Overall disaster management from a health sector po.

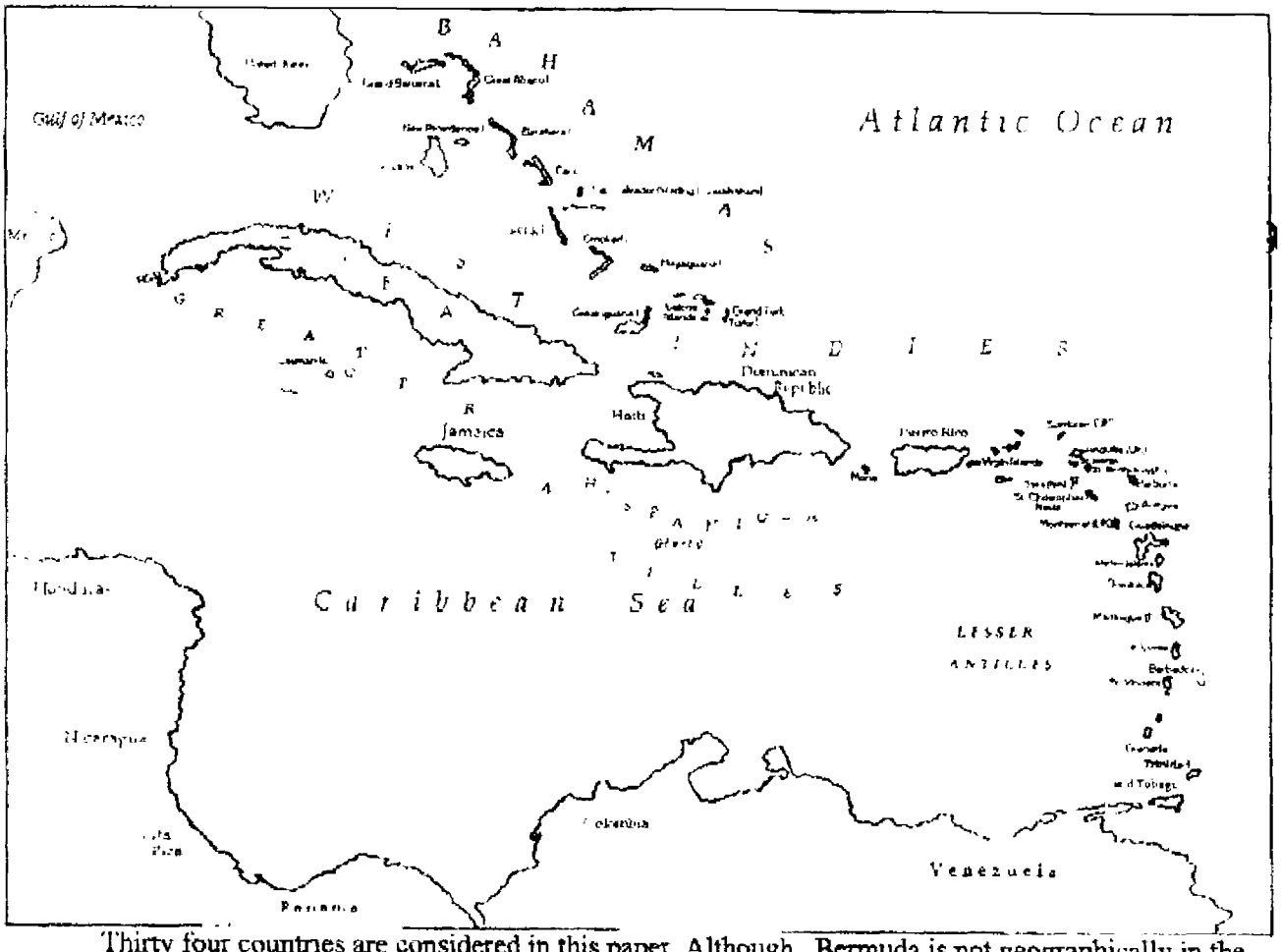
Jean Luc Poncel

This paper identifies the main trends in overall disaster management in the Caribbean regional and national levels from a health sector perspective. It highlights the main reasons why and how the region moved from an "ad hoc" response which existed in the sixties, to an organized system by the middle of the nineties. It also proposes some areas which will need special attention in order to improve regional and national overall disaster management in the future

1. Introductio :

In this article the word Caribbean refers to the Caribbean Sea and its islands, limited in the north west by Cuba and the Bahamas islands and in the south east by Trinidad and Tobago. Furthest to the east is the island of Barbados. The southern limit of the region is formed by Venezuela and the western one by Central America. (Figure 1)

A number of small islands belonging to mainland countries such as the ones which are dependents of Colombia, Honduras, Mexico or Venezuela are not considered in the discussion since their political and administrative organisation are too different in their evolution and disaster management



Thirty four countries are considered in this paper. Although, Bermuda is not geographically in the Caribbean Sea, and Guyana, Surinam, French Guyana and Belize are part of the mainland, they are included

[a] Jean Luc Poncelet, MD, MPH, Head of the Caribbean Disaster Preparedness Sub Regional Program, PAHO/WHO
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in this paper due to their similarities and affiliation with the Caribbean islands in terms of political and administrative status as well as exposure to similar hazards. This definition of the Caribbean and selection of islands must be understood to be more of an operational/functional grouping in terms of disaster management. This is useful because hazards such as earthquakes, floods, volcanic eruptions or hurricanes affect the entire Caribbean regardless of the administrative, political or economical arrangements in the regions.

