals who actively participated in the workshop and attended at least 70 percent of the programme.

A follow-up workshop is being planned, at which, case histories from various Caribbean countries will be discussed.

(Rafik Ahmad, UWI, Jamaica)

MARINE EMERGENCY MANAGEMENT

The density of marine traffic, especially oil tankers, in close proximity to the Islands of the Caribbean presents a fairly high risk of marine pollution. Antigua and Barbuda, located on the eastern edge of the island chain, could easily be affected by an incident in the Atlantic, as the prevailing currents would rapidly carry spilled oil towards the many tourist beaches. In addition, operations at the West Indies Oil Refinery Company sea buoy and wharf and the Texaco jetty, could result in spillage of crude or refined products. Moreover, in medium and major oil spills the degree of damage to the marine environment and ecosystem could reach disaster proportions, requiring emergency responses. Such pollution can threaten beaches, seas birds and marine life in the inter-tidal zones and the fishery with subsequent loss of revenue and protein sources.

Combating pollution requires a high level of coordination between the different Government Ministries and Departments, local voluntary organisations and industry.

Recognizing the foregoing, a five-day workshop on Marine Emergency Management was held from January 16-20, 1989 in St. John’s, Antigua.

The Workshop was sponsored by the Office of Disaster Preparedness, Ministry of Home Affairs, along with the Antigua Port Authority and with assistance from the Maritime Training Assistance Programme/Transport Canada, an Agency of CIDA. The Workshop was conducted by Maureen Moffat of the Canadian Coast Guard, Marine Emergency Division.

Participants for the workshop were drawn from various Government and private agencies including Police, Coast Guard and Fire Service, Environmental Health, Tourist Department, Port Authority, Meteorology Services and Foreign Affairs.

The participants covered subjects such as, Pollution Countermeasures, Crisis Management, Contingency Planning, Oil Spill and Shoreline Clean-up, and the Operational Technical aspects of Oil Spill Response. The format of the workshop comprised lectures, videotape presen-
CONFERENCE ON THE ENVIRONMENT

Regional Governments, representatives of regional organizations, donor agencies and technical experts met at the Hilton Hotel in Trinidad on March 21-22, 1989 to discuss a Caribbean strategy for dealing with environmental problems in the region.

The conference was sponsored by the Government of Canada which sent a delegation to participate in the meeting. This follows on Canada's signing of an international agreement to fight atmospheric pollution and a recently completed study by the Canadian International Development Agency (CIDA) on Caribbean Environmental Programming Strategy.

The CIDA report was reviewed by the participants at the Conference who also examined strategies on preservation of the air, land and sea of the region as developmental resources crucial to future economic development and growth. They attempted to arrive at a Common Caribbean Strategy on the Environment which would be utilized by donor agencies and countries for future development assistance planning.

WORKSHOP REPORTS....

Participants showed great interest in the presentations made and were able to experience some of the tensions inherent in emergency situations through the role-playing method utilised by the instructor in some of the sessions.

(N. Cornelia Michael, NDC, Antigua)

WORKSHOP ON CURRICULUM DEVELOPMENT IN RESOURCE MANAGEMENT

The Consortium of Caribbean Universities for Natural Resources Management, a programme of the Association of Caribbean Universities and Research Institutes (UNICA), will be presenting a University Faculty Workshop on Curriculum Development in Resource Management for the Insular Caribbean. The workshop will be held the first week in August 1989 at the campus of the Instituto Tecnologico de Santo Domingo in the Dominican Republic. Funding for the workshop is being provided by the Canadian International Development Agency.

The objective of the workshop is to provide university faculty from institutions in the region with the necessary information and the opportunity to begin redesigning current curricula to include the essential elements of natural resource management. The Workshop agenda will include a review of insular resource management issues and strategies and current resource management training programmes, outline multidisciplinary approaches to curriculum development in resource management, and provide examples of how to integrate case studies and real resource management problems into curricula.

The fourteen university members of the Consortium have all been invited to nominate a participant to the Workshop, which will accommodate all the major language groups of the region.

For further information on the Workshop, please contact the Interim Coordinator of the Consortium, Mr. Allen Putney, ECNAMP, 6A Caravelle Arcade, Christiansted, St. Croix, U.S. Virgin Islands 00820. Telephone 809-773-9854.
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(VITEMA)
COMMONWEALTH DISASTER MANAGEMENT

A new Commonwealth Science Council programme aims to help member countries deal with both natural and man-made disasters. It is to provide an information base on the vulnerabilities and needs of Commonwealth countries, and a handbook on disaster prevention and management. The handbook will be designed for the use of public administrators in health, welfare, transport, education and other fields, training and research institutions and voluntary bodies.

