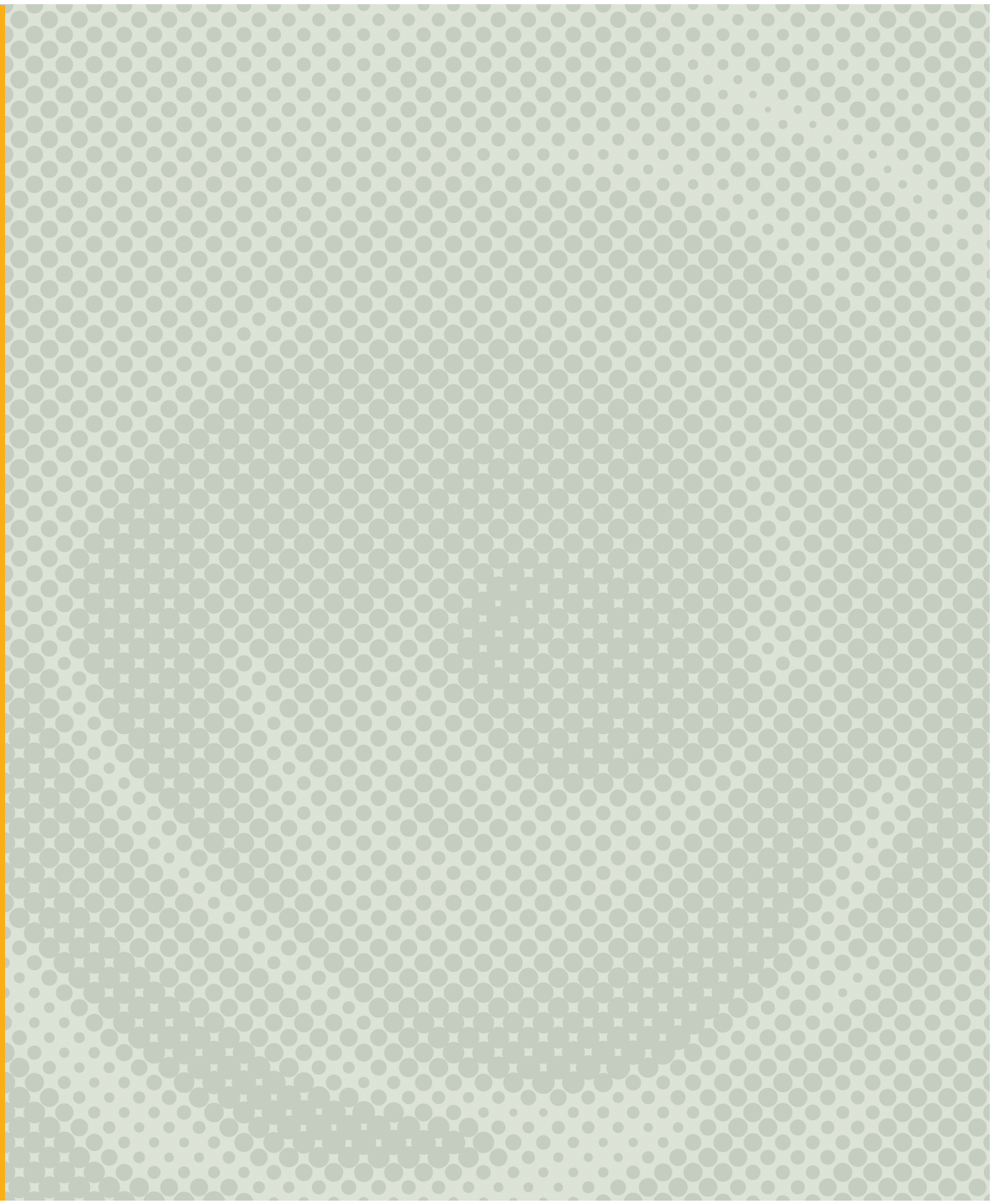
Interagency cooperation in disaster management: partnership, information and communications technology and committed individuals in Jamaica

Ina Østensvig



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Interagency cooperation in disaster management: partnership, information and communications technology and committed individuals in Jamaica

By Ina Østensvig

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Credits

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inaoestensvig@hotmail.com

Noragric
Department of International Environment and Development Studies
P.O. Box 5003
N-1432 Ås
Norway
Tel.: +47 64 96 52 00
Fax: +47 64 96 52 01
Internet: http://www.umb.no/noragric

Photo credits: Jamaica Red Cross/Ina Østensvig
Following page: Damages, assessment, communication and relief distribution related to Tropical Storm Lili in Jamaica, 2002.

Dedication

I would like to dedicate this thesis to Jamaica Red Cross' community disaster response teams and their members. I owe them a debt of gratitude for the inspiration and motivation received by their hard work, courage and commitment. Thank you!

Your efforts truly make a difference! Keep up the good work and stay strong!

Picture 1 - CDRTs in Western Jamaica, May 2004.

Picture 2 - CDRTs in Eastern Jamaica, December 2005.

Declaration

I, Ina Østensvig, hereby declare that this thesis is my original work. All materials other than my own are duly acknowledged. This work has not been submitted to any other university than UMB for any type of academic degree.

Place and Date: _____

Signature: _____

Abstract

Jamaica, with its location in the Caribbean, yearly experiences hurricanes and flooding. Hurricane Ivan happened in 2004. This study examines the partnership and interagency cooperation in the disaster management system in Jamaica during Hurricane Ivan. The use of information and communications technology in this system was also studied. Semi-structured key informant interviews were conducted of the involved agencies of the disaster management structures. A questionnaire with structured and open-ended questions was used to collect data at household level. This thesis describes the existing disaster management system in Jamaica, and the involvement of the international community. There is a national and parish level structure, with cooperation among key agencies in the varied specialised area. Popular trust in the system and the ability to prepare for action play important roles in the success of the disaster management. The time aspect and information sharing are key elements to the efficiency of operations. To some extent information and communications technology is used within the system for this purpose. This paper focuses on Red Cross' involvement at international, national and parish levels as well as examples of their partnership with private sector and community-based disaster response. This paper concludes that committed individuals within the system are needed to make the disaster management structure successful. There is also a need for training to improve the interagency cooperation and to utilise the available information and communications technologies. The experience from Jamaica shows that preparedness at community level can benefit the communities more than the disaster management system as such. Their success in community disaster preparedness, strengthen community and national self-esteem.

Acknowledgements

This thesis resulted from a strong desire to combine personal interests, experience and former education. The experience as a youth delegate in Jamaica 2002-03 with Red Cross inspired me to look into the topic of disaster management. Firstly, I want to thank the Jamaica Red Cross' staff and volunteers for exposing me to the humanitarian world, with its challenges and positive perspectives.

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Finally, I want to thank my family and friends for their support during my work on this thesis, Kylie Giffard especially for her time and efforts in the completion phase. A special thanks to the Francis' family, who welcomed me into their family during my field work. I also want to "big up" Ronald Jackson, at the Office of Disaster Preparedness and Emergency Management, for his enormous assistance with my research.

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Acronyms and abbreviations

ADRA	Adventist Development and Relief Agency
CARICOM	Caribbean Community
CDERA	Caribbean Disaster Emergency Response Agency
DIPECHO V	Disaster Preparedness ECHO project V
DMIS	Disaster Managing Information System
ECHO	Humanitarian Aid department of the European Commission
EOC	Emergency Operations Centre
ER	Ericsson Response
FACT	Field Assessment and Coordination Team
IFRC	International Federation of Red Cross and Red Crescent Societies
ISDR	International Strategy for Disaster Reduction
JCF	Jamaica Constabulary Force (Police)
JDF	Jamaica Defence Force
JFB	Jamaica Fire Brigade
JRC/S	Jamaica Red Cross Society
Met. Office	Meteorological Service of Jamaica
MLSS	Ministry of Labour and Social Security
MoH	Ministry of Health
MOU	Memorandum of Understanding
MP	Minister of Parliament
NDC	National Disaster Committee
NEOC	National Emergency Operations Centre
NGO	Non-governmental organisations
NWA	National Works Agency
ODPEM	Office of Disaster Preparedness and Emergency Management
PADRU	Pan-American Disaster Response Unit
PC	Parish Council
PDC	Parish Disaster Committee
PEOC	Parish Emergency Operations Centre
PM	Prime Minister
RC	Red Cross
RJR	RJR Communications Group, Jamaica
SDC	Social Development Commission
UN	United Nations
UNDAC	United Nations Damage Assessment and Coordination Team
UNDP	United Nations Development Programme
VCA	Vulnerability and Capacity Assessment

1. Introduction

Disasters are occurring around the world with increasing frequency. The people affected by the disasters are predominantly from developing countries and are among the poorest population. While the richer part of the population loose more in monetary value, but the percentage of losses are far less than for the poor(IFRC 2004). “Disasters disproportionately affect the poor: over 90 per cent of the total disaster-related deaths occur in developing countries; and the economic losses they cause represent a percentage of their gross national product estimated to be 20 times greater than in industrial countries”(IFRC).

“Earthquakes, floods, drought, and other natural hazards continue to cause tens of thousands of deaths, hundreds of thousands of injuries, and billions of dollars in economic losses each year around the world. The Emergency Events Database (EM-DAT), a global disaster database maintained by the Centre for Research on the Epidemiology of Disasters (CRED) in Brussels, records upwards of 600 disasters globally each year (http://www.cred.be). Disaster frequency appears to be increasing. Disasters represent a major source of risk for the poor and wipe out development gains and accumulated wealth in developing countries”(Dilley et al. 2005:1). In Jamaica floods and wind storms are the most frequent natural disasters. See Figure 1 for a summary of registered natural disasters in Jamaica.

Summarized Table of natural Disasters in Jamaica
from 1900 to 2005

	# of Events	Killed	Injured	Homeless	Affected	Total Affected	DamageUS (000's)
Drought	5	0	0	0	100,000	100,000	6,500
ave. per event		0	0	0	20,000	20,000	1,300
Earthquake	1	1,200	0	0	90,000	90,000	30,000
ave. per event		1,200	0	0	90,000	90,000	30,000
Epidemic	4	46	0	0	300	300	0
ave. per event		12	0	0	75	75	0
Flood	13	767	0	53,422	845,290	898,712	1,262,740
ave. per event		59	0	4,109	65,022	69,132	97,134
Slides	1	40	0	0	0	0	0
ave. per event		40	0	0	0	0	0
Wind Storm	23	574	225	99,420	1,224,516	1,324,161	4,260,325
ave. per event		25	10	4,323	53,240	57,572	185,232

Created on: May-28-2006. - Data version: v06.01

Figure 1 - Statistics of natural disasters in Jamaica
Source:"EM-DAT: The OFDA/CRED International Disaster Database, www.em-dat.net - Université catholique de Louvain - Brussels - Belgium"

Disaster management plays an important role in the development of a country, especially in the poorer nations. Areas and communities where disasters strike are hindered, particularly in the socio-economic sector. Interagency cooperation plays a significant part in disaster management by minimising the impact of a disaster and increasing the efficiency and effectiveness of the response. One way of improving the efficiency of interagency cooperation is the use of information and communications technology.

In disaster situations, various agencies have a pre-defined role on how to respond to assist the affected people. In most instances a Government agency plays the coordinating role in the disaster management system. Non-governmental organisations with specialisations in different areas work alongside various government agencies to reduce the recovery time for those affected by a disaster. Increasingly, the focus is on prevention, mitigation and preparedness in order to reduce the chance of disasters occurring and to be better prepared to respond to the next disaster and thereby limiting the impact.

Every year strong winds and heavy rain create disaster situations in Jamaica, especially in the hurricane season between 1 June and 30 November. In 1988 Hurricane Gilbert destroyed large areas of the island, as did Hurricane Ivan in September 2004. These events caused both damage to livelihood, housing and infrastructure; including water, sanitation, roads, electricity and the loss of lives(IFRC 2004).

In this study I have looked at the interagency cooperation in disaster management in Jamaica. I'm focusing on key disaster management agencies at international/regional, national, parish and community level, to determine how they cooperate, as well as considering the use of information and communications technology within disaster management.

Rationale

My reasons for study in this area include a combination of personal background and interests, an increased focus on disasters and disaster management in general as well as the focus on information and communications technology in relation to development.

I have been working and volunteering over a period of time for Jamaica Red Cross. During this time, I have gained an insight into the existing disaster management system in Jamaica, and wanted to focus my research in this area. The interest in investigating the use of information and communications technology (ICT) is threefold; I have an undergraduate degree in computer engineering, Jamaica is one the fastest growing countries in the Latin America/Caribbean region when it comes to use of ICT(WEF 2005), and the international focus is on the potential benefits of ICT. For example the United Nations' Millennium development goal number 8:"Develop a global partnership for development. […] Target 18: In cooperation with the private sector, make available the benefits of new technologies – especially information and communications technologies"(UNDP 2002), support this.

My research will hopefully trigger further improvements in relation to interagency cooperation in Jamaica's existing disaster management system. This could also provide other small-island states without a disaster management system in place, ideas on ways they could better cope with disaster. Another area in which this study could impact is in the use of ICT within disaster management. Improvements in efficiency, effectiveness and logistics of disaster preparedness (warnings and readiness) and response, will decrease the impact on vulnerable people. In the larger picture, these improvements could lead to positive development of the affected community and the country at large.

Existing literature covering the linkage between interagency cooperation, disaster management and information and communications technology is very limited. The separate topics are widely covered and I will therefore attempt to link the literature in this thesis.

Objectives and research questions

Objectives

The objectives of my study are:

1. Map the key agencies involved in the disaster management system in Jamaica.
2. Understand the interagency cooperation within the disaster management system; the agencies' roles, and how they operate and communicate.
3. Find out what types of information and communications technologies are used in disaster management and how they are used.
4. Find out how the partnership agreement between Ericsson Response (ER) and International Federation of Red Cross and Red Crescent Societies (IFRC) functions in practise for Jamaica and Jamaica Red Cross.

Research questions

The research questions focus on the mapping of key disaster management agencies and their roles, their cooperation and the use of information and communications technologies. For complete interview guides and questionnaire, see Appendices.

Definitions

Below is a list of key words used throughout the thesis. They are listed in alphabetical order.

Disaster

"A sudden calamitous event bringing great damage, loss, or destruction; *broadly* **:** a sudden or great misfortune or failure"

Source: (Merriam-Webster Online Dictionary)

"A situation in which a threat exposes the vulnerability of individuals and communities to a degree that their lives are directly threatened or sufficient harm has been done to economic and social structures to undermine their ability to survive".

Source: International Federation of Red Cross and Red Crescent Societies (IFRC).