While it is useful to consider these countries and territories together, there are important differences to take into account. The Caribbean territories can be grouped either by administrative/political system or by language spoken. (Table 1) although these groupings are not always well delimited. There are several "dialects" which allow the people of Haiti to be understood in St. Lucia, Dominica, Guadeloupe and Martinique. In the Netherlands Antilles, English and Papiamiento (mixing words of Dutch, Spanish and Portuguese) are spoken.

English	French	Spanish	Dutch
1. Anguilla °❐	1. Haiti *	1. Cuba *	1. Aruba –
2. Antigua & Barbuda *❐©	2. Guadelupe ⁿ	2. Dominican Republic *	2. Bonaire –
3. Bahamas *©	3. Martinique ⁿ	3. Puerto Rico +	3. Curaçao –
4. Barbados *©	4. Saint Martin ⁿ		4. Saba –
5. Bermuda °			5. St.Eustatius –
6. British Virtin Islands °©			6. Sint Marten
7. Cayman Islands °			
8. Dominica, Commonwealth *❐©			
9. Grenada *❐©			
10. Jamaica *©			
11. Montserrat *©			
12. St. Kitts & Nevis *❐©			
13. St. Lucia *❐©			
14. St. Vincent & Grenadines *❐©			
15. Trinidad & Tobago*©			
16. Turks & Caicos °			
17. US Virgin Islands +			

Table 1:* Independent country, ° British Dependent territory, + USA, ⁿ France, – Netherlands Antilles, ❐ member of OECS, ©Member of CARICOM

Thirteen English speaking countries (Table #1)are members of CARICOM (Caribbean Community) and eight English speaking CARICOM countries are members of the OECS (Organization of Eastern Caribbean States) which are two important political organizations for the English speaking territories Caribforum count with the membership of the CARICOM countries and the Dominican Republic. A large number of activities and agreements exist in the area of education/training (University, Professional), business/commerce & trade, mutual assistance in medical care and disaster response as well as in other areas. The French Departments, however, have a stronger relationship with metropolitan France as well as Haiti. The islands of the southern Netherlands Antilles (Curacao, Bonaire, Aruba) have close relations with South America -specially Venezuela and also with the Netherlands The Dominican Republic, Puerto Rico and the US Virgin Islands are closely affiliated with the USA, while Cuba has strong relationships with Russia, eastern countries, Venezuela and Mexico.

The largest islands have more than 7 million inhabitants, a second group of smaller islands including Puerto Rico, Jamaica and Trinidad have between 1.8 and 3.5 million inhabitants. The other islands together have less than 350,000 people and some may have less than 13,000 inhabitants such as Montserrat or Anguilla. Hispaniola (Haiti and Dominican Republic) and St. Martin (French and Dutch) are the only two Caribbean islands which are have two different countries sharing a common border.

The Caribbean is hence a mosaic of culture, political agreements and trade arrangements which must face similar disaster impact with limited resources.

2. Hazard in the Caribbean

Hurricanes are the most frequent meteorological hazard in the Caribbean, Table #2. Even the years when there was no significant destruction, there were several islands on alert and hurricane watch on numerous occasions. By having a hurricane season form June to November that type of hazard is by far the hazard which has most influenced successive political administrations, the scientific, the industry (tourism and agriculture among others) and the general public. Since early historical time hurricanes were well known For example the word hurricane is a word with Amerindian origins; it is a compound of "hura" and " kan" , meaning" the "Wind of God". Later on Christopher Columbus experienced the fury of these devastating events during his travel in the Caribbean and it is not surprising that the Spanish very quickly included the word " hurricane" in their vocabulary.