Leading experts in disaster management are taking part in the project. They are drawing up a plan of action which will include advice on all aspects of disaster management - from making preparations to meet emergencies to mounting recovery operations.

The programme will deal with floods, drought, hurricanes, landslides and earthquakes as well as with large-scale industrial and transport accidents. Many Commonwealth countries are vulnerable to one or more of these. The project acquired added urgency in the wake of the spate of disasters which hit several Commonwealth countries including Barbados, Britain, India, Bangladesh and Jamaica.

Experts in disaster management from several countries met in London at the end of September to draw up an action plan which will provide the basis of the handbook. It was organised by the Commonwealth Science Council and the Secretariat's Management Development Programme.

(Commonwealth Currents)

UPDATE ON UNEP IN THE CARIBBEAN

A meeting of experts for the development of a protocol on specially protected areas and wildlife in the wider Caribbean region was held in St. Croix, U.S. Virgin Islands from 24th to 26th October 1988. Representatives from 10 Contracting Parties to the Cartagena Convention and 13 international organizations examined and revised UNEP's draft protocol, prepared a timetable for its finalization and agreed that:

1. a scientific and technical committee should be set up to assist the Contracting Parties to develop and implement the protocol;
2. annexes containing lists of species and protected areas should be included in the protocol;
3. the list of protected areas should be prepared by the Caribbean Action Plan's Regional Co-ordinating Unit and UNEP.

The Regional Co-ordinating Unit (RCU) is currently incorporating the experts' recommendations into the draft protocol which will be distributed to the Contracting Parties and all the organizations concerned before being presented for adoption by the fifth Intergovernmental and Contracting Parties meeting in October 1989.

One of the RCU's major tasks over the next months will be the preparation of a draft proposal for a long-term strategy for the future development of the Caribbean Environment Programme, in close consultation with governments and regional and international organizations. The governments of the region have given top priority to the development of the strategy which is aimed at achieving sustainable economic growth through the rational management of marine and coastal resources. The RCU's strategy proposal will be reviewed by the eighth meeting of the Monitoring Committee on the Caribbean Action Plan in Kingston, Jamaica in April 1989, before being put forward for adoption by the fifth Intergovernmental and Contracting Parties Meeting.

UNEP will provide funding to help the Government in Jamaica assess the impact of hurricane Gilbert on Jamaica's coastal and marine ecosystems. A study has been carried out to assess the damage to coastal and marine resources in economic terms.

By setting up computer links between key government agencies and the United Nations Disaster Relief Organization the Caribbean Environment Programme Information Network (CEPNET) provided the Jamaican government with a vital link to international information and communication networks when Jamaica's telecommunication facilities were seriously disrupted by hurricane Gilbert.

(Commonwealth Currents)

RIISING SEA LEVELS

The Commonwealth Expert Group on the impact of the rise in sea level on low-lying regions is making detailed studies in five vulnerable countries.

Scientists and other specialists are being commissioned to report on Guyana and Bangladesh, coastal countries drained through huge river deltas, and also on low-lying atolls in Kiribati, Tonga and Tuvalu.

There is near-consensus among scientists that the earth is warming, the polar ice caps melting and the level of the sea rising. The argument now focuses on how fast the sea is rising and how high it will rise.

The group, which met in July 1988 discussed the evidence collected to date, and decided that they could with confidence base their studies on a global temperature rise of 0.8°C to 2.8°C by the year 2030. (This is a conservative estimate). From this would follow a sea level rise of 17-28 cms by the same year. By historical standards, even a 17 cm rise over 40 years is high, some estimates are much higher.

The principal danger in sea level rise is not the average increase itself, but in the multiplying effect the rise has on storm surges, and on the change in river drainage gradients.

The Expert Group is due to report to the Commonwealth summit to be held in Malaysia in 1989 and to propose measures to be taken to confront this increasing danger to many Commonwealth countries.

(Commonwealth Currents)
SEISMIC CRISIS OF LAMENTS (GUADALOUPE)

On 12-13 December 1988 the Castel Lamentin area, a small urban settlement of the Grand-Riviere valley in Goyave, was the centre of a seismic-tectonic crisis, luckily, of low strength, 40 tremors having been recorded during 18 hours.

This large northeastern valley of Guadeloupe is considered to be the result of a major accident. The Bois-Mere and Grosse-Montagne sugar mills are there, as well as a number of distilleries such as Marsolle, Routa, Bourdon, Lacung, and others. The accident occurred in Vernou, a residential area of greater Pointe-a-Pitre where a water catchment is located, and IBRA also has its main activities located.