Disaster cycle

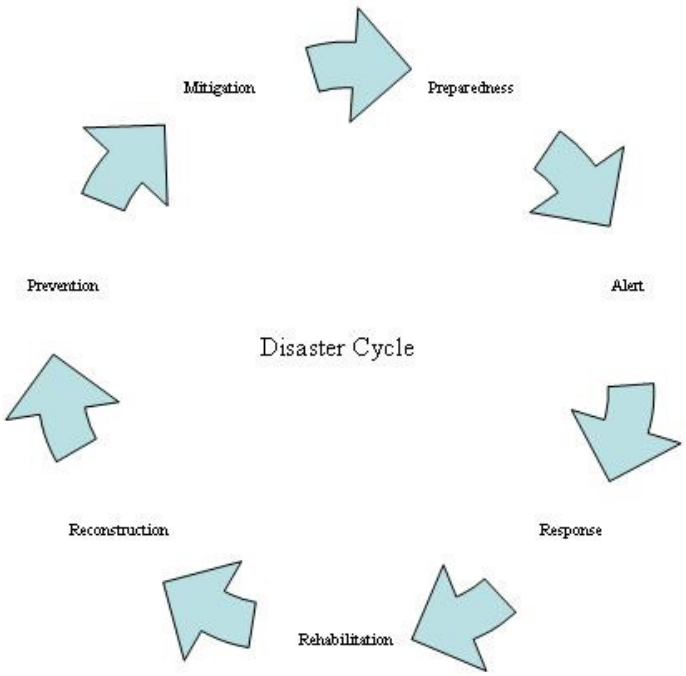

Figure 2 - Disaster cycle
Source: Office of disaster preparedness and emergency management (ODPEM-Jamaica). Adjusted by author.

Disaster management

"A collective term encompassing all aspects of planning for and responding to disasters, including both the pre- and post-disaster activities. It refers to both the risk and consequences of a disaster".

Source: Office of disaster preparedness and emergency management (ODPEM-Jamaica).

Disaster preparedness

"Activities that contribute to the pre-planned, timely and effective response of individuals and communities to withstand, reduce the impact and deal with the consequences of a (future) disaster".

Source: International Federation of Red Cross and Red Crescent Societies (IFRC).

Disaster response

"Coordinated activities aimed at meeting the needs of people who are affected by a disaster".

Source: International Federation of Red Cross and Red Crescent Societies (IFRC).

Emergency

"1 : an unforeseen combination of circumstances or the resulting state that calls for immediate action

2 : an urgent need for assistance or relief".

Source: (Merriam-Webster Online Dictionary)

Hazard

"The potential for a natural or man-caused phenomena to occur with negative consequences".

Source: Office of disaster preparedness and emergency management (ODPEM-Jamaica).

Hurricane

"A hurricane is a tropical cyclone in which the maximum average wind speed near a centre or eye exceeds 74mph or 119km/h. The winds rotate in a counter-clockwise spiral around a region of low pressure. In the Atlantic […] such systems are called Hurricanes".

Source: Caribbean Disaster Emergency Response Agency (CDERA).

Hurricane "eye"

"This is where the lowest pressure of the hurricane is found, and is usually a relatively calm center portion of the hurricane. The winds are light, the skies are partly cloudy (or even clear) and rain-free. The diameter of the eye can be as small as 5 miles or as large as 100 miles, averaging about 20 miles".

Source: National Weather Center/National Hurricane Center (NOAA).

Hurricane categories (The Saffir-Simpson Hurricane Scale)

"The Saffir-Simpson Hurricane Scale is a 1-5 rating based on the hurricane's present intensity. This is used to give an estimate of the potential property damage and flooding expected along the coast from a hurricane landfall. Wind speed is the determining factor in the scale […]".

- Category 1 Hurricane: Winds 119-153 km/hr
- Category 2 Hurricane: Winds 154-177 km/hr
- Category 3 Hurricane: Winds 178-209 km/hr
- Category 4 Hurricane: Winds 210-249 km/hr
- Category 5 Hurricane: Winds greater than 249 km/hr

Source: National Weather Center/National Hurricane Center (NOAA).

Hurricane names

"Since 1953, Atlantic tropical storms have been named from lists originated by the National Hurricane Center. They are now maintained and updated by an international committee of the World Meteorological Organization. The original name lists featured only women's names. In 1979, men's names were introduced and they alternate with the women's names. Six lists are used in rotation. […]. In the event that more than 21 named tropical cyclones occur in the Atlantic basin in a season, additional storms will take names from the Greek alphabet".

Source: National Weather Center/National Hurricane Center (NOAA).

Information and communications technology

"Electronic means of capturing, processing, storing and disseminating information".

Source: "ICTs forPoverty Alleviation: Basic Tool and Enabling Sector"(SIDA 2005)

"New ICTs: Computers, satellites, wireless one-on-one communications (including mobile phones), the Internet, e-mail and multimedia generally fall into the *New ICT* category.
The concepts behind these technologies are not particularly new, but the common and inexpensive use of them is what makes them new. Most of these, and virtually all new versions of them, are based on digital communications.
Old ICTs: Radio, television, land-line telephones and telegraph fall into the *Old ICT* category. They have been in reasonably common use throughout much of the world for many decades. Traditionally, these technologies have used analog transmission techniques, although they too are migrating to the now less expensive digital format.
Really Old ICTs: Newspapers, books and libraries fall into this category. They have been in common use for several hundred years".

Source: "ICTs forPoverty Alleviation: Basic Tool and Enabling Sector"(SIDA 2005).

"Information and communication technology refers to:

- Information channels such as World Wide Web, online databases, electronic documents, management and accounting systems, intranet, etc.
- Communication channels such as e-mail, electronic discussion groups, electronic conferences, the use of cell phones, etc.
- Hardware and software used to generate, prepare, transmit and store data, such as computers, radio, TV, computer programs/tools, etc."

Source: "Information and Communications Technology (ICT) in development co-operation – guidelines from NORAD"(Norad 2002).

Interagency cooperation

Interagency: "Involving or representing two or more agencies, especially government agencies".

Source: (*Online Dictionary - Answers.com*)

Cooperation:

"1. The act or practice of cooperating.

2. The association of persons or businesses for common, usually economic, benefit."

Source: (*Online Dictionary - Answers.com*)

"Co-operation refers to the practice of people or greater entities working in common with commonly agreed-upon goals and possibly methods, instead of working separately in competition.

Cooperation is the antithesis of competition, however, the need or desire to compete with others is a very common impetus that motivates individuals to organize into a group and cooperate with each other in order to form a stronger competitive force. […]

Many people support cooperation as the ideal form of management of human affairs. In terms of individuals obtaining goods and services, rather than resorting to theft or confiscation, they may cooperate by trading with each other or by altruistic sharing."

Source: (*Online Dictionary - Answers.com*)

Natural hazard

"These are naturally occurring events that are not caused by man's actions or activities. […] E.g. earthquake, floods, hurricanes/storm surges, landslides and drought".

Source: Office of disaster preparedness and emergency management (ODPEM-Jamaica).

Vulnerability

"The extent to which a community's structure, services or environment is likely to be damaged or disrupted by the impact of a hazard"

Source: Office of disaster preparedness and emergency management (ODPEM-Jamaica).

Structure of the thesis

The following chapter, Chapter 2, is a review of literature related to my thesis. The topics covered include disasters and disaster management, interagency cooperation, and use of information and communications technology (ICT) in disaster management.

Chapter 3 covers the methodology used in the process from a selection of study areas and informants, the methods used to collect data as well as ways to analyse findings and the limitations and ethical considerations related to my research.

My findings are presented in Chapter 4. Hurricane Ivan in Jamaica is the case used in my study. Firstly, I will introduce the storm and its impact on Jamaica. Secondly, I will show the interagency cooperation that exists in Jamaica with its key agencies at international/regional, national, parish level. A presentation of a committed community member and his community disaster response team follows thereafter. An overview of the information and communications technologies (ICT) that were used within the interagency cooperation system in disaster management follows. Lastly, I will present an example of a partnership agreement between a private sector company and a humanitarian organisation.

Chapter 5 includes a discussion of the existing literature presented in Chapter 2 and my findings from Chapter 4. Chapter 6 is the concluding chapter of my thesis.

2. Literature Review

The key topics covered in this thesis are the interagency cooperation and partnership in disaster management; international, national and community-based disaster management in addition to the use of information and communications technology in disaster management operations.

Challenges related to disasters – the need for disaster management

Disasters are both a humanitarian as well as an economic issue. The cost of relief, rehabilitation and reconstruction comes in addition to the human and economic loss caused by a disaster. “Disaster losses can be reduced by reducing exposure or vulnerability to the hazards present in a given area”(Dilley et al. 2005:115). Therefore reduction of disaster risks and vulnerability are key components for sustainable development(Dilley et al. 2005).

In the Economic and Social Survey for Jamaica 2004, it was stated that natural and man-made hazards by their occurrence “can pose a constraint to sustainable development because of the widespread social, economic and environmental degradation that accompanies them. Some effects of this are loss of live and property, displacement of residents, pollution of water resources, and sanitation and health problems”(PIOJ 2005:18.4).

The costs created by disasters are an extra burden, particularly in hazard-prone countries. This can put an extra financial pressure on the government’s mitigation and preparedness activities in hazard-prone countries, which often constitute the poorer nations(Benson & Clay 2004).

Additional challenges related to disasters are people's perceptions of risk and their behaviour. Smith(2004) is states that people's perception of risk is one of many factors taken into account when people make a decision to evacuate their homes, or refuse to evacuate. Furthermore, he emphasizes that "there is a need for a better understanding of emergency evacuation procedures"(Smith 2004:160), when it comes to people's resistance to act like the emergency planners want them to.

This leads into the element of trust. "It seems likely that trust plays a vital role in establishing the conditions for effective coordination among otherwise separate organisations in the humanitarian relief environment"(Stephenson Jr. 2005:343). For the coordination of emergency operations Stephenson Jr. describes trust as "a necessary but perhaps not sufficient condition for effective inter-organisational coordination in emergency relief situations"(Stephenson Jr. 2005:346).

Successful disaster management

According to the World Disasters Report 2005; hurricane forecasting, national warning, local government diffusion, civil society participation and popular understanding and action need to come together for successful disaster management, specified for the Caribbean(IFRC 2005). As stated in this report, "nowhere, can the government do everything. Civil society must pitch in. But this means people must trust the government"(*ibid.*:54). "Caribbean's 2004 hurricane season comes down on both sides – a balance of technology and local activism. The excellent hurricane forecasting available in the Caribbean is necessary, but not sufficient, to prevent disasters. In the most successful cases – Cuba and Jamaica – there is functional local government, proactive voluntary activities and evidence of great improvisation and local knowledge"(*ibid.*:56).

Community-based disaster management

Community-based disaster management is recognised to provide more accurate definition of local problems, where the local needs are expressed from within. Another benefit of community-based activities/organisations is the possibility of rapid, cost-effective and fair emergency response. In addition, the fact that respondents possess local know-how and can mitigate and respond to their own disaster, reduces their vulnerability to disaster(Twigg

1999). “Integration of the community system into the wider emergency response network is important as it gives the community a feeling of being supported by the wider network”(Carby 2003:813) is one of the arguments put forward supporting integrated community-based disaster management. Carby also comments that “the experience from Jamaica has shown that the community will become involved if there are a few individuals willing to take charge […]. It is also important that the community perceives that the authorities are handling their responsibility to the community”(*ibid.*).

ECHO/ISDR presented at the World Conference on Disaster Reduction in Kobe, Japan, in 2005 exemplifies good community-based disaster management. Jamaica Red Cross’ Community-Based Disaster Management Project (DIPECHO V) was one of the cases presented at the conference. The project, in short, trained community members in “light search and rescue, emergency first aid, basic logistics and evacuation procedures”(ECHO/ISDR 2005). The team members provided assistance to their communities in the Hurricane Ivan operation by warning their fellow community members ahead of the hurricane, assisting in evacuation and volunteering as shelter managers. “Their efficient reporting during the first 72 hours after the hurricane provided valid information that enhanced response mechanisms in their areas”(ECHO/ISDR 2005).

Interagency cooperation and efficiency

The Humanitarian Response Review, concludes that “interagency cooperation within the NGO community is not frequently utilized at the headquarters for planning and resource management purposes”(Adinolfi et al. 2005:10). Furthermore the report suggests that “Training should be undertaken at all operational levels and, to the extent possible, be expanded to interorganization clusters as a means of achieving the widest possible results”(*ibid*.:33). The need for a system-wide Lead Organization concept is also put forward in the report. This concept encourages “effective use of expertise and technical knowhow of mandated organizations”(*ibid*.:47), which will “facilitate clustering at different levels where this model has a potential to increase efficiency in the use of resources”(*ibid.*).

Efficiency in a multi-agent system is described by Iwata et al. (2004), saying that groups should be formed to “solve problems that are beyond the ability of a single agent. However, some agents may perform redundant actions which have already been completed by other

agents in the same group, as all agents would attempt to perform the same set of actions if they have the same goal"(Iwata et al. 2004:280). To reach their goal in an efficient way, "the agents should perform the fewest number of actions required"(*ibid.*). Often agents concentrate on their own goals and forget about their role in the wider system, as a group member. The cooperative model proposed, is defined to be a system where "agents focus on their actions as part of the group and reduce the number of redundant actions by sharing common actions"(*ibid.*:281).

Challenges with interagency cooperation and coordination

The challenges involved in interagency cooperation are "both to ensure an accurate rendering of needs and to mobilise the appropriate organisations or portions of organisations in the humanitarian network to respond rapidly and effectively to those needs"(Stephenson Jr. 2005:342). An additional challenge is that "organizations have allowed internal emergency systems to develop in isolation from the overall organizational objectives or realistic resource capabilities"(Adinolfi et al. 2005:9).

The apparent hesitance to share information with other operational humanitarian agents involved in an operation, is explained by Stephenson Jr.. He highlights both the limited encouragement given by the environment in which they are operating and the structure of the operational relationship between the agencies. The complex work environment challenges cooperation in many ways. These includes the cost of operation and cooperation, the variety of mandates among the agencies, a wish to "be first on the spot" so as to draw media's attention and thereby possibly attract new donors and finally, competition for scarce resources(Stephenson Jr. 2005).

Another factor influencing relationships and cooperation is trust, mentioned by Stephenson Jr.. "It seems likely that trust plays a vital role in establishing the conditions for effective coordination among otherwise separate organisations in the humanitarian relief environment"(Stephenson Jr. 2005:343).

Communication and coordination

"Communication has a fundamental role in maintaining relationships" (Tourish & Hargie 2004:34). Tourish and Hargie also define communication as having a primary role in maintaining consistency between management decisions and behaviour. "Cross-organizational communication [is] a vital component of program planning and organizational success"(Maiers, Reynolds & Haselkorn 2005). Maiers et al. further comment on the tension and challenges involved in relief operations and how these challenge intra- and inter-organizational communication.

Minear discusses coordination as a multifunctional activity. He mention six key elements in coordination; "(1) strategic planning; (2) gathering data and managing information; (3) mobilizing resources and assuring accountability; (4) orchestrating a functional division of labor in the field; (5) negotiating and maintaining a serviceable framework with host political authorities; and (6) providing leadership"(Minear 2002:20).