YEAR	HURRICANE	DEATHS	HISTORIC COSTS (US$)DAMAGE
1509			Santo Domingo destroyed
1667			St. Kitts mostly destroyed
1768			4000 houses destroyed in Havana Cuba
1772			Extensive damage in Dominica, Antigua,Montserrat, N@. St. KCitts,The Virgin Islands,Puerto Rico
1780 Oct 3			Savanna-la-Mar, Jamaica destroyed
1780-Oct 10-16	Great Hurricane	Nearly 20,000	Severe damage in every island from Tobago to Hispaniola
1825	Santa Ana		7000 houses destroyed in Puerto Rico
1831		1500	$7.5 million damage in Barbados
1912			Jamaica struck
1926			Cuba struck
1928			Guadeloupe, St. Kitts, Montserrat, Virgin Islands and Puerto Rico struck
1930	San Zenon	2000	$15 000 damage in the Dominican Republic
1933			Trinidad struck
1935			Bimini Islands, Bahamas struck
1951			Jamaica struck
1955	Janet		Barbados and Grenada struck
1961			Belize struck
1903	Flora	>7000	US$675 million in damage to Tobago Grenada Dominican Republic, Haiti Jamaica, Cuba Bahamas
1979	David		Extensive damage in Dominica and the Dominican Republic Over 200,000 homeless, and damage over US$ 1billion
1980	Allen		St Lucia and Dominica struck
1988	Gilbert		Extensive damage in Jamaica
1989	Hugo	52	Extensive damage in Montserrat and South Carolina, U.S.A. Total damage over US$ 10 billion

Table 2 Some Significant Post-Columbus Hurricane Events in the Caribbean

Other hazards pose a real threat for the Caribbean and earthquakes and volcanoes have had devastating impacts see table 3 and table 4. Three major tsunamis have been recorded in the Caribbean In 1692 in Port Royal- Jamaica, in 1867, in theVirgin Island, and in 1918 in Puerto Rico The submarine volcano Kick-em-Jenny is said in a preliminary study to be at high risk of creating an important Tsunami (Ref [1])

Date	Magnitude	Country	MM Intensity
1690, Apr 5	7.5 - 8.0	St. Kitts, Antigua	VIII
1692, Jun. 7	---	Jamaica	IX
1701, Nov. 9	---	Hispaniola	VII
1751 Oct. 18		Hispaniola	VIII IX
1766 Jun 11	-	Cuba	IX
1766, Oct. 21	7.9	Trinidad	VIII
1770, Jun. 03	—	Hispaniola	VIII
1810 Oct	---	Cuba	VII-VIII
1824, Apr. 20	-	St. Thomas	VIII
1827 Nov 30	---	Guadeloupe, Martinique	VII
1839, Jan 11	7.5 - 7.8	Martinique	IX
1842, May 7	7	Hispaniola	IX
1843, Feb. 8	7.8 -8	St. Kitts, Montserrat, Antigua, Guadeloupe, Martinique	IX
1844 Apr 16	-	Puerto Rico	VII
1844, Aug. 30	7	St. Vincent	VII
1851 May 16	7	Guadeloupe	VII
1852, Aug. 20	-	Cuba	IX
1867 Nov. 18	---	st. Croix, Virgin Islands	IX
1875 Dec. 8	-	Puerto Rico	VII VIII
1880, Jan. 22	- -	Cuba	VIII
1887 Sep. 23		Hispaniola	VIII
1888, Jan. 10	7.5	Grenada	VII
		Trinidad	VII - VIII
1897 Apr. 29	7	Guadeloupe	VII
1904 June	—	Hispaniola	VII VIII
1906 Feb 16	7	Martinique St. Lucia	VII VIII
1907, Jan. 14	7	Jamaica	IX
1918 Feb 24	6.2	Trinidad	VII - VIII
1918 Oct. 11	7.5	Puerto Rico	IX
1928, Sep. 26	6.5	Barbados, Tobago	VI - VII
1932 Feb 3	6.7	Cuba	VIII
1939, Aug. 14		Cuba	VII
1945 Dec. 23	6.5	Trinidad	VII
1946, May 21	7	Martinique	VII VIII
1946, Aug. 4	8.1	Hispaniola	IX
1953, Mar. 19	7.5	St. Lucia, St. Vincent	VII
1957, Mar. 1	6.5	Jamaica	VIII
1968 Sep. 20	6.9	Trinidad	VII
1974 Oct. 8	7.5	Antigua, Barbuda	VIII
1976, Feb. 19	5.7	Cuba	VII VIII

Table 3: List of Destructive Earthquake's in the Larger and Lesser Antilles (Caribbean)

	Location		Effects		Volcanic Hazards					
Country, Volcano, Periodicity	Latitude	Longitude	Date Last Eruption (2)	Fatl (3)	Prop (4)	Expl (5)	Pzy (6)	PhEx (7)	Lava (8)	Mdfl (9)	VEZ (10)
WEST INDIES											
Saba (Caribbean)											
The Mountain	17.63N	063.23W	Holocene								
St. Eugenius											
The Quill	17.48N	062.95W	Holocene								
St. Kitts and Nevis						x		x			
Mount Misery (St. Kitts)	17.37N	062.80W	1843								
Nevis Peak (Nevis)	17.15N	062.58W	Holocene								
Montserrat											
Soufriere Hills	16.72N	062.18W	Holocene			x					
Guadeloupe											
Soufriere de la Guadeloupe	16.05W	061.67W	1976			x	x	x		x	1-3
Dominica											
Morne au Diable	15.62N	061.45W	Holocene								
Morne Diablotins	15.50N	061.42W	Holocene								
Microtin	15.33N	061.33W	1880					x			1
Morne Patates	15.22N	061.37W	Holocene								
Martinique											
Montagne Pelee	14.82N	061.17W	1929	x	x	x	x	x	x	x	3-4
St. Lucia											
Qualibou (Soufriere)	13.83N	061.05W	1776					x			1
St. Vincent											
soufriere	13.33N	061.78W	1979	x	x	x	x	x	x	x	0-4
Grenada											
Kick-em-Jenny (submarine)	12.30	061.63	1777								0