The most important shock occurred on 13 December at 00H37. The main shock was preceded by 13 seismic precursors the first of which at 18H54 TU 04 hours 30 minutes before the strongest shock.

The centre of those frightening tremors were mainly located in Castel, the epicentre of the major shock, but also along the river in the Goyave valley from Castel in the North to Vernon in the south.

The replicating epicentres are grouped mainly North and East of Castel.

A secondary epicentral area appears to have been present in the neighbouring area of the Routa distillery where the strongest tremor reached the local magnitude of ML = 2.1.

The table indicating time and magnitude, starting with the first tremor is shown in Fig. 1 when it is noticeable that the tremors occurred within a relatively narrow range of magnitude =ML = 1.05 to 2.3.

Figure 2, shows the histogramme of the number of shocks in relation to times; precursory stages are particularly important. It is believed that this explains the small striking contrast between the sums of the calculated magnitudes and the main shock.

Because the magnitudes of the tremors were so close, it will not be surprising to find that the peaks are also close in the logarithmic histogramme of cumulated energies by 6 hours (Fig.3).

The total seismic energy was of 43.10 E6 joules. This represents all in all, a weak energy dissipation per seismic mechanism.

There are some similarities to the Sainte-Rose crisis in 1967. On 11 May 1967, 19 tremors were recorded, 6 of which were actually felt. The main shock was recorded as having a local magnitude of ML = 3.7. The crisis area, had its sources ill defined because of the narrow network at that time.

At the time, based on the testimony of the effects felt in the Northern part of the valley, a clear relation was not seen between that event and "the accident" of the Grande-Riviere.

Twenty-one years of tranquility separate the two events.

(Observatoire Volcanologique de la Soufriere, Guadeloupe)
DISASTER PLANNING FOR LIBRARIES IN JAMAICA

The Jamaica Library Association recently published "Disaster Planning in Jamaica: Safeguarding Documents and Vital Data", edited by Hyacinth Brown. The publication is divided into three parts with the first part covering the proceedings of the Seminar on the Protection of Documents and Vital Data in the Event of Emergencies, which was held in October 1985. Part two looks at disaster preparedness in some Jamaican libraries pre-hurricane Gilbert and part three looks at lessons from hurricane Gilbert regardless contingency and response management. Cover photo at right.

Copies of this publication are available from the Jamaica Library Association, P.O. Box 58, Kingston 5, Jamaica at a cost of US$ 10. each.

"QUAKELINE"

The National Center for Earthquake Engineering Research (NCEER) located at SUNY/Buffalo, N.Y. has produced Quakeline. This is a bibliographic database covering the literature of earthquake engineering, hazard mitigation and response, and related topics. Over 6,000 records currently reside in the database.

Anyone wanting additional information or a copy of the booklet Quakeline: An Introduction to Search, should contact:
Patricia Coty or Carol Kizis at (716) 636-3377, or write to the NCEER Information Services, c/o Science & Engineering Library, SUNY at Buffalo, Buffalo N.Y. 14260.

DROUGHT NETWORK NEWS

This is a new newsletter being published by the International Drought Information Centre. It has been established to communicate information about drought planning and management and related issues to the international scientific and policy communities.

The newsletter will be published three times per year and Network members are asked to submit information on current episodes of drought and it impacts; timely reports of response, mitigation, and planning actions of governments and international organizations; recent research results and new technologies that may advance the science of drought planning and management; recent publications; conference reports and news of forthcoming meetings.

Subscriptions to this newsletter are available free of charge. Correspondence should be addressed to: Drought Network News, International Drought Information Center, 241 L.W. Chase Hall, University of Nebraska, Lincoln, NE 68583-0728, USA.

UNDRO EVALUATES RELIEF AID FOR ARMENIA

The Office of the United Nations Disaster Relief Co-ordinator says in a report soon to be released that international aid for the victims of the disastrous earthquake in Armenia last December could have been more effective if donors had provided advance information on the amount and nature of their contributions.

The 33 page report - based on a post disaster on-the-spot investigation by a three-member UNDRO team as well as on the observations of the two UNDRO relief co-ordination officers who were in Armenia during the first weeks of the emergency - assesses the impact of the massive relief with a view to improving the provision of international disaster aid in future.

The report highlights the prompt response to the disaster of the Soviet authorities and says that the bulk of the relief assistance came from within the Soviet Union. Nevertheless, the report indicates that international aid to the earthquake victims was by far the biggest, in terms of quantity and geographical origin, ever made available by the international donor community for a single disaster.