Means of communication – challenges and possibilities of information and communications technology (ICT) in disaster management

The World Disasters Report stresses that "local organization and awareness working from 'below' are just as important as timely and accurate high-tech warnings from 'above'"(IFRC 2005:40). The different responsibilities of the media and local government are described as follows in the World Disasters Report 2005: "While national radio and television may broadcast the warning to the most isolated corners of the country, it is local government that must team up with the national Red Cross and NGOs to ensure that people understand the warnings, shelters are ready, evacuation proceeds on time and people take appropriate action.[…].Local government is responsible for ongoing public education about hurricanes, plus preparedness efforts to reduce losses when the next hurricane hits. If local government is weak, the chain of warning and preparedness breaks apart"(*ibid.*:53-4).

"Existing information is generally outdated, hard to find, scattered among different sources, or unreliable for political or other reasons"(Maiers, Reynolds & Haselkorn 2005). "The

advantages of ICT lie in what it can be used for […and] how it can be used for the management of information"(Powell 1999:24). One of the benefits of ICT usage is its capacity to integrate "information from different part of an organisation"(*ibid.*:126). "The key consideration is not which technology to implement, but rather how to use and combine it with other channels of communication"(O'Kane, Hargie & Tourish 2004:95).

The use of technology in disaster management is expanding; "Communications media, including the Internet, cell phones, radio and television, have seen explosive growth" (IFRC 2005:51). The Caribbean ICT virtual community reports from the Hurricane Ivan operation in the Caribbean that "people listened to their radios, watched their televisions and awaited word on what they should do. The Barbadian response to Ivan for example was coordinated through the use of cellular phones in the communities. Radio and television broadcasts were also used to keep the public abreast during and after the passage of Ivan"(CIVIC 2004:3).

New developments in information and communications technology are given credit for both improved risk assessments and real-time disaster management, "including applications of satellite remote sensing, Global Positioning Systems (GPS) and Geographical Information Systems (GIS)"(Smith 2004:50). Montalvo emphasises the benefits of GIS data-sets that can be used for "activities such as planning, policy making, and monitoring with regard to natural and other types of resources and infrastructures such as transport networks, telecommunications networks, and waterways"(Montalvo 2002:188). The data-sets can be produced from a combination of spatial and socio-economic data.

Maiers et al. consider the question, do "technical communications have a key role to play in the future of humanitarian relief". They stress the possibilities for "development of well-planned information and communication systems […]that enhance organizational capacity, especially in challenging areas like coordination, strategic planning, preparedness, accountability, lessons learned, training, research, and education"(Maiers, Reynolds & Haselkorn 2005). They further propose expanding the focus of NGOs from direct relief to a wider strategic management and recording 'lessons learnt' to improve future operations, as well as "help 'professionalize' the humanitarian relief"(*ibid.*).

ICT can create difficulties for disaster management operations. Some of the potential disadvantages are addressed by Powell; firstly mentioned is the basic requirements such as

electricity, phone network, printer, disks and paper for ICT must be present to be of any benefit to the operation. The cost of software, hardware, and time spent on training plus organisational issues and impacts are additional constraints(Powell 1999). “The common shortcomings that were identified [in the Caribbean] were that the communication systems used for information dissemination would not have withstood full wrath of the hurricane. […]. In hurricane winds, telephone landlines and cell phone repeaters would probably not have survived. The Internet, which also depends on national ICT grid would also not have been accessible”(CIVIC 2004:3).

Further to the possible technical shortcomings, social aspects also play a role in the efficiency of technology usage in disaster operations. “Field workers do not see direct benefits, in fact they generally experience IT initiatives as reducing their effectiveness”(Maiers, Reynolds & Haselkorn 2005), and therefore “technology is often seen as a distraction from the primary mission of reducing human suffering”(*ibid.*).

3. Methodology

In order to gain an overview of the functioning of emergency services during Hurricane Ivan it was important to select more than one community, allowing identification of differences between the communities.

In practise, due to time and access constraints, two communities were selected. The two contrast in geographical position and vicinity to urban centres. Within each community an attempt was made to obtain a good, statistically sound sample of views and experiences relating to the function of the emergency services during the Hurricane Ivan operation.

It was impossible to identify and interview all affected community members, so a sample of 10 individuals was identified from a provided list of persons accommodated in one shelter in Yallahs. The same number of people were identified in Ewarton from recollections of key people who had been sheltered there. Neither samples constitute strict probability samples of the population of each community since availability and accessibility for interviews were important constraints. But the interviews indicated similar experiences and views, with expected variance in opinions. Much care was taken to avoid individuals with strong views influencing both the actual sampling as well as the interview process of other people. The majority of views and overall opinions were fairly reflected in the samples of interviewed individuals.

Institutional affiliation

During the study, contact was made with staff and volunteers of the Jamaica Red Cross Society and the Office of Disaster Preparedness and Emergency Management as well as my

local supervisor at the University of the West Indies. This study has a focus on Red Cross operations and examples may be biased positively in their direction. This does not suggest that other organisations do not have good practises worth attention, but they were not considered in this study.

Research approach and methods

My research was based on a qualitative approach where various methods were used in the data collection process. Below is a description of the methods used in this study.

- Semi-structured key informant interviews with use of a interview guide
- Household interviews with use of a questionnaire incorporating both structured and open-ended questions.
- Informal conversations; unstructured interviews
- Observations of context, work environment and operations (EOC during Hurricane Wilma October 2005, trainings, meeting)
- Secondary data analysis; reports, web pages, books, articles, news releases from agencies/media, situation reports from operations.

Selections

Case

Hurricane Ivan was selected as the case for this research because it is one of the most recent disasters in which the international community participated in the response in Jamaica. More recent storms have occurred, however, to include the international aspect of the response, Hurricane Ivan was selected (September 2004) in preference to Hurricane Wilma which passed Jamaica while this thesis was being researched in October 2005. Some observations are from the Hurricane Wilma response. These observations could reflect a national response and should be identical to Hurricane Ivan the year before. The difference between the Hurricane Ivan and Hurricane Wilma response was the involvement of international agencies.

Study areas

Jamaica was selected as the country of study because of my former experiences with the country and in order to benefit from my former network of contacts within the disaster management system. In addition, Jamaica is a country where a predefined disaster management system exisits and is "in action" throughout the year, as opposed to many other countries where a disaster management system is only put in place during a disaster. Since I was based in Kingston, the focus was on the disaster management system of two different parishes surrounding Kingston; St. Thomas and St. Catherine as well as at the national level. In the parishes, research was limited to the key agencies within the welfare section of the disaster management system.

Communities

To determine how the national disaster management system functioned and benefited the affected people, affected household members in the community of the two selected parishes in Jamaica were interviewed.

The Yallahs community in St. Thomas parish and Ewarton community in St. Catherine parish were selected. Both communities are vulnerable to disasters and frequently affected by floods and hurricanes. In collaboration with the Office of Disaster Preparedness and Emergency Management and the Social Development Commission, Jamaica Red Cross selected eight vulnerable communities island-wide to take part in a community disaster response team training project sponsored by ECHO, in 2004. Ewarton and Yallahs were among the communities selected for the training. The training took place in the spring of 2004, with a refresher-training in November/December 2005.

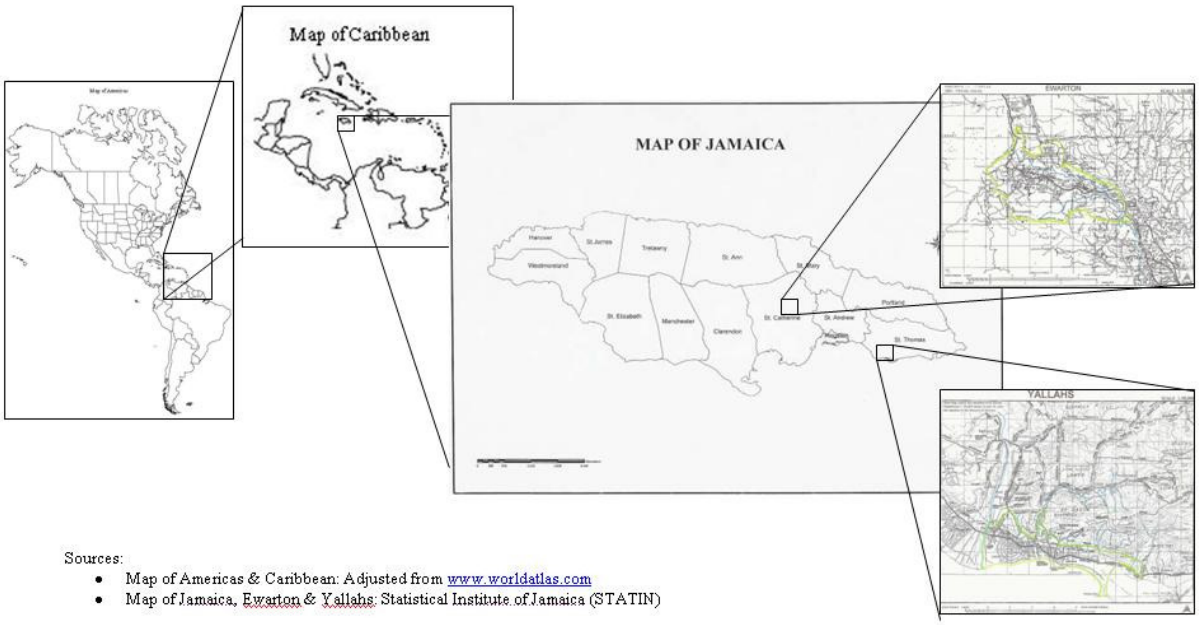

Figure 3 - Maps of study areas, linked together by author.

Key agencies

Office of Disaster Preparedness and Emergency Management was the natural starting point to map the key agencies, since this office is the governmental body coordinating all disaster management in Jamaica. Another source used to map key agencies was Jamaica Red Cross and their cooperating agencies in the welfare section of the parishes and at national level. Additionally, some leads were obtained via the local supervisor. In the interview process, feedback was obtained from the interviewees of other cooperating agencies, thereby adding relevant agencies to the data collection. The interviewees covered information service providers, first-responders, NGOs and governmental agencies, private sector, as well as international agencies.

At national level, representatives at the head offices were interviewed. In the two selected parishes, the heads of three main agencies in the welfare section at parish level were interviewed and at the community level, the community disaster response team leaders were consulted.

Households

To determine whether the disaster management system in Jamaica is effective and benefits the affected people, households were interviewed, preferably the head of the household, to hear their side of the story. People who had sought official shelter during Hurricane Ivan were sought to limit the sample size.

In Yallahs, a registration list of people in shelter, to be referred to as shelterees, during Hurricane Ivan was accessed. One of the schools used as a shelter was selected and the list of shelterees was found. With assistance from a community member and people encountered on the streets, 8 out of 19 listed people were located. Some challenges were experienced during this time; some individuals had moved since September 2004, others worked in town and were not accessible during visits to the community. One name on the list was unknown to all the assisting community members, due to the common use of nicknames and therefore being unfamiliar with given name's used on the registration form. Two people were found whom had been in the shelter but were not registered on the list.

In Ewarton, different methods were required to access the shelterees. Neither the parish nor the national level offices could provide a shelteree-list for the suggested community. As it was difficult to confirm whether a shelter existed in this community or not, the focus was changed to Ewarton where access to the community was available through Jamaica Red Cross' community disaster response team. In the absence of a list of shelterees, the contact person was instead able to find shelterees. The decision was made to interview the same number of individuals as in Yallahs. In Yallas the interviewees consisted of people who sought shelter at the same school and therefore resided in roughly the same area within the community. In Ewarton, however, the interviewees were from diverse areas of the community, seeking different shelters. The contact person was aware of people who had been given shelter through his assistance during the operations. Others were found through a teacher at a school, where a child at school was asked to list other families joining his family at the shelter during Hurricane Ivan.

Data collection

The data collection in Jamaica took place from October till December 2005. In all instances I conducted the interviews myself. A few interviews were booked by personal contacts with links to the agencies that were subsequently interviewed. The agencies interviewed at international and national level as well as at the parish level were conducted under the direction of an adjusted interview guide (Appendices 1-7), so as to phrase the questions in the same way to all the agencies for comparison and triangulation of their responses. The household interviews took place through personal visits to the communities. Local contacts assisted in locating the interviewees. The interviews were based on a structured questionnaire (see Appendix 8).

Data analysis

The comparison and triangulation of answers by the various interviewees generated more accurate research. The questions asked intended to allow a comparison of agencies at national level, but also did so from the national level through the parishes to the communities and people affected by a disaster. The inclusion of the household level intended to function as a check-up of the functionality of the disaster management system studied and to find out if the system was effective in reaching the people.

In order to assess the structure of the participating organisations and the interrelations between them a number of diagrams were constructed to visualise these relationships. They are presented in detail in Chapter 4.

In addition to comparing the data obtained during this study, findings were compared with existing literature, as presented in Chapter 2.

Limitations of the study

Firstly, the timing for research on a disaster management topic was not ideal. The hurricane season was still active and therefore the key agencies were busy responding to urgent situations instead of being easily accessible for interviews. A further seasonal consideration is that December is part of the Christmas season, making it difficult to access people.

The flooding and collapse of roads following Hurricane Wilma in October and previous storms, created challenges to accessibility and limited my choices of communities, in addition to delaying my research initially. As such, the communities included with a Jamaica Red Cross community disaster response team, were both located along main roads in close vicinity to the capital.

At the household level, the intention was to access formal lists of shelterees. This turned out to be a real challenge. In St. Thomas, the shelteree-list was accessed quite easily. After seeking permission from the head office, the parish office of Ministry of Labour and Social Security released the list. In St. Catherine, the absence of a list, was confirmed by people in the community.

The main challenge when it came to agencies was accessing a representative from Ministry of Health. Within the available time, communication was not made with anyone from the health section. This seemed to be a common challenge for other agencies involved in the disaster management system, both at national and parish level.

As this study was focusing on the disaster management system functions there was no particular effort put into the age and gender issues at the household level. The people that never reached a shelter who could be worse off than many that went to shelters were not covered by this study.

Ethical considerations

I found it important to clearly define my role, especially to emphasis my affiliation. A few of my informants knew me as a Red Cross staff member/volunteer, and therefore it was important to clarify that this study was a part of my MSc thesis and not related to Jamaica Red Cross.

While in the communities it was important to clarify my role and purpose to make sure I didn't create any false hope of any forthcoming assistance. At times, bystanders started either verbally insulting me or asking for assistance, based on previous visitors to the community that left there with false promises.

In Chapter 4, I have chosen to present one individual. This is not a case to be generalised, but to function as an example of one of many committed individuals. The selection of the individual to present was based on the amount of provided information by the individual and by other sources.

During the household interviews, I wanted to get assistance from independent sources, to limit the chances for biased responses from my interviewees. In one instance, I decided not to use a volunteer employed at a governmental agency as a link into a community. Due to lack of time, I had to settle with a involved volunteer to assist me in one of the communities, however, no prior information was given about my purpose and affiliation to the interviewees and the assistant kept a distance during the interviews.