Table 4: List of Active Volcanoes in th Caribbean

Almost every year Caribbean countries are affected by floods and landslides. These are usually more limited in geographical impact and less effective in attracting the attention of the media and the authorities except for the ones which accompany hurricanes. Tropical waves have traditionally been ignored by authorities until tropical storms Gordon in Haiti -1994 and Debby in 1994 in St. Lucia caused serious flooding, landslides and social disruption when the region became more aware. The meteorological offices and governments agreed on the need to establish a system to inform the population of upcoming torrential rains

In addition to natural hazards, technological hazards are an increasing threat for the region The increase in the number and size of airplanes landing daily in the Caribbean raises the probability of airplane crashes with larger number of casualties. These casualties may have to be transferred to other countries as was the case with the injured passengers of the aircraft crash in Suriname in June 1989. Cruise ships docking daily with a large capacity of passengers are also providing opportunities for accidents involving large numbers of persons. For examples ships of over 2,000 passengers dock regularly at the harbor of Antigua's capital which has a population of 20,000 inhabitants

New industries in the region increase the risk of accidents because regulations may not be as strict as elsewhere in the world. While there is little question of the need to industrialise the region, there is, however the need to link the installation of these new operations with preventive and response measures.

Complex emergencies have not been frequent in the region. Although in the last 15 years, there was a crisis in Suriname in 1985, an attempted coup in Trinidad and Tobago and the coup in Haiti Even if the figures are small, refugees may represent a heavy burden on the receiving island. This was the case in the Cayman Islands. where 24,000 inhabitants experienced an influx of 1,000 Cuban refugees resulting in a population of which 4% were refugees within a few weeks.

3. Vulnerability perception

Some facts support the position that hurricane risk was well perceived by the population . For example, the traditional chattel house of the English, French and Dutch speaking Antilles islands with its hipped roof takes into account possible extensive wind loads. The most likely is that the shape of these houses were influenced by the simple observation that these structures were resistant to hurricanes. It was with the progress of engineering that years later one could determine that this traditional shape was one of the most effective in resisting wind loads taking into account the available building materials. The adoption of new building designs in this century increased the vulnerability of the housing stock as the new type of structures were not studied specifically to resist hazard impacts[2]

The perception of vulnerability changed over the years as there is an increasing number of professionals who study vulnerability in order to reduce hazard impact. The University of the West Indies St. Augustine Campus in Trinidad began in 1994 to integrate a specific chapter on disaster resistant building techniques, including hurricanes, formally in the program for civil engineers In the Dominican Republic the building code was modified in 1983 making it mandatory for all construction to include a number of earthquake resistant measures.

These examples as many others support the idea that the region is moving from an empirical attitude to a professional one.

4. Responses mechanisms

The April 1979, eruption of the Soufrière volcano in St. Vincent affected more than 20,000 people (22% of the total population)[3]. The entire island (344 sq. km) experienced significant volcanic ashfall It is also the same year that the islands of St. Vincent and the Grenadines became an independent country

A few months later on August 29, it was hurricane David which hit the Commonwealth of Dominica, and on September 1, the Dominican Republic, then one week later, hurricane Frederick repeated the process. The entire island of Dominica was devastated with 88% of the roofs and 56% of structures damaged [4]. The damages were estimated at US$ 44.65 million in 1979[3]. Dominica became independent in 1978. As was the case in St. Vincent and the Dominican Republic, several lives and property were lost due to the absence of a warning system and of an organized disaster response mechanism. International Organizations such as the Pan American Health Organization, Regional office of the World Health Organization PAHO/WHO and the League of Red Cross as well as bilateral agencies such as OFDA Office of Foreign Disaster Assistance of the United States Government, CIDA -Canadian International Development Agency, the British Government and others assisted the affected countries recognizing the need for improving the assessment of needs, the coordination among agencies and the mobilization of assistance

The following year a meeting integrated by national and international representatives was convened in the Dominican Republic to study the ways to improve the response to disasters in the Caribbean. Noting the impact on the public, the national governments, the foreign assistance and the international organizations, proposed measures for improving the situation. The participants at the meeting decided to establish a disaster preparedness program in the Caribbean called the Pan Caribbean Disaster Preparedness Program which coordinated input from the Pan American Health Organization, the League of Red Cross and UNDRO, the United Nations Disaster Relief Organization together with the Secretariat of the Caribbean Community (CARICOM) and with the support of bilateral agencies: OFDA, ODA and CIDA. This program was initially created for 18 months but continued for nine years. It also changed its name to Pan Caribbean Disaster Preparedness and Prevention Program- PCDPPP in order to reflect the already growing consciousness of the importance of prevention and mitigation.