(UNDRO, Geneva)
HURRICANE GILBERT IN JAMAICA
IMPACT STUDY

The University of the West Indies recently produced the report "Assessment of the Economic Impact of Hurricane Gilbert on Coastal and Marine Resources in Jamaica". The report is based on a rapid field survey during the period November 1988-January 1989, and has been complemented by information from the Jamaican Natural Resources Conservation Division (NRCD). The terms of reference and funding for this study was provided by UNEP.

Hurricane Gilbert struck Jamaica on 12 September 1988. The report states that erosion of over 50% of beaches occurred and there was severe damage to coastal woodlands. East and north coasts were most affected. The coastal water quality deteriorated, especially as a result of sediment-laden terrestrial run-off. Recovery of water quality however occurred in about three weeks, except near river mouths where high turbidity continues.

The damage to coral reefs was disastrous. Their recovery since Hurricane Allen (1980) has been set back. There has been severe loss of all types of reef organisms and some loss of reef fish. Mangroves were also severely damaged, with loss of up to 60% of the trees in some areas. The upper parts of the trees were most affected. Only superficially affected were seagrass beds, waterfowl and other wetland animals, seabirds and shorebirds.

There is little evidence of damage to primary fisheries resources (scalefish, lobster, conch, etc). The oyster culture and artificial reef structures on the south coast were damaged. Considerable loss of fishing gear and fisheries infrastructure occurred; artisanal fishing, was disrupted for three to four months following the hurricane.

Although the available data is inadequate for an accurate assessment of the economic impact of the hurricane on coastal and marine resources in Jamaica, the immediate losses of those resources are estimated at about US$200 million. The long-term losses can be expected to be much higher.

The report concludes that most of the natural resources are expected to recover naturally, although the economic loss period for resources users may be several years in some cases. Investment in recovery effort is recommended only for a few resources, such as beaches and fisheries. Also the recovery of watershed forests should be aided in order to reduce adverse run-off effects on coastal waters.

For more information contact: Natural Resources Conservation Division (NRCD) 53/12 Molynes Rd., Kingston 10, Jamaica. Telephone: (1) 809-923-5070/5155.

DISASTER RECONSTRUCTION

The US National Science Foundation is conducting a 12 month study on Disaster Reconstruction Following Hurricane Gilbert. In September 1988, Hurricane Gilbert struck both Jamaica and Mexico and the study will involve an analysis of urban reconstruction in both a Jamaican and a Mexican community. Three main questions will be addressed i.e.

- How do reconstruction policy decisions affect the speed of redevelopment; the level of vulnerability of development to future disasters, and citizen access to public services and facilities?
- Do urban planning programs have a significant influence on changes in buildings and land use in severely damaged areas?
- How do the actions of outside operations (bilateral and international aid agencies) affect local reconstruction efforts?

The principal investigators are Phillip Berke and Benigno Aguirre, Hazard Reduction and Recovery Center, College Station, TX 77843-3137; and Timothy Beatley, School of Architecture, Campbell Hall, University of Virginia, Charlottesville, VA 22903.

DAMAGE PREDICTION

The US National Science Foundation will also be conducting a 7 month Experimental Evaluation of a Damage Prediction Model using Data Generated During Hurricane Gilbert and its Implications for Other Hazards.

Because of the magnitude and the variety of structures the hurricane affected, the project will use data regarding damage to structures in the path of Hurricane Gilbert to evaluate the accuracy of an existing model of building damage and occupant safety developed in another NSF study.

At minimum, the results of the study are expected to be:-

- A list of building damage as a function of hurricane magnitude for all buildings;
- A summary of building damage as a function of hurricane magnitude and building type;
- A comparison of damage prediction using the model with observed damage sustained by buildings;
- An indication of future areas of development for the model; and
- Extension of the results to other hazards such as earthquake damage and death predictions.

Principal investigator for the study is Norris Stubb, Hazard Reduction and Recovery Center, College of Architecture, Texas A&M University, College Station, TX 77843-3137, USA.
RESCUING WATER DAMAGED DOCUMENTS
AFTER HURRICANE GILBERT

Editor's Note:
The following paper was published in Jamaica following the passage of Hurricane Gilbert, as many libraries were left with the problem of soaked collections which had to be dried out. The information supplied will be useful to all libraries in the region who from time to time have to deal with similar problems though the scale of the problem might vary.

Nearly three weeks after the onslaught of hurricane Gilbert we are still hearing of damage by water of books, documents and records of various kinds. Wet paper is fragile and will tear at a touch. It therefore has to be handled very carefully. Matters are complicated by the fact that repairs to roofs are yet incomplete and rain is an almost daily occurrence. Without the appropriate facilities of space to dry the material much of it is increasingly being covered with mold. If this is not checked, the documents will become permanently disfigured or destroyed.