4. A case study: Disaster management related to Hurricane Ivan in Jamaica

Jamaica is defined as a low-middle income nation in UNDP's Human Development Report(Human Development Report 2005). Challenges for Jamaica's development include; unemployment, minimal economic growth, natural disasters and crime(PIOJ/UNDP 2005). These various areas require significant resources and make a complex situation even more so. In this thesis the focus is on the management of natural disasters and resource usage in that matter. The case used to illustrate the disaster management system in Jamaica, is the Hurricane Ivan operation of September 2004.

Hurricane Ivan in Jamaica

The 'eye' of Hurricane Ivan just missed Jamaica's south coast on the 11th of September 2004. Strong winds up to 250 kilometres per hour were measured as Hurricane Ivan passed Jamaica. Heavy rainfall continued the following day across the island(ECLAC 2004; EM-DAT 2005). Hurricane Ivan was the most powerful storm to strike Jamaica and the Caribbean in more than fifty years(IFRC 2005). At the time it passed Jamaica, Hurricane Ivan was a Category 4 hurricane. The path and categories of Hurricane Ivan are illustrated in Figure 4.

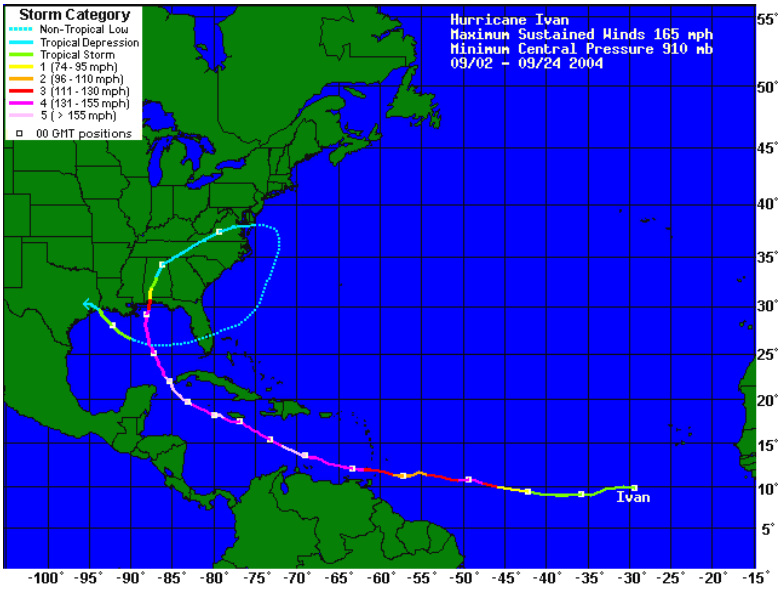

Figure 4 – The path and categories of Hurricane Ivan.
Source: (*The Weather Underground*)

Hurricane Ivan affected numerous sections of the population. Roughly 370,000 persons out of the total population of 2.65 million, or about 14.9 per cent, were directly affected by this disaster(ECLAC 2004). 17 people lost their lives as a consequence of Hurricane Ivan. The economic losses from Hurricane Ivan equate eight per cent of the country's GDP for 2003, or an estimated sum of US$ 595 million(PIOJ 2005). Hurricane Ivan and other more recent hurricanes have resulted in great hindrance to the nation (PIOJ 2005). Some of the mapped damages from Hurricane Ivan are shown in Figure 5.

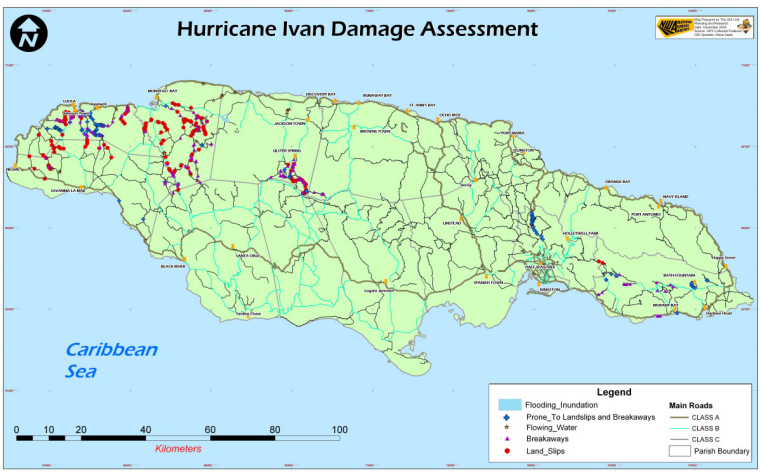

Figure 5 - Map of Hurricane Ivan damage assessment. This map is an example of maps partially displaying affected areas. National Works Agency has started the process of mapping the affected areas, starting in the northwest of the island. The hardest affected areas, the south coast, are therefore not illustrated in this map. The release of incomplete maps may distort the perception of the extent of a disaster.
Source: National Works Agency (NWA)

The structure of disaster management

Disaster management, and an efficient system of such, is one of many areas of development attempts. Improved preparedness is designed to decrease the number of people affected during a disaster, or ideally, to prevent damages from occurring. So how is the disaster management system in Jamaica organised? Below is a description of the system and how it functioned in relation to Hurricane Ivan.

When a disaster strikes and it exceeds the national capability to respond, the Prime Minister (PM) declares a state of emergency. The PM makes this decision based on an agreement between the Ministers in the Executive group with disaster management as part of their portfolio, see Figure 8, and the director general of the Office of Disaster Preparedness and Emergency Management. This Declaration functions as an appeal to the International Donor Community, which triggers emergency funds to be made available to assist the national disaster management system to restore the country to normality as quickly as possible. Below is an explanation of how this system links together and functions relative to Jamaica. The Hurricane Ivan disaster response operation is used as an example (Figure 6).

The International and Caribbean communities' involvement in disaster management

In this section the three key international disaster management agencies will be presented in relation to the Hurricane Ivan operation in Jamaica.

Caribbean Disaster Emergency Response Agency (CDERA)

Caribbean Disaster Emergency Response Agency (CDERA) is a specialized agency within the Caribbean Community (CARICOM). It is responsible for coordinating all disaster related relief activities in the Caribbean and supporting the Government's response. CDERA participates in the whole disaster management cycle, e.g. it conducts training for preparedness throughout the year and is involved in mitigation projects as well as disaster response. In the case of Hurricane Ivan, CDERA provided support to the Jamaican Government and the Office of Disaster Preparedness and Emergency Management (ODPEM), but did not have any representatives in Jamaica to coordinate the wider international community.

United Nations Disaster Assessment and Coordination (UNDAC)

United Nations Disaster Assessment and Coordination (UNDAC) is deployed by the resident coordinator, in this case the Head of United Nations Development Programme (UNDP) in Jamaica. This team assists the Government of Jamaica in its disaster response operations. The UNDAC team was the coordinating body for all the international agencies; embassies, NGOs and other UN-agencies taking part in the disaster response. In the case of Hurricane Ivan, each afternoon they organised a one hour update-meeting, where all agencies met to share information by updating and providing information on desired future actions. The needs identified in the field by the various agencies, as well as by the national disaster management agencies, were put forward in the same meeting. This allowed these needs to be addressed and dealt with in a cooperative manner. The assistance from UNDAC was at a national level, rather than local level, i.e. not part of the distribution of relief items. UNDAC operated only in the response phase, approximately for 2 weeks. After those weeks, UNDP took over and development was then the focus of their involvement.

The mechanisms of the International Federation of Red Cross and Red Crescent Societies (IFRC)

International Federation of Red Cross and Red Crescent Societies (IFRC) are getting involved in a national disaster operation on request of the Red Cross national society; here: Jamaica Red Cross. The national society requests assistance in order to fulfil its mandate when the operation exceeds their capability. IFRC sent a Field Assessment and Coordination Team (FACT) to assist Jamaica Red Cross in the case of Hurricane Ivan. FACT's role is to coordinate the international Red Cross community's involvement in the local response of the Jamaica Red Cross. Due to the Red Cross movement's seven fundamental principles for operation there are strong restrictions for involvement. For instance the principles of independence and impartiality play a strong role in the teamwork of disaster management. Red Cross is independent and therefore does not necessarily accept being told what to do, where to respond and whom to help. It operates to assist those perceived to be most in need.

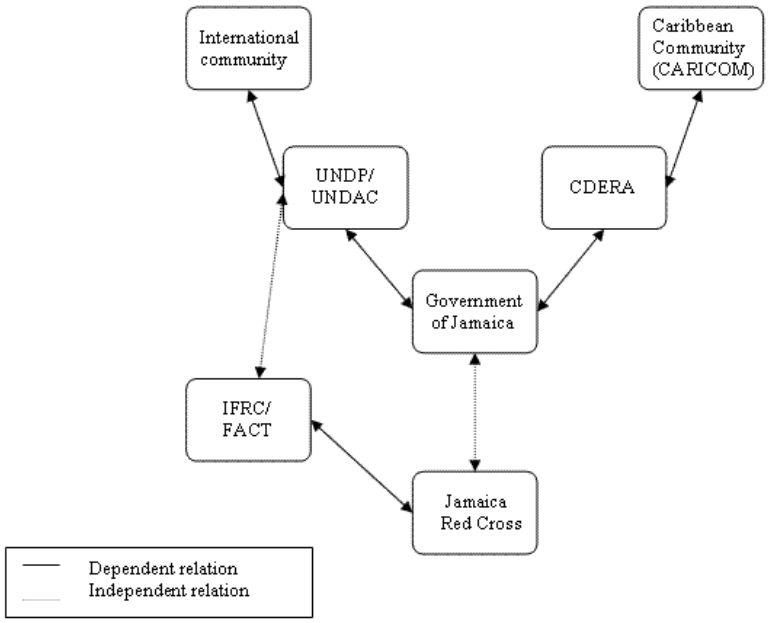

Figure 6 - Links between the involved bodies in an international disaster response, illustrated for Jamaica.
Source: Author

Coordinating agencies in disaster management

A summary of the coordinating agencies for disaster management at different levels are illustrated in the table below (Figure 7).

Area:	**Who:**	**Agency/Committee/Team:**
World	UN	UNDAC
Red Cross/Red Crescent Societies	IFRC	FACT
Caribbean	CARICOM	CDERA
Jamaica[1]	Government of Jamaica	ODPEM
Parish[2]	Parish Council	PDC

Figure 7 - Coordinating bodies in a disaster response for different areas of responsibility. Illustrated for Jamaica. [1] and [2] will be described in a following section.
Source: Author

Disaster management within Jamaica

This section will provide an explanation of the disaster management system within Jamaica and the key agencies involved. As such, non-key agencies have been omitted. The focus is on the Hurricane Ivan response phase of disaster management, although many of the mechanisms exist and run through the whole disaster cycle. Red Cross is used in order to illustrate the mechanism throughout.

The disaster cycle illustrates how the different phases of disaster management circulate in a loop. Figure 2 illustrates the overlapping stages of disaster management. The ultimate goal of disaster management is prevention. In reality disaster management is an attempt to limit the impacts and consequences of disasters, as well as to reduce the number of affected people. This is achieved by being better prepared and by conducting mitigation and prevention activities.

Through lessons learnt in the Hurricane Gilbert operations in 1988, the Government established an office to deal with the reconstruction phase of the Hurricane Ivan operation. This was done by recognising that the Office of Disaster Preparedness and Emergency Management lacked the capability to handle that phase in addition to all other tasks. Informants stated that the seated Government in the 1988 operations lost the subsequent election due to failed response and reconstruction. The reconstruction phase of Hurricane Ivan was not included in this study.

The Executive's disaster management meeting

The Executive is a group consisting of the Prime Minister and all Ministers of the Jamaican Government. Additionally, in the case of a disaster the Executive includes the Director General of the Office of Disaster Preparedness and Emergency Management (ODPEM) as well as a representative from Jamaica Red Cross; preferably the Director General. This group deals with decision-making at policy level, particularly concerning allocation of finances to the required sectors dealing with the disaster. They base their decisions on information received from ODPEM and Jamaica Red Cross. ODPEM and Jamaica Red Cross play lead roles in the national and parish operational levels of disaster management in Jamaica. As such, they have access to information from the field and should have optimal awareness of the

situation at the ground level. Another source of information for the Executive is the United Nations Disaster Assessment and Coordination (UNDAC) team's assessments as well as inputs and support from the Caribbean Disaster Emergency Response Agency (CDERA). Figure 8 illustrates the key bodies related to disaster response.

Figure 8 – The Executive's disaster management meeting at national policy level. Other ministers are left out of the figure to keep focus on the key actors related to disaster response.
Source: Author

The National Disaster Committee (NDC) / National Response Team

The National Disaster Committee (NDC) consists of all the operational agencies involved in disaster management in Jamaica; including governmental agencies and NGOs. These committee members are the implementers of the decisions made by the Executive. The Office of Disaster Preparedness and Emergency Management (ODPEM) is the designated disaster management agency in Jamaica, responsible for the coordination of disaster operations. The other agencies that are members of the National Disaster Committee have supporting roles in disaster management in additional tasks to their daily operations; e.g. the police, the utility companies, and the Red Cross. See Figure 9, for an illustration of the key NDC-member agencies involved in disaster response. The colour code on the circles shows the link to ministry at the Executive level.

The disaster committee has monthly meetings where all member agencies send a representative, preferably the same person for reasons of continuity regarding planning and implementation. The Prime Minister (PM) chairs the National Disaster Committee at a standing meeting in May, the beginning of the hurricane season. The PM also chairs the pre-strike meeting when a hit is expected to impact the island. In such situations, the ODPEM activate a National Emergency Operations Centre (NEOC), in which all National Disaster Committee members take part.

Figure 9 - National disaster committee. Other bodies are left out of the figure to keep focus on the key actors for the issues covered in this thesis.
Source: Author

The Parish Disaster Committee (PDC) / Parish Response Team

The Parish Disaster Committee (PDC) is the coordination unit at local level, equivalent to the National Disaster Committee at parish level. The members of the parish level are branches of the head-agency taking part in the national committee. The Mayor chairs the monthly meetings of PDC. Each of Jamaica's parishes has its own Parish Disaster Committee, coordinated by a Parish Disaster Coordinator located at the Parish Council. The Parish Council is a branch of the Ministry of Local Government, Community Development and Sport. The Parish Disaster Coordinator is often mistaken to be ODPEM at parish level. However, the Coordinator is employed by the Parish Council, being the liaison to ODPEM.

The Parish Council with its disaster coordinator is responsible for implementing ODPEM's operations at parish level.

Figure 10, shows the key agencies in disaster response within the Parish Disaster Committee. The colour of the circles illustrates who the agency falls under; at both policy level as well as national operational level.

In a disaster situation, the parish council activates a Parish Emergency Operations Centre (PEOC). The same function as at national level, the PDC members take part in the PEOC.

Figure 10 - Parish Disaster committee (PDC). Other bodies are left out of the figure to keep focus on the key actors for the issues covered in this thesis.
Source: Author

Welfare sub-committee

The welfare sub-committee of the disaster committee, at national and parish level, consists of agencies dealing with relief; distribution of food, clothing, mattresses, blankets, beddings, and hygiene kits, as well as conducting household damage assessments.