The main achievements of PCDPPP were to increase awareness, especially in government circles, of the idea that hazards exist and that the implementation of low cost measures could reduce their impact At the closing date of the PCDPPP all Caribbean countries had started the institutionalization of disaster preparedness. For example they had nominated Disaster Program coordinators in the Ministries of Health, the Red Cross and at national level. In addition several hundreds of people had been exposed in the Red Cross, the Ministries of Health , Ministries of Interior and Universities to disaster preparedness training

Hurricane Gilbert devastated Jamaica in 1988 and hurricane Hugo flattened all structures in Montserrat, in 1989. As in 1979, the devastating effect of two hurricanes and the impact of the PCDPPP, it was realized that a new mechanism had to be put in place to improve response from within the countries and the region The head of CARICOM states approved in 1991 the constitution of the Caribbean Disaster Response and Emergency Agency which is funded by the member states and donors agencies, and in charge of mobilizing resources among CARICOM countries.

The PCDPPP having completed its mission and having found a successor in CDERA, closed its office which was based in Antigua. PAHO decided to maintain its cooperation in the region and to support CDERA member states from its subregional office in Barbados. The Federation of Red Cross Societies, the previous League of Red Cross, also remained in the region with a similar program and was transferred to Jamaica

CDERA now has several cooperation agreements with international agencies. Caribbean Carriers[b] and defense forces[c] among others.

The non-English speaking countries do not have such formal arrangements for several reasons. Among them the size of the islands, the political arrangements and economic links. Due to their larger size, the Greater Antilles: Cuba, Puerto Rico, Haiti and the Dominican Republic are less likely to have the entire country devastated. The economy of these islands is larger and less susceptible to complete collapse. This applies also to the French Departments of Martinique, Guadeloupe and French Guyana which are part of the French economy and solidarity. The Netherlands Antilles have their special economic and political links with Holland. Although there are several agreements among the countries especially in the area of seismology and meteorology. Also in case of disaster management, neighboring states have been keen in providing assistance to the affected ones.

The response mechanisms have improved at regional level among the Caribbean States but also among the International Organizations. Although a lot remains to be accomplished for improving the inter island mutual arrangements. For example there are inter-island mutual assistance technical procedures which have been developed with the support of PAHO between Saint Lucia and Martinique or between Dominica and Guadeloupe, however the formal agreements of understanding are not yet signed There are diplomatic factors as well as political and economic factors which have to be considered by the countries involved. Due to the multiplicity and differences which exist among the Caribbean Countries and territories it will take several years to reach formal agreements

5. National disaster management

Up to the sixties there were no specific national organisation to deal with Natural Disaster[5] This was left to the special power given to the head of states and defence or police force when a state of emergency was declared. Cuba, Puerto Rico, Barbados, Jamaica and the French Departments were among the first ones to create a specific body by the end of the 60's. Cuba has given that responsibility to the civil defence which is directed from the highest military command and the President. In the case of the English speaking countries national disaster committees were created in the prime minister office or the Ministry of Interior. The Dominican Republic has opted for a mixed system as there is civil defence and also a National Disaster Commission which is in charge of writing and updating the National Disaster Plan.

Throughout the Caribbean all these groups were looking almost exclusively at improving national disaster preparedness and response. The beginning of the International Decade for Natural Disaster Reduction in 1990 and the recent impact of Hurricane Gilbert and Hugo provided the opportunity for the Caribbean to start integrating disaster mitigation measures more systematically Other factors influenced the private sector. After hurricane Gilbert and Hugo and in 1992 after hurricane Andrew insurance companies under the pressure of re-insurance companies started to double or triple the premiums to insure properties in the Caribbean. In the case of USVI one insurance company could not meet any hurricane claims as the company went bankrupt. Some private companies conduct cost benefit studies of probable losses versus the cost of reinforcing the building. Not surprisingly these studies demonstrated that it is more profitable to reinforce buildings and systems than to pay for the repair of frequent damage. These companies decided to recommend vulnerability analyses and implementation of plans to progressively make structures more resistant to disasters[6].