Mold spores are living organisms present in the atmosphere and they thrive on wet damp materials in hot and humid areas. Because mold growth starts within forty-eight hours, time is of essence.

A constant flow of air is necessary to dry documents to reduce the growth of mold. The drying area should be well ventilated and ideally should be in an air-conditioned room, with fans to direct a flow of air towards the affected material.

It is preferable to dry documents in this way rather than to place them in the sun. All light is harmful to paper and none more so than direct sunlight which will cause wet books to warp as they dry.

However, under the present circumstances, when many institutions still have no electricity, it is better to place the materials in the sun to dry rather than to leave them in their original condition. They should not be left out longer than necessary.

While one can take a decision to discard ephemeral material, every effort should be made to salvage vital documents which may be of medical, legal, religious or educational importance. The following simple guidelines are presented to assist persons to salvage their materials.

PRINTED MATERIALS

These procedures should be followed in the drying of bound volumes, files, computer printouts, maps and drawings. Unbound materials are easier to deal with as individual sheets can be laid flat to dry on absorbent paper.

As soon as the item can be opened with little risk of damage, it should be interleaved with absorbent paper to help in the drying operations. Blotting paper, paper towelling or plain newsprint can be used. Coloured paper or used newsprint (newspapers) should not be used.

The paper used for interleaving of a volume should be changed frequently and it is important not to place too many of these sheets at a time or the spine will curl and the volume will be destroyed. As the volume becomes dry it can be opened flat on its spine and interleaved more closely. Interleaving should not exceed one-third the total thickness of the volume.

The exception of this is water damage to books printed on coated (glossy) paper which must be interleaved at every page to prevent them from sticking.

The most effective way to eliminate mold is to spray the affected material with a solution comprised of thymol crystals dissolved in industrial alcohol, ethanol or acetone. Thymol is however, poisonous and not easily available. Alcohol as near to 100% proof as possible is effective on its own and can be used to kill spores. After it has been sprayed the mold should be allowed to dry. Afterwards it should be dusted off within a well ventilated area preferably out of doors. Do not attempt to wipe or brush off the wet mold as it will spread and discolor the material.

Bound volumes tend to become distorted by the action of water and the swelling of the leaves. In such cases the spine forms shape when the book is closed. Hanging a partially dried book across three or more nylon or fishing lines will help the book to return to its normal shape while drying. Under no circumstances should books be hung when saturated with water.

When volumes are dried they should be closed, laid flat on a table and held in place with a light weight. Volumes should not be returned to cabinets or shelves until they are thoroughly dried, as mold will develop particularly along their inner margin.

PHOTOGRAPHIC MATERIALS

Photographs will stick together when they become wet. To separate them, place them in a tray with water and allow them to come apart naturally. If they are forced apart they will tear.

Once they are separated, place them, image upwards, to dry on absorbent paper. If placed face down, the image can be destroyed.

Framed prints or photographs should be removed from the frames and allowed to dry.

Damaged films of any kind should be professionally dried and reproduced as soon as possible.

Please do not discard valuable documents because you feel that you do not have the time or capability to dry them out.

(John Aarons, National Library of Jamaica, East Street, Kingston, Jamaica.)
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HURRICANE SEASON IS JUNE TO NOVEMBER

BE PREPARED by checking on the following:

1. See that galvanised sheeting on your roof is properly fastened.
2. Make a thorough check up of hurricane shutters, hooks and latches.
3. Trim trees or branches close to the house since these can cause damage if blown down.
4. Ensure that your flashlight is in good working order and keep it handy, along with matches, candles, storm lanterns and large plastic bags.
5. Ensure that you have a transistor radio in good working order and keep extra supply of batteries.
6. Check that your First-Aid Kit is properly stocked.
7. Find out where the shelters for your area are located.

HURRICANES DO HAPPEN
BE PREPARED

Pan-Caribbean Disaster Preparedness & Prevention Project
P.O. Box 1399, American Road, St. John's ANTIGUA
Tel: (809)462-4432 TLX:2195 AK FAX:(809)462-4431

...EARTHQUAKES...VOLCANOES...HURRICANES...FLOODS...FIRES...OIL SPILLS...AIR CRASHES...

SUPPORT DISASTER PREPAREDNESS
A MESSAGE FROM THE PAN-CARIBBEAN DISASTER PREPAREDNESS AND PREVENTION PROJECT (PCDPPP)

Caribbean Disaster News

PCDPPP
DOCUMENTATION CENTRE
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