The main focus of the welfare group is to assist the affected households to restore normality as quickly as possible following a disaster. The key bodies included in the welfare sub-committee are shown in Figure 11.

At the parish and community levels in particular, the different agencies are encouraged to cooperate in pooling their resources and reaching the largest number of people possible.

During the damage assessment process, all available agencies in the vicinity of the affected area form an assessment team. The assessment team then visits the affected areas, from household to household, to map damage from the disaster. The findings of the assessments are recorded on a standard form, an “all-agency-form”. All who partake in the assessment collect data and compile the team’s findings in a report. The complete report is sent to the Ministry of Labour and Social Security (MLSS) in the parish, who then forward the report to the head office of the ministry. At the head office of MLSS, the data collected in the field is analysed before information is fed back to the agencies at a later date.

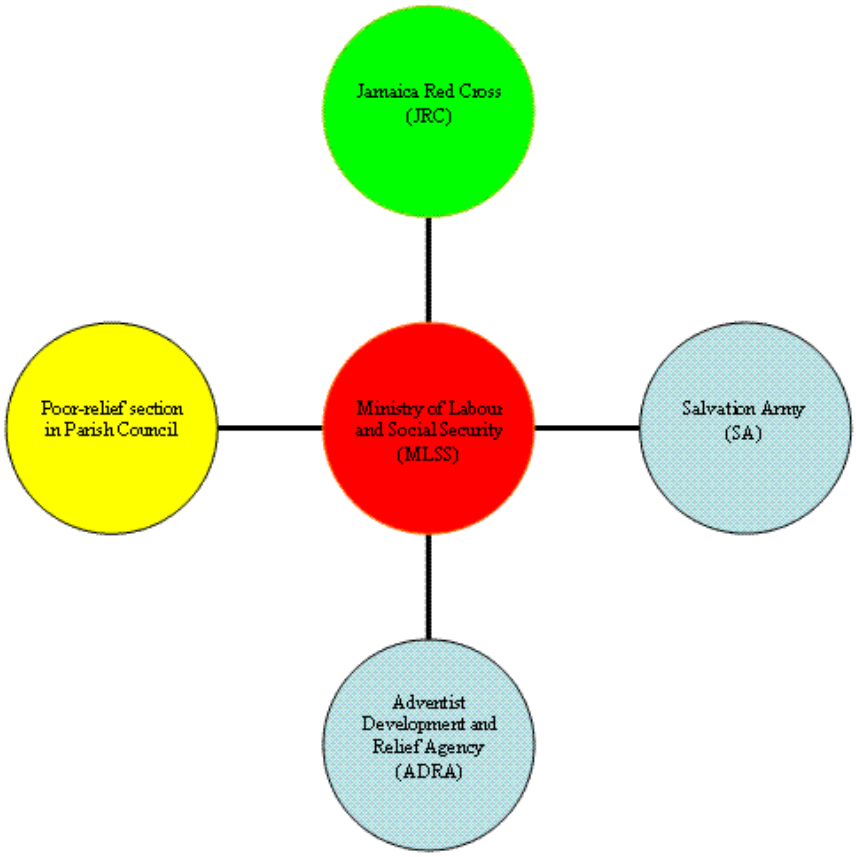

Figure 11 – Welfare sub-committee of the disaster committee – welfare assessment teams.
Source: Author

Emergency Operations Centre (EOC)

The Emergency Operations Centre functions as a hub for all information sharing in a disaster response operation. The National Emergency Operations Centre (NEOC) is located at the OPDEM facilities and is staffed 24 hours a day for the length of the response phase of the operation. In the Hurricane Ivan operation the NEOC was open for 3 weeks. The NEOC is equipped with TV, radio, internet with links to meteorological services and news, landlines and mobile phones, maps and boards as well as a Messaging Handling system. The Messaging handling system is a database, where incoming calls/reports are recorded, to keep track of all incidents needing attention.

The NEOC is staffed by ODPEM personnel, in addition to representatives from the disaster committee agencies. As well as to the national EOC, there are parish EOCs (PEOC). The PEOC is staffed by both Parish Council personnel and agency representatives from the parish

disaster committee. Each agency taking part in the EOC, at both the national and parish level, activate their own EOC at their head office.

The Meteorological Services (Met.office) of Jamaica is in close contact with ODPEM, while tracking and monitoring the severe weather systems. On advice from the Met. office, ODPEM issue warnings. The warnings are mostly issued through the public media, e.g. TV and radio. The largest media-house in Jamaica provides access to newsrooms for the Prime Minister and ODPEM to address the nation in disaster situations. Weather forecast is also available through the media, as in an automated service for mobile phones. Most Jamaicans have access to mobile phones, but in a disaster such as a Hurricane, coverage is often cut due to problems with towers or electricity supplies. The radio is the most reliable mode of communication for reaching affected communities and getting messages to the responders; those who respond to disaster situations, mainly relief operations on the ground. Messages can also travel through runners, who inform neighbouring communities and pass information between operational agencies (Figure 12).

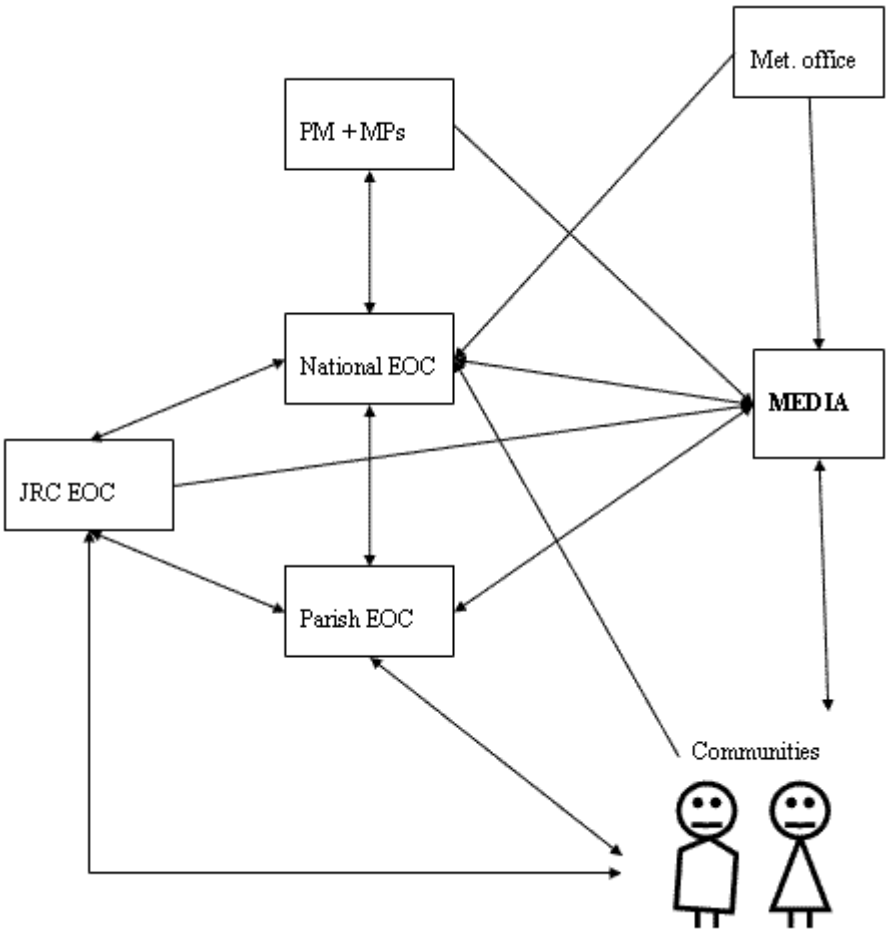

Figure 12 - Information flow in disaster response; to and from the various Emergency Operations Centres (EOCs) directly and/or via the media to the affected communities.
Source: Author

The following is a scenario based on actual events, which indicates how information could transfer through the EOC-system and subsequent actions be taken:

In community X the roads have been blocked by landslides and houses have been partly and completely washed away by the heavy water flow. The strong winds have blown off roofs and large trees have damaged many houses. People can't get in or out of the community. The water is rising and there is a need to evacuate people to safety. A pregnant woman needs medical attention urgently. People are running around screaming, as they search for their missing children. The telephone and electricity are cut off.

Mr. Swimmer, who lives in community X, is determined to assist his community and access assistance from outside the community. Since the roads are blocked and all telecommunications are out of service, he sees the need to swim across the flowing water to get help. On the other side, he manages to make a phone call to the local branch of the Red Cross. They record all the information Mr. Swimmer reports from his community. He is advised to listen to the radio and go back to his community to reassure them that assistance will arrive.

At the Red Cross branch office, they report the incident to the Parish EOC as well as to the Red Cross EOC. Both the Parish EOC and/or Red Cross EOC feed the information to the National EOC.

The NEOC delegates tasks to representatives of the various agencies. The Jamaica Defence Force (JDF) is requested to evacuate the people from community X, with their helicopter, bringing relief supplies to the area as well as providing medical personnel to take care of the pregnant woman. National Works Agency (NWA) has the task of clearing the road, allowing access to the community. The Ministry of Health provides the medical personnel to accompany the JDF to the community. Red Cross and the Ministry of Labour and Social Security (MLSS) are asked to open and manage shelter in the area. The police are asked to assist in the evacuation as well as the search and rescue. All the agencies at the NEOC contact their "own" EOC, and coordinate internally ways of meeting their responsibilities. The media publishes situation reports, mainly on the radio, on a regular basis to update the affected community.

At the PEOC, the welfare sub-committee is activated to enter the area as soon as the NWA have accessed the community by road. More information about the welfare sub-committee follows. The agency representatives at parish level should be in close contact with their "own" EOC as well as the representative at the NEOC to ensure an efficient response.

The Red Cross EOC, run from the Jamaica Red Cross Headquarters, is coordinates the Red Cross response throughout Jamaica. They communicate with the international Red Cross; in Geneva, Trinidad and Panama; IFRC head office, IFRC sub-regional office and the Pan-American Disaster Response Unit (PADRU). In addition, they are in touch with their sponsoring partners. The Disaster Mental Health Unit, one of many units within Jamaica Red Cross volunteers, is assigned to visit some affected areas, to reassure the people that their reactions are quite normal in a disaster situation. This team is also employed by the international Red Cross, to assist in the psychological healing process of the affected people. The EOC have lots of sources of information, which allow them to remain updated on what is happening in the field as well as address the policy level of the disaster operation, see Figure 13.

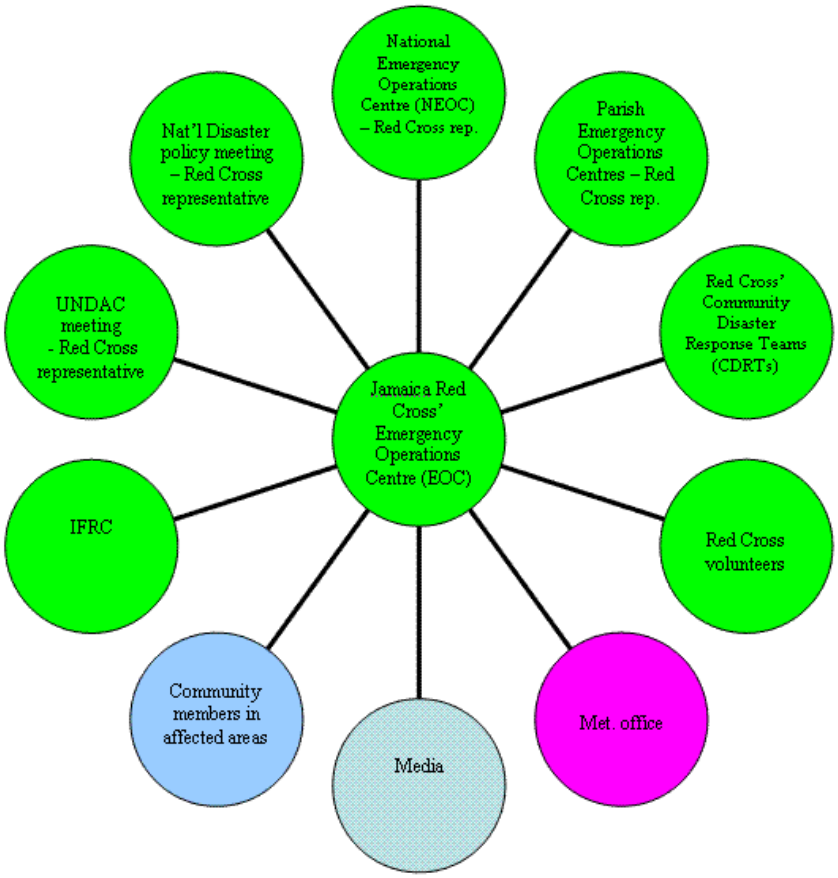

Figure 13 - Sources of information for Jamaica Red Cross' Emergency Operations Centre (EOC). Source: Author

Community-based disaster management

In this section an example of successful community-based disaster management project is proposed. Benefits of training are considered; not only in the disaster relief operation alone but also some elements of personal and community development.

Community Disaster Response Teams (CDRTs)

One example of community-based disaster management is the Humanitarian Aid department of the European Commission (ECHO) sponsored project with the International Federation of Red Cross and Red Crescent Societies (IFRC) in the Caribbean; DIPECHO V in 2003/04. DIPECHO stands for disaster preparedness ECHO. DIPECHO V's aim was to improve the local capacity in disaster preparedness. By offering training for community members in basic disaster management, they were found to be better prepared for a disaster and better able to help themselves in the initial stages of a disaster response. Jamaica Red Cross (JRC) was one of the selected national societies which took part in that project.

Jamaica Red Cross addressed the Social Development Commission (SDC) and the Office for Disaster Preparedness and Emergency Management (ODPEM), appealing for the initiation of a Memorandum of Understanding (MOU) for collaborative efforts in the implementation of DIPECHO V. As the SDC works in community development, they are trusted by the people, making it easier to identify community members who wished to take part in the project. ODPEM, being the coordinating agency in disaster management, supported the project and assisted in the selection of Jamaica's 6-8 most vulnerable communities. These communities were given the opportunity to train people for a Community Disaster Response Team (CDRT).

A community meeting was arranged by the SDC in the selected communities. Jamaica Red Cross provided the training and facilitated the meeting. During this meeting the community members were introduced, made aware of the benefits of localised disaster management and encouraged to take part in the project, with their expertise on local know-how. Vulnerability and capacity assessment (VCA) of the community was done by the attending community members. VCA is carried out using participatory methods like constructing community and hazard maps, seasonal calendars indicating disaster prone times of the year as well as historical calendars highlighting previous disasters in the community. The community members selected candidates among themselves to attend the following CDRT-training.

Two Community Disaster Response Team trainings took place in April-May 2004; specifically for the teams in eastern and western Jamaica. The training comprised of basic disaster management, basic first aid, light search and rescue, team work activities, and simulation exercises. A total of 59 participants were certified Community Disaster Response Team members, part of eight teams across the island. The training was completed just in time for the 2004 Hurricane season. The teams eagerly awaited a chance to put their newly gained skills in practise.