[b] BWIA Trinidadian airline, LIAT Airlines which belongs to several Eastern Caribbean States

[c] There are mutual support agreements which binds the Defense Forces of the English speaking countries. In addition the Regional Security Services is an "association " of the defense and police forces of Antigua and Barbuda, Barbados, Commonwealth of Dominica, Grenada, St. Kitts and Nevis, Saint Lucia and St. Vincent and the Grenadines

Government also became more interested. The 1991 Disaster Mitigation Conference[7] organized in Jamaica by PAHO with the collaboration of a number of other international and bilateral agencies was the opportunity for the 25 countries represented to share experience on mitigation projects and identify some broad lines for a Caribbean Disaster Mitigation Policy. Other organizations such as UNDP, the United Nation Development Program, in Haiti or OAS in Trinidad and Tobago assisted the government in mitigation projects Bilateral agencies also decided to assist the region in that field, for example, OFDA's support for a Caribbean mitigation project implemented by OAS, and ODA -UK and CIDA also are very active in this field The CARICOM Secretariat, CDERA and several governments presented projects to be funded by the international community.

With the introduction of disaster mitigation, the task of the disaster coordinator became more difficult. The Ministries of Health for example selected in the 80's young health personnel to be in charge of the new disaster programs. In 1995 due to the complexity of the task and the higher authority and responsibility it became necessary for the job to fall under the direct supervision of Permanent Secretaries (the highest administrative position in the Ministry in the English speaking Caribbean) or to the Chief Medical Officer or a Senior Medical officer. In the French territories it was the Medicine Inspector (Highest Ministry of Health staff). In the Dominican Republic, Cuba, Haiti, Puerto Rico a senior Medical officer is in charge and becomes the direct advisor of the Minister in case of a disaster. At national level a similar attitude was adopted. The national disaster coordinators are now full time positions and closer to the highest executive level of the government.

There have also been changes in the way the UN system approaches disasters in the region since the beginning of the Disaster Management Training Program, a UNDP/DHA initiative, five years ago which ensures the training of the UN staff with the technical support of PAHO and the Organization of American States This project emphasizes training in high risk countries in the Caribbean such as the Dominican Republic, Jamaica and Barbados. This initiative has boosted the cooperation among the UN agencies and the donor community. As an example, in Barbados following the procedures agreed on by the group of international agencies that have the potential to provide either technical or financial assistance in case of disaster, the UN Resident Coordinator regularly convenes an interagency meeting at least three times a year with the purpose of reviewing post disaster assistance procedures.

5.1 Who should be part of disaster management?

Disaster management is understood in this context as the management of all areas related to disaster response, preparedness, mitigation and prevention.

Since the 1980's all countries have developed national, health and hospital disaster plans which integrate the procedures to more efficiently manage their limited national resources.[8] The main limitation of the existing disaster plans is the frequent absence of a clear distinction between preparedness (activities to improve the response) and response (a set of pr ures to be implemented during the post disaster period). In the present disaster plans, responsibil re broad' escribed and most of the time there is no specific person or post in charge d there are several compone f disaster preparedness such as training activities or modification w , should be done for buildings. By clearly separating these two aspects, each individual should know how to protect him or herself and what he/her specific role in order for the organization to which he/she belongs to fulfill its mission during the post disaster. On the other hand the disaster preparedness program will be better focused.

There is a large number of actors who have responsibilities in disaster and who should participate in a dis preparedness committee. This is especially important in the preparedness phase/period when there is time to discuss and consult. During the emergency phase th gh, and especially in small territories where there are limited human resources, there is inter to set up all permanent disaster response committee or cell whose duty is to take quick decisions. Th ommittee should be integrated by a very senior

civil servant a person just below the head of state with four or five additional members, depending on the situation, and which may changed in time. In the case of an earthquake, the emergency situation usually involve trauma injuries, water, power supply , road accessibility and manpower A few days later injuries will not be a problem any more but international assistance may become one. The persons in the crisis cell will change accordingly. Having a small structure like this will avoid having long meetings were everybody comments on his/her point of view to the decision level This has been observed in the immediate post disaster period as well as in large drills such as the Tradewinds exercises[d] and also in Haiti in the period immediately preceding and following President Aristide's return to the country after his exile in the USA. By the end of each day the disaster response committee should brief all key players - usually the members of the disaster preparedness committee- who are participating in the response.

St. Lucia is restructuring its National Disaster Committee in such as way that only five or six persons will be present all day long at the national emergency operating center in case of disaster. The same small decision committee will be promoted in each key private institution and ministry involved in disaster response. It will take time to implement this system as it requires a perfect understanding and confidence from all sectors of the society.

At the beginning of the 90's the tendency was to request the disaster coordinator to take charge of disaster mitigation. However as they were mostly oriented to disaster response there were difficulties in integrating the disaster mitigation concepts. It seems that there is a shift and that planners or developers are progressively taking the leadership. In Jamaica the Office of Disaster Preparedness is mostly a disaster response coordinating agency, however that agency is promoting for example that town planners take hazards into account in land use. In 1995, high level discussions were held in the Dominican Republic with the support of UNDP to create an entity in the Presidency of the Republic which will have the overall responsibility of coordinating response, preparedness and mitigation activities based on the Colombian experience [e] That entity should be in place by 1996 or 1997.