In September, the "exam" was approaching for the CDRTs. Hurricane Ivan headed towards Jamaica. The CDRTs prepared themselves, finding their plan of action, keeping in touch with the parish office and head quarters, getting ready to respond. Some of the team members went out in their communities and started warning people to pack up and secure their things, marking houses where people who would need assistance lived, in case of an evacuation, circulating information about shelters in the community and cutting branches of trees to prevent them from damaging houses and blocking roads. The most committed of the team members left their own families, in order to assist people throughout the storm.

After the storm, team members went out to assess the needs of their community. Once identified, a list of needs was handed over to the branch and/or the head quarters as quick as possible. Red Cross relief items were delivered to the communities through the CDRTs. Some community members attempted to access the relief items, but the CDRT-members remained firm, insisting on first helping those most in need.

In the aftermath of the operation, the CDRTs were recognised as a success. One of the team members emphasised; "It was tough, but a great experience". Another team member added; "this experience helped me to be more human". Those team members that attended the refreshers training in late 2005 (see Picture 3), were clearly proud of the work they had accomplished and were proud to be part of the International Red Cross movement.

Picture 3 - Community Disaster Response Teams refresher-training in Jamaica. 2005.

It was not only the team members themselves that were proud of the CDRTs' performance, they received recognition from the wider Red Cross community. This recognition was warmly welcomed by the team members, making them seemingly prouder, while at the same time, preparing them for another hurricane season full of hard work and new challenges.

Reports from the branch, head quarters and international links of Red Cross supported each other; providing glowing recommendation for the CDRT training. The assessments done in the field made operations easier from the offices and providing greater knowledge of the situation and the needs in the field. At the same time, the CDRT functioned as a link to the community for relief supplies from the organisation. As the Director General of Jamaica Red Cross acknowledged; "They're not only Red Cross volunteers, they are community leaders".

Experiences from one of the committed Community Disaster Response Team members

"It was hard in the beginning to do the assessments without resources. People from the community didn't want to help with a little transportation or lunch and so on", 'Locks' informed me about the challenge of being a community disaster response team member. He explained that people in Jamaica have been begging for money for community development activities for many years. Mistrust exists among the people; they believed that much of the money was being misappropriated rather than being used to help those in need.

This strongly committed volunteer has an intense desire to assist his community. "I'm a self-employed farmer, and have time to do lots of community work. I don't think I could have a full-time job, and not be able to do what I love to do; community work", said 'Locks'. In

addition to be part of Jamaica Red Cross' Community Disaster Response Team (CDRT), he is a member of other interest groups and boards in the area. Following completion of the CDRT training in April 2004, he returned to his community and started networking. That was the beginning of a disaster response coalition group.

The coalition group consists of members from various community based groups and companies. The coalition team undertakes assessments in the community. Although they did not have a standard assessment form initially, instead following procedures from the training, they were able to develop a form, making adjustments as necessary. The coalition group returned to the field in order to complete their assessment forms. They came together and compiled all data into a damage assessment report, complete with pictures taken by one of the volunteers.

The completed damage assessment report was printed, copied, and distributed widely to all relevant parties; e.g. Red Cross, parish council, other agencies, and private sector in the community. Those in receipt of the report continued to refer to the assistance they received from this community. Transportation and lunch were provided by a private company, to assist with the assessment. Through the Red Cross network, 'Locks' was able to access some relief supplies to bring back to his community. A friend, with a car, was mobilized to assist him to pick up the items, and distribute them to those most in need. The needs in the community were greater than the help received, but the relatively small amount of assistance received made a positive impact. The distribution went quite smoothly, compared to others teams' reports. 'Locks' explained that "people in my community know I'm strict on it [the distribution criteria], so they didn't act up".

People have been hesitant to participate, but once they see it's working, they want to join the team. In some instances, people join in order to access relief supplies for themselves rather than the humanitarian idea of assisting those in need. There exists a thin line between those in need following disaster and those constantly in need due to poverty. Time and again, the poorest in the community seem to be hardest hit, with limited or no ability to rebuild their lives.

"In the time of the hurricane [Ivan], I felt so enthusiastic about what I was doing, I almost forgot to take care of my life" 'Locks' laughed when thinking back. He continued; "I was just

going out collecting information, getting what I could get to distribute within the area to assist the people. People were depending on my". Eagerly he added; "when I do it I feel satisfaction, it just give me more energy and urge to go again". But when the operation slowed down; "that's when I started realising, nothing happening for me".

More than a year after Hurricane Ivan, his farm has not fully recovered. He has investigated the assistance available for farmers, but the seeds on offer were flower seeds and so could not really assist the farmers. As 'Locks' points out; "we are food-farmers", he laughs. Red Cross attempted to assign him some relief supplies, but he ended up giving it to others he felt needed it more. In the end, he did receive assistance to set up a small house for himself, since his house was damaged in the storm.

"We [assessment team from the coalition group] had our itches and were a bit timid about what to do, because you want to do it right the first time. But with time and experience, we felt more comfortable of what we were doing, by positive feedback and positive happenings like acknowledgement from head quarters [Red Cross] and International Red Cross that came and interviewed us", 'Locks' said, adding; "we were told in one of those interviews that our assessment were the best within the Caribbean". "We were feeling relieved within ourselves that we had covered such a wide area, not only our community and island, but also islands around. That we had been acknowledged for our assessment, and in Japan [Kobe, 2005] there were a disaster seminar where our team was mentioned", he proudly concluded.

'Locks' has plans for his community. The plans are impressive, however funding is lacking in most instances. Referring to himself and his team members he stated; "Volunteers do need ways and means to be able to help, as community workers". "We [the coalition group] try to get the resource-strong members in the community involved, but we have not been very successful about that. But our aim and goal is to see through practical work if they will come", he mentioned with a fighting spirit. We want to set up a storage of supplies in the community; food and hygiene kits, source a digital camera so we can document damages, and transportation possibilities. Transportation provided one of the real challenges in the Hurricane Ivan operation. "We realised that it is better to see people we distribute to and not only give to those who come, so to reach those who really need the assistance but couldn't get to us", the active volunteer related. Another thing he yearned was to set up an office for the key community groups, so they had somewhere to distribute information, e.g. somewhere

with access to a telephone and a computer. This office could also function as a place where community members could visit to source information and/or advice on how to get assistance. 'Locks' exhibited a burning desire, at the time of interview, to set up a processing factory in the community. Benefits of such a project are numerous: Jobs could be created in the community, the farmers could process their produce and a share of the profit could be set aside in a disaster fund, as a back-up for the next disaster to affect the community. The community had access to land and the funding to build, but required an architect to draw the plans.

Things had certainly changed in the community. 'Locks' and his team had received recognition both within his community and outside after their successful disaster response operation in September 2004. These days, when he approaches organisations and companies in the community, he is told by influential individuals that; "we have been waiting for you to come. It's you we want to work with". Community members have also commented to him, that he is a man to look up to and talk positively about. The positive attitude of the people towards 'Locks' was evident during interview. Some of the interviewees requested to talk to him in private. He would take his little notebook out of his pocket and begin postulating ways to assist the people. "What I want to see happening is that people can help themselves, not depending. The best thing; if everyone come together and achieve a little that can build the community faster, by sharing the little people have", he remarked. "Relationships in communities break down, when people stop talking to each other when they get so frustrated from not having anything. It's not on free will, but forced on them, by financial commitment and can't afford things like food". 'Locks' concluded; "blame can go on the government, but also we the people; we need to help ourselves".

Operations in reality

The disaster management system's structure as explained above relates how the system should function. In reality, operations don't always go according to plan. Below is a brief description of the findings of the thesis, with an identification of gaps in the system.

Evacuation

At the time of my fieldwork, forced evacuation was being discussed in Cabinet. People affected by disasters frequently resist efforts to evacuate, in order to protect their property

from looting. Time and again relief agencies must go back to the same people, which becomes very costly in the long run. With forced evacuation, people relieve the state of any responsibility if they refuse to leave. Relocation of certain housing units and restricting construction in certain areas were also heatedly debated issues. On the top of this, many of the housing units, in disaster prone areas are not built following proper specifications of quality.

Shelters

It was difficult to identify those responsible for the shelters and their operation. This area is known to be one of the bottlenecks in the disaster management system. The Office of Disaster Preparedness and Emergency Management (ODPEM) is primarily responsible for the shelters. In a the national disaster plan matrix, where all agencies involved in the disaster management are stated with their primary, secondary or support roles, the Ministry of Labour and Social Security (MLSS) is primarily responsible for shelters. In the Hurricane Ivan response, MLSS' capacity to manage the shelters was exhausted, so Jamaica Red Cross assumed a primary rather than supporting role in the shelter situation. This endorses the need for the agencies involved to be flexible and step in where others are not strong enough to deal with the situation alone. The shelter issue is one area that requires further attention.

Damage assessments and relief operations

The government's capacity is limited and resources are scarce. In an operation like Hurricane Ivan, both human and financial resources are overextended. Therefore, the government has to prioritise allocation of those same resources. Generally, they end up going to the hardest hit areas, while other areas fall out of the assistance system. Some households situated within an assessed community are bypassed, since the assessment focuses on those seeking official shelter and those who are registered there. The storms can come rather quickly, thus some people will go to the shelter, fearing their house will not stand the storm, but later return to find their homes undamaged. This provides evidence that teams and groups like the community disaster response team and the disaster response coalition created in the above-mentioned community, are strongly needed in the disaster management system.

During relief operations, the political bias of certain communities can challenge the relief distributors. It is easier to follow the path of least resistance and distribute items to those that scream the loudest, instead of locating and assisting those in critical need.

Another challenge experienced during the distribution process, as mentioned by a number of national level informants, is that agencies focus on their eagerness for publicity and recognition, instead of focusing on the teamwork efforts and assisting as many people as possible. While speaking with individuals on the ground, there were reports of good cooperation. It was mentioned that agencies endeavoured to uniform their team members, so the public could observe who was present or not. Those who received supplies did not seem to know who they had received the items from at all, with the exception of a few who remembered the individual, rather than the agency, they got the aid from. Another source reported they had faced challenges with people only wanting relief supplies from one agency and not the other, due to differences in content of the relief package. Another challenge with the staffing in the operations, in the field, is the mix of mind-sets. The first responders; the fire brigade, the police and the defence force, are employed to work 24/7 throughout the operation. Contrary to this, some civil servants operate within set office hours, wanting to go home after office hours are over even during a disaster response. The third group mentioned are the volunteers who offer any available time.

Community-based disaster teams

There is a need for assessment teams and the community-based disaster teams could play a crucial part in the damage assessment process at local level. These teams can function as contact point in their area, do assessments, distribute relief, get involved in broader community development activities, to name a few. Localised capacities improve the efficiency to conduct assessments and pool limited resources; both human and financial. It is been said that private sector companies are more likely to take part in projects based in their own communities. Multi-usage of already existing teams is one way of stretching resources in a challenged damage assessment system.

Team building and cooperation

Team building among and within the agencies as well as with the private sector and communities is essential for a successful disaster management.

Agencies proposed simulation exercises as a great way of improving their efforts in the next disaster and to foster team work. It is one thing is to have a seemingly good structure of operations but it is pointless if the implementation does not occur. It appears that the system lacks legitimacy with some of the participating agencies. Agencies and community members

seem to lack trust in the system. A key to get things done is to have personal contacts. One way of improving those contacts is by training together.

At both national and parish operational level, some agencies were said to rarely take part in the disaster committee meetings and/or the Emergency Operations Centre (EOC). Representatives are at times missing from the EOC in a disaster response, or a representative may turn up for only a short time. Internal communication in some of the agencies is weak, while messages do not reach the relief agents in the field doing the distribution, if/when decisions are made at higher level of the system. A limited power to mobilize agencies taking part in operation may be a result of limited resources, training, motivation or working environment and conditions. These challenges hinder the ability to access all the required agencies in the field and to get the teams working together.

Time aspects and information sharing during operation

It was reported that the EOCs, both national and in various parishes, were disorganised and were not operational for the first couple of days after Hurricane Ivan. Information was either rarely shared, or was shared at up-date meetings in the afternoon. These updates from the various agencies appeared incomplete and tended to represent individualistic operations. Information was predominantly distributed on paper and was therefore easily lost.

The promptness of data processing, before feedback was sent back to the involved agencies, resulted in creation of internal systems within the agencies, rather than a cooperative effort.

The media provided information to the nation throughout the entire hurricane Ivan operation. The TV transfers where cut off before the hurricane passed to ensure protection of equipment during the storm. The service was restored within 72 hours of the passing of Hurricane Ivan.

Committed individuals and information and communications technology

The general trend seems to be that the system needs committed individuals; staff and/or volunteers to function well. A major challenge in relocating funds for things such as transportation and equipment, is the general economic state of the country. Information and communications technologies (ICTs) are predominantly available only at the national level, thus this link between national and parish level has great potential for improvement. Some ICTs are available at the parish level, but it seems that implementation of ICT in the daily

routine has not yet occurred in most instances. Some basic training in ICT usage would make the sharing of data from the field more efficient.

Information and communications technology in disaster management

Information and communications technology (ICT) is taking up more and more of the information sharing process of disaster management. At the same time, there are lots of areas for improvement. Below is an overview of the information and communications technologies used in relation to the Hurricane Ivan operation in Jamaica. The ICTs are listed in order of the author's perception of relevance to this situation.

Radio

Radio was the main means of information sharing within the communities, with non-stop radio transfer during Hurricane Ivan. Radio transfers are actively used by the agencies in disaster management; mainly the Office of Disaster Preparedness and Emergency Management (ODPEM) and the Prime Minister, when a disaster is threatening the country. Those agencies are given free airtime to address the nation. When the radio issues a warning to the nation, an emergency signal has been developed to be used in advance of the news-update with the warning, to raise people's awareness of the impending disaster. Almost everyone has access to a radio and it can be run by batteries or solar energy. One of the benefits of AM/FM services is that it can reach areas far away. In the Hurricane Ivan situation, Jamaican radio services were provided for a neighbouring island whose own system had broken down in the storm.

Mobile phones

"Everyone" in Jamaica has at least one mobile phone, many have more than one. In some areas of the country where one of the service providers has difficulties with coverage, the other might function well. The mobile network has been expanded greatly in the last few years and most areas have coverage in "normal" operation. In a disaster situation, the transferring towers can break or blow out of range, electricity can be cut and generators have limited run-time to keep up the services. On the consumer side problems include the batteries running down, lack of credit, poor coverage and rain damage to the phone. The network can also be overloaded in a disaster situation, when everyone attempts to contact their loved ones or call for help. The disaster responders can then face a real challenge with accessing

information regarding what is going on in the field as well as transferring important messages to the affected people. During the Hurricane Ivan operation, some areas were cut off for some length of time due to some of the above-mentioned challenges.

TV

TV is another of the major means of information sharing with people living in the communities. It was reported that the TV transfers were stopped for a period before Hurricane Ivan passed, in order to protect equipment. 72 hours after the passing of the hurricane, the TV transfers were back to normal.