At the international level, a similar situation occurred. PAHO is an agency assisting in the development and planning for the Ministries of Health, however, the disaster preparedness program which was created in 1976 by the directing council which is integrated by Ministers of Health of Latin America and the Caribbean to assist in disaster response. [9] With the proposal at the United Nation General Assembly in 1988 and the adoption of the resolution 44/236 in 1989, PAHO decided to support the idea by more aggressively promoting the mitigation concepts.

Response, Preparedness and mitigation have in common the hazard and the vulnerability of the population, but the type of action involved, and the personnel required are specific to each area. Table 5 intends to clarify as far as possible who should be in charge of which area of disaster management.

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[d] Tradewinds is the name of an exercise which has been promote by RSS. Since 1989 civilians have participated each year with more participants. Since 1993 this exercise is organize togheter with the government of the island were the exercise is taking place.

[e] In 1993 an entity (Direccion National de Prevention y Attention a los Desastres) was established in the Colombia presidency That entity has operational capabilities with the support civil defense, armed forces, rescue team, emergency physicians, etc.. but has also planning capabilities in the ministry of planning or reconstruction responsibility through a " disaster fund" (Fondo de calamidades)

Skills required by type of disaster management activity		
	Example of ype of personnel	*Leader*
Disaster Mitigation	Town and planning, banks, planners of Ministries of Health, Works, development NGO's, Disaster Co-ordinators, etc...	Leader at national level: Ministry of planning or interior or minister of the presidency National Disaster entity. Leader for the health sector: Ministry of health planning division
Disaster Preparedness	All public and private agencies which has resources to improve the response to disaster	Leader a national level: Civil Defence, National Disaster Co-ordinator, the head of civil protection etc.. Leader for the health sector the ministry of health
Disaster response	Every body who has operational capabilities	Highest authority of the government executive. Small Committee integrated by 5 to 6 decision level staff

Table 5

The leader of each sector is, in most cases, not the disaster coordinator. He/she should be the direct advisor to the leader. If "ad hoc" arrangements were sufficient up the end of the sixties and it was possible to have a very small group in "charge of disasters," up to the end of the eighties, with the introduction of mitigation and the addition of new concepts brought in by scientists and other professionals, countries will have to strengthen existing entities or create new ones which will have a comprehensive disaster management mandate. Ideally, that mandate should be limited to coordination and hence should remain as small as possible, promoting that each Ministry, NGO or private institution strengthen their internal capabilities according to responsibilities agreed with the national disaster management entity.

5.2 Budget

Some encouraging signs exist in that direction. The national disaster coordination office in all countries have a budget, even if small, and staff. However, at sector level, there is no specific budget with a few exceptions like Jamaica, which has a specific budget for disaster management in the ministry of health. Another encouraging sign is that the permanent secretaries and the health disaster coordinators who attended the June 1994 Health Disaster Coordinators Meeting of the English speaking countries recommended that countries establish a small disaster management budget.[10] The French Antilles adopted legislation whereby each institution must implement the revised building code at their own cost. If it is decided, that it is not so important to have a budget line, it is critical that all institutions, private or public, have a mechanism to mobilize the human resources and necessary finances to reduce their vulnerability.

5.3 Sectorial interaction

Some type of responsibilities seem clearly, to belong to one sector and do not have to be dealt with by a national disaster entity. Casualty management is one example. The Ministry of Health is in charge of management of that type of situation and the day to day operation even if in practice it may be the

ambulance of the fire department or the Red Cross which is doing the first responder work. In the case of large numbers of injuries, the resources of the institution in charge of casualty management are not sufficient. Other institutions must be mobilized with different responsibilities and capabilities. The resources which could and should be mobilized depend on a large variety of institutions whose heads are usually at the same administrative or political level. For example during a meeting organized by CERO in 1993[11] the number of institutions was surprisingly high. Going from the hospitals to the coast guard or from the airport authority to the Red Cross as well as the fire services, the defense force, insurance companies, medical association, and religious groups. In addition, it was realized that medical and health resources from overseas, also had to be taken into account. A large number of the institutions involved do not depend at all on the Ministry of Health. In the case of Cuba most of the ambulances are operated by the Red Cross. The government of Antigua, St. Lucia and Dominica placed their ambulances under the control the fire services which is part of the police force. In these last situations there are conflicting interests in mobilizing resources as the firemen are expected both to extinguish a fire and manage the ambulances with too few human resources.[12]

A small but increasing number of emergency medical specialists acknowledge that the only solution for this type of problem is to set up a national mass casualty management system with adequately trained personnel[13] and under the leadership of the National Disaster Office in the territories where they are under the Prime Minister's authority. This body seems to be the only one able to make all necessary national resources available to the head the sector. Having such a system working would be a major improvement not only in mass casualty management but in all disaster management areas.

6. Disaster management training

Training has evolved in the Caribbean with a similar pattern as the one followed by disaster managers. It is in the 80's that the first course on disasters was officially introduced at the Faculty of Medicine and Nursing Schools[14] with an elaborate table of contents which was proposed in 1985 for health sciences[15] Geography Departments in several Universities, and the Seismic Research Unit in Trinidad are also training in that field. More recently the Faculties of Engineering in Trinidad and Tobago and in the Dominican Republic are also initiating the process of integrating disaster reduction in their curriculum.

At post graduate level it is in the 90's that the sporadic sessions were replaced by a formal training which was forming part of the Curriculum In the medical field there is, in the one year Master in Public Health (MPH) Program at the University of West Indies (UWI), Mona Campus in Jamaica, a two week intensive course on health disaster management and a four week module in the Master in Public Health Program in Cuba. In the four year Emergency Medicine specialty at the University of West Indies, Cave Hill campus in Barbados, there is a three week intensive course on medical disaster management. These courses are intensive (6 to 8 hours per day) in order to allow professionals who are not part of the formal post graduate program to follow the course leaving their post for the shortest time possible. The successful participants receive a certificate from the University in Disaster & Emergency Medicine or Disaster Health Management

Due to the relatively recent introduction of formal training in the Caribbean Universities, most professionals occupying disaster management positions were trained in disaster management only through short training sessions provided by an increasing number of regional and international institutions. It is hoped that in the near future, disaster management training will increase and that the disaster manager post description will include specific training in disaster management. A first document was elaborated in 1993 guiding Eastern Caribbean Health Authorities who want to set up a pre-hospital emergency management system on who should be trained in what and where.[16]

7. Conclusions

This paper does not pretend to be comprehensive in discussing every disaster management area but rather is intended to raise the some important accomplishments in the last twenty years as well as propose areas which need strong follow up in to pursue these in the most cost effective manner possible.

Before the beginning of the seventies, like in other regions of the developing world, disaster management could be summarized as an almost improvised disaster response whereby everybody was helping with what they had but with no prepared, planned or coordinated procedures.

Two "disaster periods" in the last twenty five strongly influenced disaster management in the Caribbean. The first one was between 1979 and 1980 with La Soufriere volcanic eruption in St Vincent in 1979, Hurricane David and Frederick in the Dominican Republic and Dominica the same year and hurricane Allen in St Lucia and St. Vincent (1980). The second period extends between 1988 and 1992 with hurricane Gilbert (1988) in Jamaica, hurricane Hugo (1989) in Guadeloupe, Montserrat, St Kitts and Nevis, Antigua and Barbuda , British Virgin Islands, US Virgin Islands and Puerto Rico and Hurricane Andrew (1992) in the Bahamas and United States. The first period corresponds to the passage from the "ad hoc" response system to a disaster response management and the second one, the shift from preparedness to disaster mitigation.

The participation of scientific, disaster program coordinators, politicians and other national professionals with the support of international and regional organizations since the end of seventies to the present allowed a change in attitude and movement from a circumstantial reaction to an analytical and continuous attention. The development of risk maps, the Caribbean Unified Building Code (CUBIC Code)[1] and disaster plans are just three examples of Caribbean professional input. Several elements indicate that disaster management will continue to progress and will become a science on its own.. The participation of universities and of high level professionals are forerunners of a Masters Program in Disaster Management.

There is no doubt about the accomplishments of the region in disaster management but there are a number of areas which need a urgent attention of all partners to better reduce potential hazard impacts on the society.

The vulnerability of the region is better now than before. Risk maps need to be developed in almost all of the region to allow individuals and politicians to take appropriate action.

Disaster response mechanisms at regional level and country level exist, however, there is a lack of clarity in the procedures and responsibilities. The formalization of inter country agreement should facilitate the inter country mutual assistance

More professionals are participating in disaster management. Countries and institutions at national , regional and international level will have to clarify the mandate and establish appropriate leading agencies for response , preparedness and mitigation.

The establishment of overall national disaster management offices is the only solution in the long term to ensure a comprehensive vision of disaster reduction and to ensure that there are no gaps between all sectors of the society. The intersectorial coordination should be the main if not the only function of that national disaster management entity.

[1] The CUBIC Code is a building code which was elaborated by Caribbean consultant to be adapted and adopted by Caribbean governments. With the initial support from USAID and CARICOM the Caribbean Unified Building code was finally proposed in 1985. Its application , however has not been made obligatory due to the unfounded fear that the cost of implementation may be high.[2]

Building codes exist but have not integrated all disaster reduction measures and should be mandatory in all territories w the appropriate control systems.

The budget needed for disaster management is low but need to exist. All institutions should facilitate resources for disaster reduction

Too few universities have integrated in comprehensive curricula disaster management at pre or post graduate level

The professionals occupying disaster management positions are seldom formally trained and there is virtually no disaster management position which requires specific disaster management training

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