Land-line phones

The land-line system functioned during Hurricane Ivan. Mobile and land-line phones are the main means of communication in the disaster response.

Computers

Computers are used mainly to produce reports; needs lists or operation reports. Some agencies use databases to record information coming in and going out, to keep track of actions needed and those already taken. Computers are also used for presentations and to present data/information visually at meetings.

Internet

The Internet is a good source for information sharing, as long as the network is up. Weather forecasts, online newspapers and situation reports are among issues of relevance to disaster preparedness and response. These are all available online. Some agencies also use the Internet for online databases, sharing information with their international counterparts and sponsors.

E-mail

E-mail is used for information sharing; mainly at the agencies managerial level. It varies both in availability and use. Head offices tend to have access to e-mail and use that as a natural means of communication. At the parish level, the e-mail access was rarely, if ever available.

Managing information system (MIS)

Managing information system (MIS) is used by some agencies. The Office of Disaster Preparedness and Emergency Management are developing their existing system to function as a interactive information sharing system for the key agencies in disaster operations. This system,

if based online, can be logged into from various sights and can provide information to donors around the world and staff/volunteers in the field.

Fax

Very few of the informants mentioned the fax machine as a means of information sharing. Some stated it was predominantly used when communicating with the ministries especially at the parish level.

CB radio (2-way radio/"walkie talkie")

CB radio systems are used by many of the agencies, however, their use is declining. Some agencies are still using the old radio system internally, while others have stopped using it altogether. At this time, the majority of the national agencies depend on the police radio system in instances where mobile or land-line networks were not working.

Newspapers

Newspapers are also used, but warnings are often issued too late for the public to react in time. The printed media is a good source for preparedness information provided by different agencies, e.g. Red Cross and ODPEM. The online version of newspapers was available though in a simplified format in the midst of the Hurricane Ivan situation.

Geographical information system (GIS)

Geographical information systems (GIS) is making its way into the disaster management system in Jamaica. Some agencies have the equipment already and there is an agreement from the policy level to use one GIS-program, to facilitate interagency exchange data. Hurricane Ivan data on damages was collected in parts around the island.

Satellite phones

Satellite (sat.) phones are becoming increasingly popular, taking their place as the new "must have" for agencies in the field. Some have used the equipment, but with the exception of one of the international agencies assisting in the disaster response, no one actually used the satellite phone during operations. The national phone providers were operational throughout Hurricane Ivan, so there was no need for the satellite phones.

One way of allocating resources is to develop partnerships with the private sector. Below is a case of an attempted international partnership agreement, which aims to benefit the national level in the long run.

Partnership with private sector

The international agreement between the International Federation of Red Cross and Red Crescent Societies (IFRC) and Ericsson Response from 2002, is an example of non-profit organisation and private sector cooperation; an attempt at corporate social responsibility. An investigation into how this international agreement benefits and functions down at a national level; e.g. the Hurricane Ivan operation in Jamaica, was undertaken. Figure 14 shows the set up of the two agencies and the links between them.

The agreement between the International Federation of Red Cross and Red Crescent Societies (IFRC) and Ericsson is the first of its kind; where a humanitarian organisation and a private company have come together to focus on disaster telecommunications solutions(IFRC 2002). On Ericsson's web pages they state: "Through Ericsson Response, Ericsson wants to improve the international relief work by bringing skilled staff and additional technology to be used in the relief operations. That requires close partnership with the leading relief organizations"(Ericsson).

In Jamaica this cooperation turned out to be limited at best. Miscommunication is the main reason for the weak connection between the two agencies. On one hand, Jamaica Red Cross was unaware of who to contact in Ericsson Jamaica and as such had no contact with Ericsson related to the Hurricane Ivan operation. Ericsson, on the other hand, was using one individual in Jamaica Red Cross as their contact person during the Hurricane Ivan operations.

The person Ericsson refers to as their contact person in Red Cross, is a volunteer who has professional experience in the telecommunication business. From the Red Cross side, head quarters personnel attempted to email someone in Ericsson with no reply. It turned out, however, to be the incorrect person to contact.

Some benefits relating to the agreement were still noted. Although the contact was poor at the national level, Jamaica Red Cross benefit indirectly by the agreement through regional

trainings for their staff and volunteers, as well as developing the disaster managing information system (DMIS) for the Red Cross.

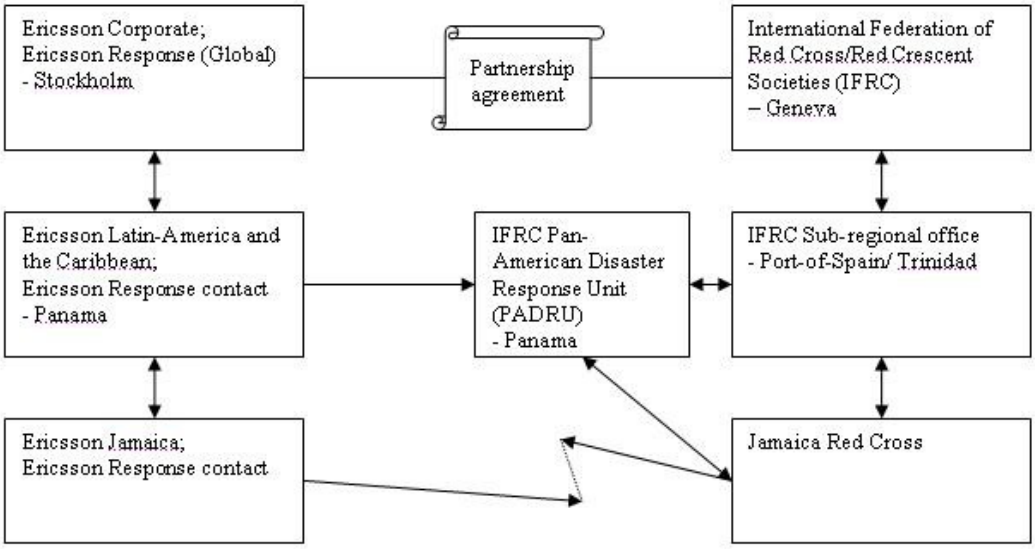

Figure 14 – Partnership agreement between Ericsson Response and International Federation of Red Cross and Red Crescent Societies (IFRC) – illustrated for the Caribbean/Jamaica.
Source: Author

5. Strengthening actions – a discussion

The experience of Hurricane Ivan has highlighted the network and a sequence of actions that may improve a country's ability to handle disaster situations.

Disaster management entails many elements which need to be considered for a successful operation. The sequence of tasks to be done; from prevention, mitigation and preparedness before the event, to the response, rehabilitation and reconstruction afterwards, requires significant resources. These resources are scarce and therefore there is a need for efficient management to facilitate and assist the affected people and nation in the best possible manner with the limited available resources. Disaster preparedness activities have shown to be beneficial in relation to mitigation of the impacts. Later in this chapter discussion will focus on how benefits of preparedness activities also assist community development. Interagency cooperation and partnerships at all levels within a nation in addition to the international community and private sector, are examples of utilizing and acquiring useful assistance from specialized agencies to support the disaster management of a nation. Information and communications technology can be used to improve the efficiency of the response to a disaster, as well as in the planning process for a next disaster.

Successful disaster management

The key factors for successful disaster management listed in World Disasters Report 2005; forecasting, warning, local government diffusion, civil society participation and popular understanding and action, will function as a guideline to discuss the disaster management system in Jamaica.

Forecasting and warnings

The forecasting of disasters in Jamaica is functioning well. The local Meteorological Services (Met. office) provides the nation with accurate information about weather conditions through the media, by direct contact and through automated services. In the initial stage of a severe weather system approaching the Met. office works closely with the Office of Disaster Preparedness and Emergency Management (ODPEM), to issue adequate warnings to the nation if and when necessary . Peoples' perception and trust in the forecasts and warnings seemed to have strengthened in Jamaica after Hurricane Ivan when they experienced the accuracy of the information received about the threat of heavy winds and rain.

The local government diffusion

The Jamaican disaster management structure divides the country into a national and parish level system, with zonal representatives in larger parishes. The specialised agencies in various areas are pre-assigned to certain tasks, working together in teams, with the strongest agency as a lead agency in the operation. On paper, this structure seems like a sensible system. In reality there are a few challenges related to the operation of this structure.

Inefficient communication within and between agencies prevents information and decisions made at a national level from being passed down to local responders on the ground. This can result in conflicts and overlapping of work and relief distribution. Some communities might be covered by many agencies while others miss out on relief. This may be one of the major challenges for utilising the scarce resources available. Interagency cooperation is encouraged. By combining resources, the agencies can better distribute them to the affected people and communities. Assessment and relief distribution is encouraged to be a team effort. In reality, this occurred to varying degrees. Some communities and teams cooperated well, knowing they could not expect outside assistance due to the inaccessibility of the community. The focus seemed to stay on the people needing assistance and this is the best way with few resources available. Trust plays an important role in this system, where relief workers share information with fellow workers from different agencies. In a small community/parish there is a closer relationship between the agencies when they don't expect much outside help. In larger parishes, in close vicinity to head offices and outside assistance, this seemed to reflect negatively on the focus and rapid response within the parish/community. However, committed individuals, both volunteers and staff, appear to be the key for a successful operation in both settings.

Civil society participation

Involvement of volunteers and the civil society in general are a crucial element for successful disaster management. The government has limited capacity and needs assistance to adequately help as many affected people and communities as possible. Community-based disaster management activities, as in the case illustrated in Chapter 4, are a solution for supporting the national disaster management system. The capacity of those community teams was essential for a rapid response which addressed accurately the needs identified from within the community. The teams could, however, be utilised in a wider manner. Agencies benefited from local informants, who can save peoples' lives and prevent damage by informing and assisting in preparedness and evacuation activities.

In addition to helping the agencies, these teams could be beneficial for the national disaster management system as a whole. Take for instance the damage assessments conducted by the government organised assessment teams that are unable to reach all affected communities in a larger disaster. The community-based teams could be incorporated into the national system and be trained to conduct the assessments in their community using the national standard of assessment criteria. This could save human resources and more communities could be assessed in less time.

Another way of examining the advantages of such teams is to look at the benefits for the team members. By observing the team members from the beginning of the training process until after their "exam" during the Hurricane Ivan operation, it was clear that the team members had gained personal strength and self-esteem. They expressed pride and encouragement by being part of such a team and using the training to be able to help their fellow community members. Most people interested in joining the teams have good intentions and want to assist in the next disaster, however, some individuals look at it as a way of accessing items for their own gain.

Yet another benefit from community-based activities is the community development potential. The local resource persons can pull together and become strong teams on their own initiative when seeing the local needs they are facing, Chapter 4 quotes one example. The team building and the expansion of cooperation within the community, and corporate sponsoring of local projects is easier. Again, trust plays a role in this setting. Community teams that bring results

will gain future trust and cooperation not only from corporate bodies but also the fellow community members.

Popular understanding and action

To be able to act adequately to warnings, it is important to understand **why** it is essential to act as well as **how** to act. This is important both for community members and those who respond. Awareness training can reduce the vulnerability of a community drastically. The responders within the community are taught to respond in a more efficient way utilising local know-how. The community members are better prepared to respond in line with the way the responding agencies wish. Awareness training could also address the dilemma of coordination and visibility in the field. A common understanding of the role of the coordinating agency could reduce tension and frustration among the field workers who wish to see the national agencies out in the field. The coordinating agency is assigned to direct the disaster response and at the same time the parish and community relief workers are longing to see them out in the field taking part in the physical work to gain a feel of what is happening on the ground.

Disaster preparedness

Simulation exercises are one way to develop awareness and build stronger disaster response teams. The procedures of the operation will be drilled and adjusted to prepare for a better response the next time around. Another factor resulting from simulation exercises is the gain of personal contact with other responders which could lead to stronger commitment to assist each other, share information and cooperate during an operation, regardless of the agency the individual works for.

The ability to prepare among the affected people is linked to uncertainty. Even with the will to prepare for a hurricane the economic situation of the household may not allow elements of preparedness since they work and live from day to day. No savings are available to buy supplies to cover the basic needs for the next couple of days until external assistance reaches the community. The economic constraint also prevents the poorer households, which are located in the most vulnerable areas, to prepare their housing units to withstand the wrath of the storm.

The use of information and communications technology in disaster management

In Jamaica information and communications technology (ICT) is quite widespread and therefore has great potential for efficient use in a disaster response situation or planning for the next disaster.

Incoming reports from the affected communities are, at the national level, registered into a computerised system, while at the parish level paper versions are widely used. With expansion of ICT to parish level, the sharing of information and tracking of earlier information is easier. It can lead to a more rapid and accurate responses. There is already some equipment available at the parish level but its use could be improved by making uncomplicated and standardised procedures and recording forms. The standardising of forms makes it faster and easier to pass on the essential information to the interagency network. Training of staff and volunteers could make the use of ICT part of the daily routines, instead of being considered a burden by the users.

The cost of equipment and maintenance could be a challenge for agencies. Much of the equipment used today is provided by project funding that rarely includes maintenance costs. Another of the challenges with ICTs is the need for a manual back-up solution in case of power cut-offs and breakdown of systems.

The benefits from the use of ICTs should be highlighted. Information sharing can be timely and cost-effective. Reports can come in from the field and be dealt with almost simultaneously from the national or parish emergency operation centres, instead of being delayed until the field workers return. The records saved electronically can easily be retrieved and function as a basis for preparations for a next disaster, through reviews of lessons learnt from the previous operations. Stock-keeping and volunteer/staff rosters with contact information could easily be updated and sent to those requiring the information. Online services like the newspapers, weather forecasting and databases can provide information to sponsors, or potential sponsors, to trigger rapid external assistance. There are logistical issues of accessing relief items to cover the local needs either by requesting items or funding for local purchasing of items.

For a disaster management system to function well, many elements play a role. Issues that have been discussed in this chapter include forecasting, warnings, local government diffusion, civil society participation, and popular understanding and action in addition to the elements of disaster preparedness and information and communications technology in Jamaica.

6. Conclusion

The evidence from Hurricane Ivan in Jamaica strongly suggests that working together in teams where resources are pooled to best serve the affected people, is a powerful way to organize disaster management. The support and commitment from involved agencies, staff, volunteers and the affected people depends greatly on their trust in the system. Trust is essential for a good disaster management structure to function optimally. Additionally, training of the relevant people is crucial for preparing the population for the next disaster. Awareness training generates a larger number of people who are better prepared to take care of themselves during disaster situations. The Jamaican evidence shows that the disaster management agencies demonstrate a greater awareness of the drills and knowledge of who to contact, through continuous training and improved interagency cooperation. Communication within and among the various agencies is one of the major challenges for a well functioning disaster management system. Partnership between agencies requires communication and clarification of tasks and procedures in order to utilise the scarce resources available in the most efficient way. Preparedness and cooperation save time and resources by efficient information sharing. This leads to a more accurate and comprehensive response.

Use of information and communications technology (ICT) can be a important way of improving the information sharing process. The ICTs are available in most instances, they simply require utilisation. One way of doing this is to offer adequate training and make straight forward procedures and applications. ICTs need to be a natural part of the daily routine to be useful and facilitate a more efficient operation. Information can easily be saved and shared, allowing the operation to be more accurate and less time consuming. Simultaneous reports from the field make a faster response possible. The decision-makers can

receive the needed information straight away and can make prompt decisions regarding how to respond.

Community-based disaster management activities are a positive way of improving the overall disaster management system in Jamaica. The benefits appear to exceed the initial goal of saving lives and reducing damage to the community. The individuals involved in the activities also gain knowledge and respect from other community members through their efforts. In addition, the community as a whole can greatly benefit from these activities. Committed individuals can expand their visions and together with others in their community, are able to initiate further projects in their own community. These projects lead to income generating activities as well as jobs for individuals. The Jamaican experience with Hurricane Ivan suggests that disaster management and development can go hand in hand at community level and can also provide guidance for wider cooperative efforts between both national and international governments and governmental and non-governmental organisations.

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Appendices

Appendix 1: Sources of primary data - List of interviews – all in 2005

Interview guide 1: National Level Agencies (Kingston) & International Level Agencies

- Office of Disaster Preparedness and Emergency Management (ODPEM)
- Ministry of Labour and Social Security (MLSS)
- Ministry of Local Government
- National Works Agency (NWA)
- Jamaica Fire Brigade
- Jamaica Constabulary Force (Police)
- Jamaica Defence Force (JDF)
- Jamaica Red Cross Head Quarters (JRC HQ)
- Adventist Development and Relief Agency (ADRA)
- United Nations Disaster Assessment and Coordination team (UNDAC)
- International Federation of Red Cross and Red Crescent Societies (IFRC)** (**now IFRC, during Hurricane Ivan a liaison with IFRC from JRC)
- Caribbean Disaster Emergency Response Agency (CDERA)

Interview guide 2:

Parish Level agencies: St. Thomas / St. Catherine

- Ministry of Labour and Social Security, Branch Managers
- Parish Council; Parish Disaster Coordinators
- Jamaica Red Cross; Branch Directors

Interview guide 3:

Community Level:

- Jamaica Red Cross' Community Disaster Response Team (CDRT); Team Leaders

Interview guide 4:

- Jamaica Meteorological Services
- Disaster Mental Health JRC (adapted)

Interview guide 5:

- RJR Communications Group

Interview guide 6:

- Ericsson Jamaica (Ericsson Response)
- Jamaica Red Cross Head quarters (JRC HQ)

Questionnaire: Household Level

- Community members in Yallahs; St. Thomas: 10 shelterees
- Community members in Ewarton; St. Catherine: 10 shelterees

Informal conversations with staff and volunteers; Jamaica Red Cross and ODPEM.

Attended meetings:

- National Emergency Operations Centre staff during Hurricane Wilma,
- Jamaica Red Cross' Community Disaster Response Team refreshers training
- Jamaica Red Cross' Emergency Services' Council meeting.

Appendix 2: Interview guide 1

Interviewee: Date: 2005

Position:

Agency: ODPEM/MLSS/JCF/JDF/Fire/NWA/MLG/ADRA/JRC
UNDAC/CDERA/IFRC (adjusted for int'l agencies)

1. What are the main disaster management agencies in Jamaica?
2. What are the roles of the mentioned agencies?
3. What are the links/lines of communications between those agencies?
4. What is the mission of your agency in disaster management?
5. How does your agency define a disaster?
6. At what stage(s) of a disaster does your agency take part? (Probe: preparedness, response, post-disaster)
7. In a disaster who speaks for your agency?
8. What is your agency's mandate in disaster management?
9. How do the named agencies cooperate before a disaster?
10. How do the named agencies cooperate during a disaster?
11. How do the named agencies cooperate after a disaster?
12. What did your agency do related to Hurricane Ivan in Yallahs?
13. What were the needs in the community?
14. How did you identify those needs?
15. Did you cooperate with other agencies in this specific case? What were they?
16. What was the nature of the cooperation? (Share information? How? Media used?)
17. Where there challenges with that cooperation? If yes, what were they?
18. Were there benefits from that cooperation? If yes, what were they?
19. What did your agency do related to Hurricane Ivan in Ewarton (Nightingale Grove)?
20. What were the needs in the community?
21. How did you identify those needs?
22. Did you cooperate with other agencies in this specific case? What were they?
23. What was the nature of the cooperation? (Share information? How? Media used?)
24. Where there challenges with that cooperation? If yes, what were they?
25. Were there benefits from that cooperation? If yes, what were they?
26. What kinds of data did you collect from the affected areas? (Refer to MLSS assessment form, was it used? Why/why not?)
27. How do you use the information collected from the field?

28. Do you share the data/information? If so, with whom? How?
29. What kind of information (warnings, evacuation notice, situation reports, assistance etc.) did you share with affected community members?
30. How did you share information with the affected areas (types of medium)?
31. What types of Information and Communications Technologies are available for your agency's use in disaster management?
32. Who are the available ICT intended to benefit and used by? Management? Community?
33. What types of ICT did you use in the case of Hurricane Ivan? (Probe: some not used? Why?)
34. What are your back-up solutions for information sharing with affected areas? (Probe: roads are blocked, internet fails, mobile network is down, batteries for radios/mobiles are dead etc?)
35. How did you acquire this equipment? (Own funds, donors, private sector agreements?)
36. [If agreements. How does this agreement function? Benefits? Challenges?] (JRC additional questions added here for JRC HQ.)
37. Did you make any changes to routines/operations following Ivan (Sept,'04)? If so, explain.
38. Are there any external factors influencing/challenging your work? (eg. Politics, economics, volunteers, training). Please explain.
39. Is there anything that emerged from the Hurricane Ivan experience that has policy implications? (Probe: If so, have you done anything about it?)
40. Do you have any additional information that could be useful for me to know? If so, What?

Appendix 3: Interview guide 2

Interviewee: Date: 2005

Position:

Agency: PDC/MLSS/JRC – St.Thomas/St.Catherine

1. What are the main disaster management agencies in Jamaica?
2. What are the roles of the mentioned agencies?
3. What are the links/lines of communications between those agencies?
4. What is the mission of your agency in disaster management?
5. How does your agency define a disaster?
6. At what stage(s) of a disaster does your agency take part? (Probe: preparedness, response, post-disaster)
7. In a disaster who speaks for your agency?
8. What is your agency's mandate in disaster management?
9. How do the named agencies cooperate before a disaster?
10. How do the named agencies cooperate during a disaster?
11. How do the named agencies cooperate after a disaster?
12. What did your agency do related to Hurricane Ivan in Yallahs/Ewarton(Nighingale Grove)?
13. What were the needs in the community?
14. How did you identify those needs?
15. Did you cooperate with other agencies in this specific case? What were they?
16. What was the nature of the cooperation? (Share information? How? Media used?)
17. Where there challenges with that cooperation? If yes, what were they?
18. Were there benefits from that cooperation? If yes, what were they?
26. What kinds of data did you collect from the affected areas? (Refer to MLSS assessment form, was it used? Why/why not?)
27. How do you use the information collected from the field?
28. Do you share the data/information? If so, with whom? How?
29. What kind of information (warnings, evacuation notice, situation reports, assistance etc.) did you share with affected community members?
30. How did you share information with the affected areas (types of medium)?
31. What types of Information and Communications Technologies are available for your agency's use in disaster management?
32. Who are the available ICT intended to benefit and used by? Management? Community?
33. What types of ICT did you use in the case of Hurricane Ivan? (Probe: some not used? Why?)
34. What are your back-up solutions for information sharing with affected areas? (Probe: roads are blocked, internet fails, mobile network is down, batteries for radios/mobiles are dead etc?)

35. How did you acquire this equipment? (Own funds, donors, private sector agreements?)
36. [If agreements. How does this agreement function? Benefits? Challenges?] (JRC additional questions added here for JRC HQ.)
37. Did you make any changes to routines/operations following Ivan (Sept,'04)? If so, explain.
38. Are there any external factors influencing/challenging your work? (eg. Politics, economics, volunteers, training). Please explain.
39. Is there anything that emerged from the Hurricane Ivan experience that has policy implications? (Probe: If so, have you done anything about it?)
40. Do you have any additional information that could be useful for me to know? If so, What?

Appendix 4: Interview guide 3

Interviewee: Date: Dec 2005

Position:

Agency: Community Disaster Response Team – Team leader Ewarton/Yallahs

1. How often has your community been affected by a disaster? What types of disasters?
2. Do you have a disaster response team in your community?
3. Who are the members of the team?
4. What is the team's role in disaster management?
5. What kind of training is provided for the team?
6. If training, by who?
7. How long has the team been operating?
8. How successful do you consider the operation of the team?
9. Do the team's efforts benefit the affected community and its members? If yes, specify how.
10. What kind of external assistance do you receive in case of a disaster?
11. As a community response Team leader, what kind of external assistance would you wish to receive in case of a disaster?

Hurricane Ivan:

12. How was your community affected by the hurricane?
13. How did you get information (warnings etc) about the hurricane? Type of medium; radio, TV, mobile, internet, landline, email, paper reports, personal conversations at site, laud speakers etc.). From who?
14. What were these needs for assistance in the community? (food, bedding, water & sanitation, medicines, shelter, other.
15. Who were the assisting agencies?
16. By whom were these needs recognized/acknowledged?
17. How did you pass on your needs (type of medium; mobile, mass media, landline, email, paper reports, personal conversations at site, laud speakers etc.) to access assistance? To whom did you pass on the needs?
18. What did you expect of external assistance?
19. Did you receive it?
20. Did you receive assistance from within the community? If yes, What form did the assistance take?
21. How do you perceive the importance of the community response team for the Hurricane Ivan response for your community?
22. Overall, did the community receive the needed assistance? Explain.
23. Did you make any changes to routines/operations following Ivan (Sept,'04)? If so, explain.
24. Are there any external factors influencing/challenging your work? (eg. Politics, economics, volunteers, training). Please explain. (Probe: What? How?)
25. Is there anything else about your hurricane Ivan experience that stands out that you would like to mention?

Appendix 5: Interview guide 4

Interviewee: Date: 2005

Position:

Agency: Jamaica Meteorological Services / Jamaica Red Cross Disaster Mental Health Unit

1. Do you have a role in disaster and emergency management in Jamaica? If yes, What is it? (Probe: Pre-disaster, during, post-disaster)
2. (If not mentioned above) Do you have a disaster plan/strategy/policy? If so, what are the key elements? Explain.
3. (If not already told) What type of services do you provide?
4. Who are the receivers of your services? (ODPEM/Government & Public)
5. How do you share your information? (Probe: mass media, fax, internet; email/web page) With whom? (Probe: ODPEM/Government/Management agencies & Public)
6. [Which medium do you use to provide your information?]
7. (If not already told) In case of power shutdown eg, do you have any backup plan for receiving/providing your services?
8. Did you make any changes to routines/operations following Ivan (Sept,'04)? If so, explain.
9. Are there any external factors influencing/challenging your work? (eg. Politics, economics, volunteers, training). Please explain. (Probe: What? How?)
10. Do you have any additional information that could be useful for me to know? If so, What?

Appendix 6: Interview guide 5

Interviewee: Date: 2005

Position:

Agency: RJR Communications Group

1. What is your role in disaster management in Jamaica?
2. Do you have a disaster plan/strategy/policy? If so, what are the key elements? Explain.
3. What type of services do you provide?
4. Who are the receivers of your services?
5. What types of data/information do you receive?
6. Where and who do you access your data/information?
7. By which medium do you access this data/information?
8. What types of data/information do you deliver?
9. Do you have a special relationship with ODPEM? If so, what is it?
10. Which media do you use to provide information? (radio, TV, internet etc.)
11. In case of power shutdown eg, do you have any backup plan for receiving/providing your services?
12. Did you make any changes to routines/operations following Ivan (Sept,'04)? If so, explain.
13. Are there any external factors influencing/challenging your work? (eg. Politics, economics, volunteers, training). Please explain.
14. Do you have any additional information that could be useful for me to know? If so, What?

Appendix 7: Interview guide 6

Interviewee: Date: 2005

Position:

Agency: Ericsson Jamaica - Ericsson Response / Jamaica Red Cross Headquarters

1. Is there an agreement between International Federation of Red Cross and Red Crescent Societies (IFRC) and Ericsson Response (ER)? If so, how did it come about?
2. What are the key elements of the agreement between IFRC and ER? (Probe: What kinds of ICTs are available? Personnel?)
3. What is the purpose of this agreement?
4. How is this agreement intended to work in practise?
5. How did it work in the case of Hurricane Ivan?
6. Who are the intended users of the equipment?
7. Does it require any training to operate? If so, is the training available? For who? By who? How many persons have been trained in Jamaica to use this equipment?
8. I believe that an agreement on international level is expected to benefit the affected persons and communities on the ground. How is it reaching the community and its members? What is expected to reach the community? Faster response? The right response to mapped needs? In theory and practise? Please explain.
9. Did your agency benefit from the agreement related to Ivan? In general? If so, How? What? Explain.
10. Do you experience any challenges with this agreement (considering the cooperation of a private sector company and a humanitarian organisation)? If yes, what is it?
11. What are the areas of possible improvement in this cooperative agreement for Jamaica?
12. Did you make any changes to routines/operations following Ivan (Sept,'04)? If so, explain.
13. Are there any external factors influencing/challenging your work? (eg. Politics, economics, volunteers, training). Please explain.
14. Do you have any additional information that could be useful for me to know? If so, What?

Appendix 8: Household questionnaire

Date:

Household

1. Name (HHH):

2. Household:

Adults: _____

Children (age, Sep '04): _____

3. Community:

___

___ Other _____

Shelter

4. Shelter: __
__ Other _____

5. Days in shelter: ___

6. First time in shelter related to Hurricane Ivan?
___ Yes

___ No - When? Where? Why? _____

Community Disaster Response Team

7. Do you have a disaster response team in your community? ___ Yes ___ No (Go to question 10)

8. Who are the members of the team?

9. What is the team doing for your community?

Hurricane Ivan

10. How did you hear about the hurricane?
___ Radio ____ Friends/Family ____ Other:_____

___ TV ____ Community disaster response team

11. How did you prepare?

12. How were you affected by the hurricane?

13. How did you know about the shelter?

14. What were your needs for assistance?
____ Shelter ____ Food ____ Baby food ____ Medicine ____ Water

___ Other: _____

15. How where these needs met?

16. What kind of assistance did you expect to receive?

17. Is there anything you learnt from your hurricane Ivan experience? If yes, what?
____ Yes _____

_____

____ No

18. Is there anything you would do differently to prepare for a next hurricane? If yes, what?
____ Yes _____

_____

____ No

19. Are there any external factors influencing/challenging your situation related to preparing for hurricanes? Please explain.
____ Economic situation of HH ____ Politics ____ Training ____ Other:_____

_____

20. Is there anything else about your hurricane Ivan experience that stands out that you would like to mention?